

Plenary Meeting #9, Oahu, Hawaii
20th – 22nd September 2000.

Source: TSG_N WG 3
Title: CRs to R99 Work Item T.E.I (multimedia) part 1 of 2
Agenda item: 8.6.3
Document for: APPROVAL

Introduction:

This document contains 7 CRs on **R99 Work Item T.E.I (multimedia)**, that has been agreed by **TSG_N WG3**, and is forwarded to TSG_N Plenary meeting #9 for approval.

Doc-2nd-	Spec	CR	Rev	Phase	Subject	Cat	Version-Current
N3-000456	03.10	A012		R99	32kbit/s UDI/RDI multimedia	F	8.1.0
N3-000474	04.21	A018		R99	32kbit/s UDI/RDI multimedia	F	8.1.0
N3-000455	08.20	A008		R99	32kbit/s UDI/RDI multimedia	F	8.1.0
N3-000453	27.001	031		R99	32kbit/s UDI/RDI multimedia	F	3.5.0
N3-000459	27.001	032		R00	32kbit/s UDI/RDI multimedia	A	4.0.0
N3-000458	29.007	029		R00	32kbit/s UDI/RDI multimedia	A	3.5.0
N3-000452	29.007	030		R99	32kbit/s UDI/RDI multimedia	F	3.5.0

6.1.1 Rate adaptation

The RA0 rate adaptation is only used with asynchronous interfaces. Incoming asynchronous data is padded by the addition of stop elements to fit the same or nearest higher synchronous rate defined by 2^n (where $n \leq 6$) times 600 bit/s, 14.4 kbit/s or 28.8 kbit/s. Thus 300 bit/s user data signalling rate shall be adapted to a synchronous 600 bit/s stream. This function is described in GSM 04.21. The RA0 used in GSM is not identical to that described in ITU-T Recommendation V.110 which converts the 14,4 and 28,8 kbit/s user rates to 19,2 and 38,4 kbit/s, respectively.

The intermediate rate adaptation function (RA1) is a rate adaptation function which turns either the output of the RA0 function or a synchronous user data stream into a data stream at 8, 16, or 32 kbit/s by bit repetition and frame addition. This function is described in GSM 04.21.

The adaptation of intermediate rates to 64 kbit/s (RA2) performs the final conversion from the intermediate rates generated by the RA1 function to 64 kbit/s.

The radio interface intermediate rate adaptation function (RA1') is in the case of transparent data transmission a variant of the RA1 function and it adapts synchronous user data stream or the output of the RA0 function to one of the following data rates: 3.6, 6.0 or 12.0 or 14.5 kbit/s over the radio path. In case of a TCH/F28.8 channel two 14.5 kbit/s substreams produced by the RA1' function are multiplexed into a 29.0 kbit/s air interface channel by an EDGE multiplexing function. For the non-transparent case, the RA1' function provides direct access to the 12.0 or 6.0 kbit/s data rates. This is achieved by allowing the V.110 frame status bits to be used as additional data bits. This function is described in GSM 04.21 and GSM 08.20. RA1' is not applied in TCH/F14.4 or EDGE non-transparent operation.

For TCH/F14.4 channel coding three GSM-specific adaptation functions are used: namely, RA1'/RAA', RAA', and RAA'' (GSM 08.20). On the network side of the air interface, the 14.5 kbit/s substreams multiplexed into a 29.0 or 43.5 kbit/s air interface channel are transferred just as in a multislot connection of TCH/F14.4 substreams. RA1'/RAA' adapts between the 14.5 air-interface rate and the 16 kbit/s rate used across the Abis-interface. RAA' adapts between the 16 kbit/s Abis Interface-rate and 16.0 kbit/s A-interface substream. (Up to four such A-interface substreams may be multiplexed into the 64kbit/s A-interface stream). RAA'' converts between the A-interface data substream(s) and the overall synchronous stream. In non-transparent operation the RAA'' converts between the A-interface stream and the 290-bit blocks containing bits M1, M2, and 288 data bits as described in GSM 04.21.

In multislot data configurations the intermediate rates 16, 32, and 64 kbit/s are supported on those sections of the network where the overall data stream is not split into multiple channels (GSM 04.21 and 08.20). RA1-adaptation is not applied to rates higher than 38.4 kbit/s. Instead, a GSM-specific rate adaptation function RA1'' to user rates 48 and 56 kbit/s is applied; this function adapts between these rates and the 64 kbit/s "intermediate" rate. The RA2 function passes rate 64 kbit/s on as such.

In multislot data connections, the rate adaptation functions are performed per TCH/F between the Split/Combine-functions. On the A-interface up to four TCH/Fs are multiplexed into one 64 kbit/s channel according to the procedures defined in GSM 08.20. However, multiplexing is not applied to those user rates which make use of more than four TCH/Fs; for such rates the Split/Combine-function is located at the BSS.

The splitting and recombining of the data flow into/from TCH/Fs takes place at the RA1-function or RAA' function (transparent service) at the MSC/IWF and at the MS's RA1/RA1'- or RA1'-function, or between the RLP and RA1' (RA1' not applied to TCH/F14.4) (non-transparent service) at the MS and between RA1 or RAA'' and RLP at MSC/IWF (figures 6 and 7). The TCH/Fs are treated as independent channels between the Split/Combine-functions.

For user rates requiring more than four TCH/Fs (transparent only) the Split/Combine-function is located at the RA1/RA1'-or RA1'-function at the MS and at the RA1'/RA1-function at the BSS (figures 6 and 7). The rate adaptation functions for the various user data rates are summarized in tables 1 to 3. It should be noted that in the case of synchronous data transmission, the RA0 is not present.

For 56 and 64 kbit/s connections using a $2 \times$ TCH/F32.0 channel configuration across the radio interface, no rate adaptation is applied as the PLMN offers a '64 kbit/s pipe' between TE and an external network.

For 32 kbit/s connections using a $1 \times$ TCH/F32.0 channel configuration across the radio interface, the ITU-T I.460 rate adaptation is applied as described in GSM TS 04.21.

Table 1: Rate adaptation functions for the support of TE2 in the transparent case

R I/F	RA0	RA1'	Radio I/F
async			
2.4	<----->	<----->	3.6
4.8	<----->	<----->	6.0
9.6	<----->	<----->	12.0 or 2 × 6.0
14.4	<----->	<----->	14.5 or 2 × 12.0 or 3 × 6.0
19.2	<----->	<----->	2 × 12.0 or 4 × 6.0
28.8	<----->	<----->	1 × 29.0 or 2 × 14.5 or 3 × 12.0
38.4	<----->	<----->	3 × 14.5 or 4 × 12.0
			4 × 14.5 or 5 × 12.0
			2 × 32.0 or 4 × 14.5 or 5 × 12.0 note 1
			2 × 32.0 or 5 × 14.5 or 6 × 12.0 note 1

NOTE 1: AIUR of 11.2 kbit/s per 12.0 kbit/s air interface channel (GSM 04.21).

Table 2: Rate adaptation functions for the support of TE1/TA in the transparent case

RA0	RA1	RA2	S I/F	RA2	RA1/RA1'	Radio I/F
async						
2.4	<----->	8	64	8	<----->	3.6
4.8	<----->	8	64	8	<----->	6.0
9.6	<----->	16	64	16	<----->	12.0 or 2 × 6.0
14.4	<----->	32	64	32	<----->	14.5 or 2 × 12.0 or 3 × 6.0
19.2	<----->	32	64	32	<----->	2 × 12.0 or 4 × 6.0
28.8	<----->	64	64	64	<----->	1 × 29.0 or 2 × 14.5 or 3 × 12.0
38.4	<----->	64	64	64	<----->	3 × 14.5 or 4 × 12.0
		64	64	64	<----->	4 × 14.5 or 5 × 12.0 note 1
		64	64	64	<----->	2 × 32.0 or 4 × 14.5 or 5 × 12.0 notes 1, 2
		64	64	64	<----->	2 × 32.0 or 5 × 14.5 or 6 × 12.0 notes 1, 2

NOTE 1: RA2 not applicable.

NOTE 2: AIUR of 11.2 kbit/s per 12.0 kbit/s air interface channel (GSM 04.21).

Table 3: RA1' function in the non-transparent case

RA1'
6.0 <-----> 6.0
12.0 <-----> 12.0

NOTE: RA1' not applicable to TCH/F14.4, TCH/F28.8, or TCH/F43.2

6.3.2 Information transfer rate (kbit/s)

Attribute values for connection elements:

3.6 or 6.0 or 12.0 or 13.0 or 14.5 or 29.0 or 32.0 or 43.5 or 64.0

or $n \times 6.0$ ($1 \leq n \leq 4$) or $n \times 12.0$ ($1 \leq n \leq 6$) or $n \times 14.5$ ($1 \leq n \leq 5$) or 2×29.0 or 2×32.0

Attribute values for overall connection type:

3.6 or 6.0 or 12.0 or 13.0 or 14.5 29.0 or 32.0 or 43.5 or 64.0;

or $n \times 6.0$ ($1 \leq n \leq 4$) or $n \times 12.0$ ($1 \leq n \leq 6$) or $n \times 14.5$ ($1 \leq n \leq 5$) or 2×29.0 or 2×32.0 ..

Association Law:

The value for the overall connection type will be equal to the lowest value of any of its connection elements.

6.3.11 Further attributes and attribute values

This subclause has outlined the relationships between those attributes values presently existing, the possibility for new values being added remains.

Table 4 summarizes the attributes values for GSM PLMN connection elements.

Table 4: Values for attributes for GSM PLMN connection elements

Attributes	Values for attributes	
	Radio interface connection element	A interface connection element
1 Information Transfer Mode	Circuit	Circuit
2 Information Transfer Rate Layer 1	3.6 or 6.0 or 12.0 or 13.0 or 14.5 or 29.0 or 32.0 or 43.5 or $n \times 6.0$ ($1 \leq n \leq 4$) or $n \times 12.0$ ($1 \leq n \leq 6$) or $n \times 14.5$ ($1 \leq n \leq 5$) or 2×29.0 or 2×32.0 kbit/s	64.0 kbit/s
3 Information Transfer Susceptance	Speech processing equipment, Echo suppression equipment, Null	Speech processing equipment, Echo suppression equipment, Null
4 Establishment of Connection	Demand	Demand
5 Symmetry	Bidirectional symmetric Bidirectional asymmetric	Bidirectional symmetric Bidirectional asymmetric
6 Connection Configuration Topology	Point-to-point	Point-to-point
7 Structure	Unstructured SDU integrity	Unstructured SDU integrity
8 Channel Rate Information Channel Signalling Channel	TCH/F(s) or TCH/H Dm	64.0 kbit/s Common channel signalling system
9 Connection Control Protocol Layer 1 Layer 2 Layer 3	GSM 04.03 and 05 series GSM 04.05 and 04.06 GSM 24.007, 24.008, 24.011	GSM 08.04 GSM 08.06 GSM 24.007, 24.008, 08.08
10 Information Transfer Coding/Protocol Layer 1 Layer 2 Layer 3	GSM 04.21 05 and 06 series GSM 24.022 and 27.002 or 24.022 and 27.003 04.06 or transparent Transparent, 24.011	GSM 08.04 and 08.20 GSM 24.022 and 27.002 or 24.022 and 27.003 or transparent Transparent

6.6 Limited set of GSM PLMN connection types (for EDGE channels)

Figure 8 provides the information transfer protocol models for the identified set of GSM PLMN connection types for support of TCH/F28.8 or TCH/F43.2. The description of models given in subclause 6.4 applies also to figure 8.

When a TCH/F28.8 channel is used in multislot configurations, multiple EDGE multiplexing functions are applied on both sides of the air-interface; i.e. one multiplexing function — on each side of the air interface — is associated with each air-interface channel.

When TCH/F32.0 channels are ~~only~~ used in double slot configurations, (for details refer to GSM 04.21). No rate adaptation is applied as the PLMN offers a '64 kbit/s pipe' between TE and an external network. When TCH/F32.0 channels are used in single slot configurations, the ITU-T I.460 rate adaptation is applied. (For details refer to GSM 04.21).

Table 5: Relationship between Bearer services and GSM PLMN Connection elements

Connection description	Bearer service user data rate	Radio interface connection element	Intermediate rate at the BSS-MSC interface	BSS-MSC connection element	Protocol model in figure 6, 7 or 8
Circuit mode unstructured with unrestricted digital capability transparent.	Data circuit duplex async $n \times 4\,800$ ($n \leq 4$) or $n \times 9\,600$ bit/s ($n \leq 4$). Data circuit duplex sync $n \times 4\,800$ ($n \leq 4$) or $n \times 9\,600$ bit/s ($n \leq 5$) or $n \times 1\,200$ bit/s ($n = 5$ or 6).	cct mode unstructured unrestricted $n \times 6$ kbit/s ($n \leq 4$) or $n \times 12$ kbit/s ($n \leq 6$) on n full rate channels.	8 or 16 kbit/s per TCH/F. For data connections using 5 or 6 TCH/Fs no intermediate rate(s) .	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 1 d, 1 e, 2 d, 2 e
	Data circuit duplex async $n \times 14\,400$ bit/s ($n \leq 3$). Data circuit duplex sync $n \times 14\,400$ bit/s ($n \leq 5$)	cct mode unstructured unrestricted $n \times 14.5$ kbit/s ($n \leq 5$) on n full rate channels	16 kbit/s per TCH/F.	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 1 d, 1 e, 2 d, 2 e
	Data circuit duplex async 28 800 bit/s. Data circuit duplex sync 28 800 bit/s <u>Data circuit duplex Sync 32 000 bit/s</u> Data circuit duplex sync 64 000 bit/s	cct mode unstructured unrestricted 29.0 kbit/s on full rate channel <u>cct mode unstructured unrestricted 32 kbit/s on full rate channel</u> cct mode unstructured unrestricted 2 x 32.0 kbit/s on full rate channels	16 kbit/s per TCH/F. <u>32 kbit/s</u> No intermediate rate for the 64 000 bit/s rate	cct mode unstructured unrestricted 64 kbit/s.	Fig 8 : 1 a, 1 b, 2 a, 2 b None
	Data circuit duplex async 14 400 bit/s Data circuit duplex sync 14 400 bit/s	cct mode unstructured unrestricted 14.5 kbit/s on full rate Channel	16 kbit/s	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 1 a, 1 b 2 a, 2 b
	Data circuit duplex async 9 600 bit/s. Data circuit duplex sync 9 600 bit/s.	cct mode unstructured unrestricted 12 kbit/s on full rate channel.	16 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 1 a, 1 b Fig 6 2 a, 2 b
	Data circuit duplex async 4 800 bit/s. Data circuit duplex sync 4 800 bit/s.	cct mode unstructured unrestricted 6 kbit/s on full rate channel and half rate channel.	8 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 1 a, 1 b Fig 6 2 a, 2 b
	Data circuit duplex async 300. Data circuit duplex async 1 200. Data circuit duplex async 2 400. Data circuit duplex sync 1 200. Data circuit duplex sync 2 400.	cct mode unstructured unrestricted 3.6 kbit/s on full rate channel and half rate channel.	8 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 1 a, 1 b Fig 6 1 a, 1 b Fig 6 1 a, 1 b Fig 6 2 a, 2 b Fig 6 2 a, 2 b

Connection description	Bearer service user data rate	Radio interface connection element	Intermediate rate at the BSS-MSC interface	BSS-MSC connection element	Protocol model in figure 6, 7 or 8
Circuit mode unstructured with unrestricted digital capability non transparent.	Data circuit duplex async $n \times 4\,800$ ($n \leq 4$) or $n \times 9\,600$ bit/s ($n \leq 4$).	cct mode SDU unrestricted $n \times 6$ kbit/s ($n \leq 4$) or $n \times 12$ kbit/s ($n \leq 4$) on full rate channels.	8 or 16 kbit/s per TCH/F.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 3 d, 3 e
	Data circuit duplex async $n \times 14\,400$ bit/s ($n \leq 4$).	cct mode SDU unrestricted $n \times 14.5$ kbit/s ($n \leq 4$) on full rate channels.	16 kbit/s	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 3 d, 3e
	Data circuit duplex async $n \times 28\,800$ bit/s ($n \leq 2$). Data circuit duplex async 43 200 bit/s	cct mode SDU unrestricted $n \times 29.0$ kbit/s ($n \leq 2$) on full rate channels. cct mode SDU unrestricted 43.5 kbit/s on a full rate channel.	16 kbit/s per TCH/F. 16 kbit/s per TCH/F.	cct mode unstructured unrestricted 64 kbit/s.	Fig 8 : 3a, 3 b
	Data circuit duplex async 14 400 bit/s	cct mode SDU unrestricted 14.5 kbit/s on full rate channel	16 kbit/s	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 3 a, 3 b
	Data circuit duplex async 9 600 bit/s.	cct mode SDU unrestricted 12 kbit/s on full rate channel.	16 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 3 a, 3 b
	Data circuit duplex async 4 800 bit/s.	cct mode SDU unrestricted full rate channel, 12 kbit/s or half rate channel, 6 kbit/s.	16 kbit/s FR 8 kbit/s HR.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 3 a, 3 b
	Data circuit duplex async 300. Data circuit duplex async 1 200. Data circuit duplex async 2 400.	cct mode SDU unrestricted full rate channel, 12 kbit/s or half rate channel, 6 kbit/s.	16 kbit/s FR 8 kbit/s HR.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6: 3 a, 3 b Fig 6 : 3 a, 3 b Fig 6 3 a, 3 b

Connection description	Bearer service user data rate	Radio interface connection element	Intermediate rate at the BSS-MSC interface	BSS-MSC connection element	Protocol model in figure 6, 7 or 8
Circuit mode unstructured with 3.1 kHz audio ex PLMN transparent.	Data circuit duplex async $n \times 4\,800$ bit/s ($n \leq 4$) or $n \times 9\,600$ bit/s ($n \leq 3$). Data circuit duplex sync $n \times 4\,800$ bit/s ($n \leq 4$) or $n \times 9\,600$ bit/s ($n \leq 3$).	cct mode unstructured unrestricted $n \times 6$ kbit/s ($n \leq 4$) or $n \times 12$ kbit/s ($n \leq 3$) on n full rate channels.	8 or 16 kbit/s TCH/F.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 1 d, 1 e, 2 d, 2 e
	Data circuit duplex async $n \times 14\,400$ bit/s ($n \leq 2$). Data circuit duplex sync $n \times 14\,400$ bit/s ($n \leq 2$)	cct mode unstructured unrestricted $x \times 14.5$ kbit/s ($n \leq 2$) on n full rate channels	16 kbit/s per TCH/F	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 1 d, 1 e, 2 d, 2e
	Data circuit duplex async 28 800 bit/s. Data circuit duplex sync 28 800 bit/s	cct mode unstructured unrestricted 29.0 kbit/s on a full rate channel	16 kbit/s per TCH/F.	cct mode unstructured unrestricted 64 kbit/s.	Fig 8 : 1 a, 1 b, 2 a, 2 b
	Data circuit duplex asynch 14 400 bit/s synch 14 400 bit/s	cct mode unstructured unrestricted 14.5 kbit/s on full rate channels	16 kbit/s	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 1 a, 1 b for asynch Fig 7 2 a 2 b for synch
	Data circuit duplex async 9.6 kbit/s sync 9.6 kbit/s.	cct mode unstructured unrestricted 12 kbit/s full rate channel.	16 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 1 a, 1 b for asynch. Fig 6 : 2 a, 2 b for synch.
	Data circuit duplex async 4.8 kbit/s sync 4.8 kbit/s.	cct mode unstructured unrestricted 6 kbit/s full and half rate channel.	8 kbit/s.		
	Data circuit duplex async $\leq 2\,400$ sync $\leq 2\,400$.	cct mode unstructured unrestricted 3.6 kbit/s full and half rate channel.	8 kbit/s.		

Connection description	Bearer service user data rate	Radio interface connection element	Intermediate rate at the BSS- MSC interface	BSS-MSC connection element	Protocol model in figure 6, 7 or 8
Circuit mode unstructured with 3.1 kHz audio ex PLMN non transparent.	Data circuit duplex asynch $n \times 4\ 800$ ($n \leq 4$) or $n \times 9\ 600$ ($n \leq 4$) bit/s. Data circuit duplex sync $n \times 4\ 800$ ($n \leq 4$) or $n \times 9\ 600$ bit/s ($n \leq 4$).	cct mode SDU unrestricted $n \times 6$ kbit/s ($n \leq 4$) or $n \times 12$ kbit/s ($n \leq 4$) on full rate channels.	8 or 16 kbit/s per TCH/F.	cct mode unstructured unrestricted 64 kbits/s.	Fig 6 : 3 d, 3 e for asynch. Fig 6 : 4 d, 4 e, 4 f for sync.
	Data circuit duplex asynch $n \times 14\ 400$ bit/s ($n \leq 4$). Data circuit duplex sync $n \times 14\ 400$ bit/s ($n \leq 4$).	cct mode SDU unrestricted $n \times 14.5$ kbit/s ($n \leq 4$) on n full rate channels	16 kbit/s per TCH/F	cct mode unstructured unrestricted 64 kbits/s.	Fig 7 : 3 d, 3 e for asynch Fig 7 : 4 d, 4 e 4 f for synch
	Data circuit duplex asynch 28 800 bit/s. Data circuit duplex asynch 43 200 bit/s	cct mode SDU unrestricted 29.0 kbit/s on a full rate channel. cct mode SDU unrestricted 43.5 kbit/s on a full rate channel.	16 kbit/s per TCH/F. 16 kbit/s per TCH/F.	cct mode unstructured unrestricted 64 kbits/s.	Fig 8 : 3a, 3 b
	Data circuit duplex sync 28 800 bit/s	cct mode SDU unrestricted 29.0 kbit/s on a full rate channel.	16 kbit/s per TCH/F.	cct mode unstructured unrestricted 64 kbits/s.	Fig 8 : 4a, 4 b, 4c
	Data circuit duplex asynch 14 400 bit/s synch 14 400 bit/s	cct mode SDU unrestricted 14.5 kbit/s full rate channel	16 kbit/s	cct mode unstructured unrestricted 64 kbits/s.	Fig 7 : 3a, 3b for asynch Fig 7 : 4 a, 4 b, 4 c for synch
	Data circuit duplex asynch 9.6 kbit/s sync 9.6 kbit/s.	cct mode SDU unrestricted 12 kbit/s full rate channel.	16 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 3 a, 3 b for asynch. Fig 6 : 4 a, 4 b, 4 c for synch.
	Data circuit duplex asynch 4.8 kbit/s sync 4.8 kbit/s.	cct mode SDU unrestricted half rate channel, 6 kbit/s or full rate channel, 12 kbit/s.	16 kbit/s FR 8 kbit/s HR.		
	Data circuit duplex asynch $\leq 2\ 400$ sync $\leq 2\ 400$.	cct mode SDU unrestricted half rate channel, 6 kbit/s or full rate channel, 12 kbit/s.			

Table 5 (continued): Relationship between Bearer services and GSM PLMN Connection elements

Connection description	Bearer service user data rate	Radio interface connection element	Intermediate rate at the BSS-MSC interface	BSS-MSC connection element	Protocol model in figure 6, 7 or 8
Packet services basic access transparent.	Data circuit duplex sync $n \times 4\,800$ ($n \leq 4$) or $n \times 9\,600$ bit/s ($n \leq 5$) or $n \times 11\,200$ bit/s ($n = 5$ or 6).	cct mode unstructured unrestricted $n \times 6$ kbit/s ($n \leq 4$) or $n \times 12$ kbit/s ($n \leq 6$) on n full rate channels.	8 or 16 kbit/s per TCH/F. For data connections using 5 or 6 TCH/Fs no intermediate rate(s).	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 2 d, 2 e
	Data circuit duplex sync $n \times 14\,400$ bit/s ($n \leq 5$)	cct mode unstructured unrestricted $n \times 14.5$ kbit/s ($n \leq 5$) on n full rate channels.	16 kbit/s per TCH/F	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 2 d, 2 e
	Data circuit duplex synch 14 400 bit/s	cct mode unstructured unrestricted 14.5 kbit/s on full rate channel.	16 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 2 a, 2 b
	Data circuit duplex sync 9 600 bit/s.	cct mode unstructured unrestricted 12 kbit/s on full rate channel.	16 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 2 a, 2 b
	Data circuit duplex sync 4 800 bit/s.	cct mode unstructured unrestricted 6 kbit/s on full rate channel and half rate channel.	8 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 2 a, 2 b
	Data circuit duplex sync 2 400 bit/s.	cct mode unstructured unrestricted 3.6 kbit/s on full rate channel and half rate channel.	8 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 2 a, 2 b

Connection description	Bearer service user data rate	Radio interface connection element	Intermediate rate at the BSS-MSC interface	BSS-MSC connection element	Protocol model in figure 6, 7 or 8
Packet services basic access non transparent.	Data circuit duplex sync $n \times 4\,800$ ($n \leq 4$) or $n \times 9\,600$ bit/s ($n \leq 4$).	cct mode SDU unrestricted $n \times 6$ kbit/s ($n \leq 4$) or $n \times 12$ kbit/s ($n \leq 4$) on full rate channels.	8 or 16 kbit/s per TCH/F.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 4 d, 4 e, 4 f
	Data circuit duplex sync $n \times 14\,400$ bit/s ($n \leq 4$).	cct mode SDU unrestricted $n \times 14.5$ kbit/s ($n \leq 4$) on full rate channels	16 kbit/s per TCH/F	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 4 d, 4 e, 4 f
	Data circuit duplex sync $n \times 28\,800$ bit/s ($n \leq 2$).	cct mode SDU unrestricted $n \times 29.0$ kbit/s ($n \leq 2$) on full rate channels	16 kbit/s per TCH/F	cct mode unstructured unrestricted 64 kbit/s.	Fig 8 : 4 a, 4 b, 4 c
	Data circuit duplex sync 43 200 bit/s.	cct mode SDU unrestricted 43.5 kbit/s on a full rate channel	16 kbit/s per TCH/F		Fig 8 : 4 a, 4 b, 4 c
	Data circuit duplex synch 14 400 bit/s	cct mode SDU unrestricted 14.5 kbit/s on full rate channel	16 kbit/s	cct mode unstructured unrestricted 64 kbit/s.	Fig 7 : 4 a, 4 b, 4 c
	Data circuit duplex sync 9 600 bit/s.	cct mode SDU unrestricted 12 kbit/s on full rate channel.	16 kbit/s.	cct mode unstructured unrestricted 64 kbit/s.	Fig 6 : 4 a, 4 b, 4 c
	Data circuit duplex sync 4 800 bit/s.	cct mode SDU unrestricted full rate channel, 12 kbit/s or half rate channel, 6 kbit/s.	16 kbit/s FR 8 kbit/s HR.	cct mode unstructured unrestricted 64 kbit/s.	4 a,b,c
	Data circuit duplex sync 2 400 bit/s.	cct mode SDU unrestricted full rate channel, 12 kbit/s or half rate channel, 6 kbit/s.	16 kbit/s FR 8 kbit/s HR.	cct mode unstructured unrestricted 64 kbit/s.	4 a,b,c

Annex A (informative): List of definitions of GSM PLMN connection type attributes and values

A.1 Attribute definition and their values

Information transfer mode:

This attribute describes the operational mode for transferring (transportation and switching) user information through a GSM PLMN connection in the network.

Value: - Circuit

Information transfer capability:

This attribute describes the capability associated with the transfer of different types of information through a GSM PLMN connection.

Values: - Unrestricted digital information

- Speech

- Group 3 facsimile

- 3.1 kHz audio ex PLMN

- Restricted digital information (Note: this value is signalled in the "Other ITC" element, due to a lack of further code points in the "ITC" element.)

Information transfer rate:

This attribute describes either the bit rate (circuit mode) or the throughput (packet mode, for further study). It refers to the transfer of digital information on a GSM PLMN connection.

Values: - Appropriate bit rate

- Throughput rate

Establishment of connection:

This attribute describes the mode of establishment used to establish and release GSM PLMN connections.

Value: - Demand

Symmetry:

This attribute describes the relationship of information flow between two (or more) access points or reference points involved in a GSM PLMN connection.

Values: - Bidirectional symmetric

- Bidirectional asymmetric (Multislot configurations for data)

Connection configuration:

This attribute describes the spatial arrangement for transferring information on a given GSM PLMN connection.

Value: - Point-to-point

Structure:

This attribute refers to the capability of a GSM PLMN connection to deliver information to the destination access point or reference point in a structure that was presented in a corresponding signal structured at the origin (access point or reference point).

- Values: - Service data unit integrity (see note 1)
- Unstructured (see note 2)

NOTE 1: Applicable for connection element "non transparent".

NOTE 2: Applicable for connection element "transparent".

Channel rate:

This attribute describes the channels and their bit rate used to transfer the user information and/or signalling information.

- Value: - Name of channel (designation) and/or the corresponding bit rate

NOTE 3: This attribute can be used several times for connection characterization.

Connection control protocol, information transfer coding/protocol (layer 1 to 3):

These attributes characterize the protocols on the connection control and/or user information transfer channel.

- Value: - Appropriate protocol for each layer

NOTE 4: This attribute can be used several times for connection characterization.

Synchronous/Asynchronous:

This attribute describes the type of transmission between the reference access points.

- Values: - Synchronous
- Asynchronous

Negotiation:

This attribute describes the possibility of inband parameter exchange (according to V.110) between reference access points.

- Value: - In band negotiation not possible

User Rate:

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

- Values: - 0.3 kbit/s
- 1.2 kbit/s
- 2.4 kbit/s
- 4.8 kbit/s
- 9.6 kbit/s

Intermediate rate:

This attribute defines the intermediate rate (according to GSM 08.20 and ITU-T V.110) at the A interface connection element part.

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

Fixed network user rate FNUR ~~(Multislot configurations for data):~~

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

- Values:
- 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

Acceptable channel coding(s) ACC:

This attribute indicates the channel codings acceptable to the MS. This parameter is given at call set-up and it is non negotiable.

- Values:
- 4.8 kbit/s
 - and/or 9.6 kbit/s
 - and/or 14.4 kbit/s
 - and/or 28.8 kbit/s
 - and/or 32.0 kbit/s
 - and/or 43.2 kbit/s

Maximum number of TCH/Fs ~~(Multislot configurations for data):~~

This attribute is given at call set-up and it enables the mobile user to limit the number of TCH/Fs used during the call.

- Values:
- 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7 (note 5)
 - 8 (note 5)

NOTE 5: Not used by the currently specified services.

Wanted air interface user rate (AIUR) ~~(Multislot configurations for data):~~

This attribute is applicable to non-transparent services only, and it gives the AIUR that the mobile user wants and which the network tries to achieve but which it is not allowed to exceed.

Values: 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

User initiated modification indication (Multislot configurations for data):

This element is relevant between the MT and the IWF.

Values: - User initiated modification not requested

- User initiated modification up to 1 TCH/F requested
- User initiated modification up to 2 TCH/F requested
- User initiated modification up to 3 TCH/F requested
- User initiated modification up to 4 TCH/F requested

The parameters where it is indicated that they are related to Multislot configurations for data are optional.

For 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" take precedence over the "user rate" and "modem type", except for modem types "autobauding", "modem for undefined interface" or "none".
- 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	16 kbit/s (on the A interface but 32 kbit/s inside the MS)

- 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
TCH/F14.4	14.4 kbit/s

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

Network independent clocking on Tx:

This attribute defines the usage of NIC at the reference access point in the transmit direction.

- Values: - Not required
- Required

Network independent clocking on Rx:

This attribute defines the usage of NIC at the reference access point in the receive direction.

- Values: - Not accepted
- Accepted

Number of stop bits:

This attribute describes the number of stop bits for the asynchronous type of transmission between reference access points.

- Values: - 1 bit
- 2 bit

Number of data bits excluding parity if present:

This attribute describes the number of data bits for a character oriented mode of transmission between reference access points.

- Values: - 7 bit
- 8 bit

Parity information:

This attribute describes the type of parity information for a character oriented mode of transmission between the reference access points.

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

Duplex mode:

This attribute describes the kind of transmission of the GSM PLMN between reference access points.

- Value: - Full duplex

Modem type:

This attribute describes the modem allocated by the IWF/MSC in the case of a 3.1 kHz audio used outside the GSM PLMN information transfer capability.

- Values: - V.21
- V.22
- V.22bis
- V.26ter
- V.32
- Autobauding type 1

- None
-

Other Modem Type (OMT):

This element is relevant between the MS and IWF.

- Values:
- No other modem type
 - V.34

Compression

This attribute describes the possible usage of data compression between the reference access points. In the network to MS direction, it indicates the possibility of using data compression. In the MS to network direction, it indicates the allowance of data compression.

- Values:
- Data compression not possible/not allowed
 - Data compression possible/allowed (see note 6)

NOTE 6: Only applicable for the asynchronous transmission between the reference access points, if connection element is "non transparent".

Radio channel requirement:

This attribute describes the available channels for the transfer of the user information between the reference access points.

- Values:
- Full rate channel (Bm)
 - Half rate channel (Lm)
 - dual rate/full rate preferred
 - Dual rate/half rate preferred

Negotiation of Intermediate Rate Requested (NIRR)

This attribute indicates if 6 kbit/s radio interface rate is requested.

- Values:
- NIRR not requested/not accepted
 - NIRR requested/accepted

Connection element:

This attribute describes the possible usage of GSM layer 2 protocol between the reference access points.

- Values:
- Transparent
 - Non-transparent (RLP)
 - Both, transparent preferred
 - Both, non transparent preferred

User information layer 2 protocol:

This attribute describes the layer 2 relay protocol used between the reference access points in non-transparent transmissions.

- Values:
- ISO 6429, code set 0
 - X.25
 - Character oriented protocol with no flow control

Signalling access protocol:

This attribute characterizes the protocol on the signalling or user information transfer channel at the mobile reference access point.

- Values:
- I.440/450
 - X.21
 - X.28, dedicated PAD, individual NUI (note 7)
 - X.28, dedicated PAD, universal NUI(note 7)
 - X.28, non dedicated PAD
 - X.32
 - X.32

NOTE 7: This value was used by services defined for former GSM releases and does not need to be supported.

Rate adaptation:

This attribute describes the rate adaptation used at the fixed reference access point.

- Values:
- V.110/X.30
 - X.31 flag stuffing
 - No rate adaptation
 - V.120 (Note: This value is signalled in the "Other Rate Adaption" element, due to a lack of further code points in the "Rate Adaptation" element.)

Coding standard:

This attribute refers to the structure of the BC-IE defined in the TS 24.008.

- Value:
- GSM

User information layer 1 protocol:

This attribute characterizes the layer 1 protocol to be used at the Um interface according to the GSM 05.01.

- Value:
- Default

Rate adaption header/no header:

This attribute 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 attribute 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 attribute 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 attribute 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 attribute 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 attribute 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.

3 General approach

GSM 03.10 defines the PLMN connection types necessary to support the GSM PLMN data and telematic services.

Within the MS there are several different data rate adaptation functions - and a Split/Combine-function in case of a multislot data configuration - which are combined as shown in GSM 03.10 as part of the connection type.

The rate adaptation functions are RA0, RA1, RA2, RA1', RA1'' and RA1/RA1'. The RA0, RA1 and RA2 are equivalent to those functions described in CCITT recommendation V.110 [11].

The RA1' function is similar to RA1 but has a reduced bit rate output compatible with the coding scheme proposed for data services on the radio interface.

The RA1'' function is used for converting between synchronous user rates of 48 and 56 kbit/s and the rate 64 kbit/s. The equivalent function in CCITT recommendation V.110 does not have a name.

The RA1/RA1' is a relay function, used as indicated in GSM 03.10.

In multislot data-configurations the overall data stream is split into parallel substreams between the Split/Combine-functions.

3.1 Overview of data rates and configurations

In Table 1, an overview of the supported transparent air-interface user rates is given. For each rate, also intermediate rates per channel between BTS and MSC, overall radio interface rates, and channel configurations are given. For single slot connections the intermediate rates are per channel carrying the overall data stream, whereas for multislot connections, the intermediate rates are per substream.

In Table 2, intermediate rates within the MS, overall radio interface rates, and channel configurations are given for the air-interface user rates. The intermediate rates are per overall data stream.

For single slot rates up to 4,8 kbit/s, the used intermediate rate is 8 kbit/s, and for the 9,6 kbit/s single slot rate 16 kbit/s.

For TCH/F9.6 and TCH/F4.8 channel codings, the multislot intermediate rates are 16 and 8 kbit/s per TCH/F, respectively.

For TCH/F14.4 channel coding, the multislot intermediate rate is 16 kbit/s per TCH/F.

Connections utilising TCH/F28.8 or TCH/F43.2 across the radio interface, use multislot combinations of TCH/F14.4 between BTS and MSC. Thus the corresponding multislot intermediate rate is 16 kbit/s.

No multislot intermediate rates are applicable to [56 and 64 kbit/s](#) connections using TCH/F32.0 radio interface channels. [The intermediate rate for the 32 kbit/s user rate using the TCH/F32.0 channel is 32 kbit/s.](#)

Between the TE and the Split/Combine-function at the MS, where the overall data stream is not split, intermediate rates of 8, 16, 32 and 64 kbit/s are applicable

Table 1: AIUR/Multislot intermediate rates

Air interface user rate	DTE/DCE statuses	RA0	RA1'/RA1 RA1'/RAA'		RA1'	
			Multislot intermediate rate	Frame type	Radio interface rate	Padding
≤ 600 bit/s	X	X	8 kbit/s	80 bit frames	3,6 kbit/s	
1200 bit/s	X	X	8 kbit/s	80 bit frames	3,6 kbit/s	
2,4 kbit/s	X	X	8 kbit/s	80 bit frames	3,6 kbit/s	
4,8 kbit/s	X	X	8 kbit/s	80 bit frames	6 kbit/s	
9,6 kbit/s	X	X	16 kbit/s or 2×8 kbit/s	80 bit frames	12 kbit/s or 2×6 kbit/s	
14,4 kbit/s	X	X	2×16 kbit/s or 3×8 kbit/s	80 bit frames	2×12 kbit/s or 3×6 kbit/s	P (note 1)
			16 kbit/s Note 7	Note 8	14,5 kbit/s	
19,2 kbit/s	X	X	2×16 kbit/s or 4×8 kbit/s	80 bit frames	2×12 kbit/s or 4×6 kbit/s	
28,8 kbit/s	X	X	3×16 kbit/s	80 bit frames	3×12 kbit/s	
			2 x 16 kbit/s Note 7	Note 8	2×14,5 kbit/s	
					1×29 kbit/s	
32 kbit/s			1 x 32 kbit/s		1 x 32 kbit/s	
38,4 kbit/s	X	X	4×16 kbit/s	80 bit frames	4×12 kbit/s	
			3 x 16 kbit/s Note 7	Note 8	3×14,5 kbit/s	P (note 6)
43.2 kbit/s Note 10	X		3 x 16 kbit/s Note 7	Note 8	1×43.2 kbit/s	
48 kbit/s	X		Note 2	Note 2	5×12 kbit/s	
			4 x 16 kbit/s Note 7	Note 8	4×14,5 kbit/s	P (note 6)
56 kbit/s			Note 2	Note 2	5×12 kbit/s (note 3)	
			4×16 kbit/s Note 7	Note 8	4×14,5 kbit/s	P (note 6)
			Note 9	Note 9	2×32.0 kbit/s	
64 kbit/s			Note 2	Note 2	6×12 kbit/s (note 3)	P (note 1)
					5×14,5 kbit/s	(note 6)
			Note 9	Note 9	2×32.0 kbit/s	

P=Padding used

Table 2: AIUR / Intermediate rates

Air interface user rate	DTE/DCE statuses	RA0	RA1		RA1'	
			Intermediate rate	Frame type	Radio interface rate	Padding
≤ 600 bit/s	X	X	8 kbit/s	80 bit frames	3,6 kbit/s	
1200 bit/s	X	X	8 kbit/s	80 bit frames	3,6 kbit/s	
2,4 kbit/s	X	X	8 kbit/s	80 bit frames	3,6 kbit/s	
4,8 kbit/s	X	X	8 kbit/s	80 bit frames	6 kbit/s	
9,6 kbit/s	X	X	16 kbit/s	80 bit frames	12 kbit/s or 2×6 kbit/s	
14,4 kbit/s	X	X	32 kbit/s	80 bit frames	2×12 kbit/s	P (note 1)
					3×6 kbit/s 1×14,5 kbit/s	
19,2 kbit/s	X	X	32 kbit/s	80 bit frames	2×12 kbit/s or 4×6 kbit/s	
28,8 kbit/s	X	X	64 kbit/s	80 bit frames	3×12 kbit/s 2×14,5 kbit/s 1×29 kbit/s	
<u>32 kbit/s</u>			<u>32 kbit/s</u>		<u>1 x 32 kbit/s</u>	
38,4 kbit/s	X	X	64 kbit/s	80 bit frames	4×12 kbit/s	
					3×14,5 kbit/s	P (note 6)
43.2 kbit/s Note 10	X		Note 11	Note 11	1×43.2 kbit/s	
48 kbit/s	X		64 kbit/s Note 4	Note 4	5×12 kbit/s	
					4×14,5 kbit/s	P (note 6)
56 kbit/s			64 kbit/s Note 4	Note 4	5×12 kbit/s (note 3)	
					4×14,5 kbit/s	P (note 6)
					2×32.0 kbit/s	
64 kbit/s			64 kbit/s Note 5	Note 5	6×12 kbit/s (note 3)	P (note 1)
					5×14,5 kbit/s	(note 6)
					2×32.0 kbit/s	

P =Padding used

NOTE 1: For information on the padding procedure, please refer to clause 10 of the present document.

NOTE 2: No multislot intermediate rate; substreams combined at the BSS with a resulting data rate of 64 kbit/s.

NOTE 3: AIUR 11,2 kbit/s per channel

NOTE 4: For this rate GSM-specific rate adaptation function RA1'' rather than RA1 is applied.

NOTE 5: For this rate RA1- and RA2- adaptations are not applied.

NOTE 6: Padding used as specified for TCH/F14.4 channel codings

NOTE 7: At the network side, RA1'/RA1 not applied; instead a TCH/F14,4-specific adaptation RA1'/RAA' used (GSM 08.20)

NOTE 8: A 320-bit frame format described in GSM 08.60.

NOTE 9: No multislot intermediate rate. Data rate between BSS and MSC 64 kbit/s.

NOTE 10:Used only in non-transparent configurations.

NOTE 11: In NT cases there is no direct relationship between AIUR and Intermediate rate.

8 The RA1/RA1' Function

The RA1/RA1' function is used in transparent cases to convert between the intermediate rate and the input rate to the channel coder or the multiplexing function. This conversion also appears on the infrastructure side in both transparent and non-transparent cases as specified in GSM 08.20 except for channel codings TCH/F14.4, TCH/F28.8, TCH/F32.0, and TCH/F43.2.

8.1 Single slot rates

Intermediate rate	Radio interface rate
8 kbit/s	3,6 kbit/s
8 kbit/s	6 kbit/s
16 kbit/s	12 kbit/s
32 kbit/s	14,5 kbit/s

There are seven data rates (known as Radio Interface data rates) used for data transfer to the channel coder. These are 43.5 kbit/s (NT only), (32.0 kbit/s (T only); not used in single slot configurations), 29 kbit/s (In cases where EDGE channel codings TCH/F43.2 or TCH/F28.8 are used, the RA1/RA1' function adapts the data stream to 14.5 kbit/s substreams as if multiple 14.5 kbit/s radio interface channels were used.), 14,5 kbit/s, 12 kbit/s, 6 kbit/s and 3.6 kbit/s.

The 32 kbit/s user rate is identical to the 32 kbit/s intermediate rate. In this case the 32 kbit/s intermediate rate is directly mapped to the 32 kbit/s radio interface data rate.

and in order to adapt the 8, 16, 32 and 64 kbit/s intermediate rates and the 32 kbit/s intermediate rate with other than 32 kbit/s user rates are adapted to these radio interface data rates as follows; three processes are used.

Intermediate rate	Radio interface data rate
8 kbit/s	3,6 kbit/s
8 kbit/s	6 kbit/s
16 kbit/s	12 kbit/s
32 kbit/s	14,5 kbit/s

For the adaptation the following three processes are used:

Firstly the 17 synchronization bits are removed.

Secondly the E1, E2 and E3 bits are removed. For transparent services, the values of the E1, E2, E3 bits are determined at the MT and in case of TCH/F9.6 and TCH/F4.8, at the BTS based on the indication given by outband signalling (either in the User Rate field of the BC-IE of the SETUP message for the MT or in the Channel Type information in the ASSIGNMENT REQUEST message for the BSS). For non transparent services, the coding of the E1, E2 and E3 bits is described in GSM 08.20.

Thirdly, in the 3.6 kbit/s case, half the data bits are discarded. These processes result in modified CCITT V.110 frames of sizes 60, 60 and 36 bits for the 12, 6 and 3.6 kbit/s data rates respectively. The resultant modified CCITT V.110 frames for the various user data rates are shown in figures 5 - 9.

Further procedures for TCH/F14.4, TCH/F 28.8, and TCH/F43.2 channel coder input rates in subclauses 8.1.1, 9.1 and 9.3, respectively.

16.2 TCH/F14.4, TCH/F28.8, and TCH/F32.0 channel codings

16.2.1 User rate adaptation on the A interface, AIUR less or equal to 56 kbit/s

The A-TRAU frame is used for transparent user data rates other than 32 kbit/s on the A interface. These A-TRAU frames are transmitted on up to four substreams multiplexed into one stream sent over the A interface. The split/combine function is applied on the substreams as specified in clause 7 of this TS. The relation between the AIUR and the number of channels is specified in table 12.

In a given A-TRAU frame on the A interface:

- for 14 400 bit/s there is no repetition of bits D within the 16 kbit/s stream in a given A-TRAU frame on the A interface.

The CCITT I.460 rate adaptation is used for the transparent 32 kbit/s user rate on the A interface, i.e. four bits of each octet in the 64 kbit/s time slot are used for transporting the 32 kbit/s user data.

16.2.2 User Rate Adaptation on the A-interface, AIUR greater than 56 kbit/s

For AIUR of 64 kbit/s one stream consisting of CCITT V.110 32 bit frames or 64 bit frames, as specified in GSM 04.21 is transmitted over the A-interface. Splitting/Combining which occurs in the BSS, is as specified in GSM 04.21.

Table 12 gives the relation between the User Rate, Substream Rate Channel Coding and the Intermediate Rate.

16.2.3 Relation between AIUR and the number of channels

Table 12: Relationship between the AIUR, AIUR per substream, channel coding, intermediate rate and number of substreams

AIUR	Number of substreams x AIUR per substream	Channel Coding	Multislot intermediate Rate (note 1)
14,4 kbit/s	14,4 kbit/s	TCH/F14.4	16 kbit/s
28,8 kbit/s	2X14,4 kbit/s	TCH/F14.4 TCH/F28.8	16 kbit/s
32 kbit/s	1x32 kbit/s	TCH/F32.0	32 kbit/s
38,4 kbit/s	3X14,4 kbit/s w/padding	TCH/F14.4	16 kbit/s
48 kbit/s	4X14,4 kbit/s w/padding	TCH/F14.4	16 kbit/s
56 kbit/s	4X14,4 kbit/s w/padding 1x64.0 kbit/s (Note 2)	TCH/F14.4 TCH/F32.0	16 kbit/s 64 kbit/s
64kbit/s	5X14,4 kbit/s w/padding 1x64.0 kbit/s (Note 2)	TCH/F14.4 TCH/F32.0	64 kbit/s
NOTE 1: For AIURs ≤ 56 kbit/s this column indicates the multislot intermediate rate: for higher AIURs it indicates the intermediate rate.			
Note 2: One substream over two air interface timeslots. No multislot intermediate rate.			

16.2.4 Handling of status bits X and SB

The X and SB bits are carried over the A interface in a multiframe structure as described in subclause 8.1.1.1 of GSM 04.21. SA bit is not carried over the A interface.

The handling of the status bits will comply with the synchronisation procedures for transparent services which are as described in GSM 09.07 (MSC), GSM 04.21 (BSS), GSM 07.01 (MS).

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 3G 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 3G 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 GSM 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 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 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 (note11)
- 8 TCH (note11)

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

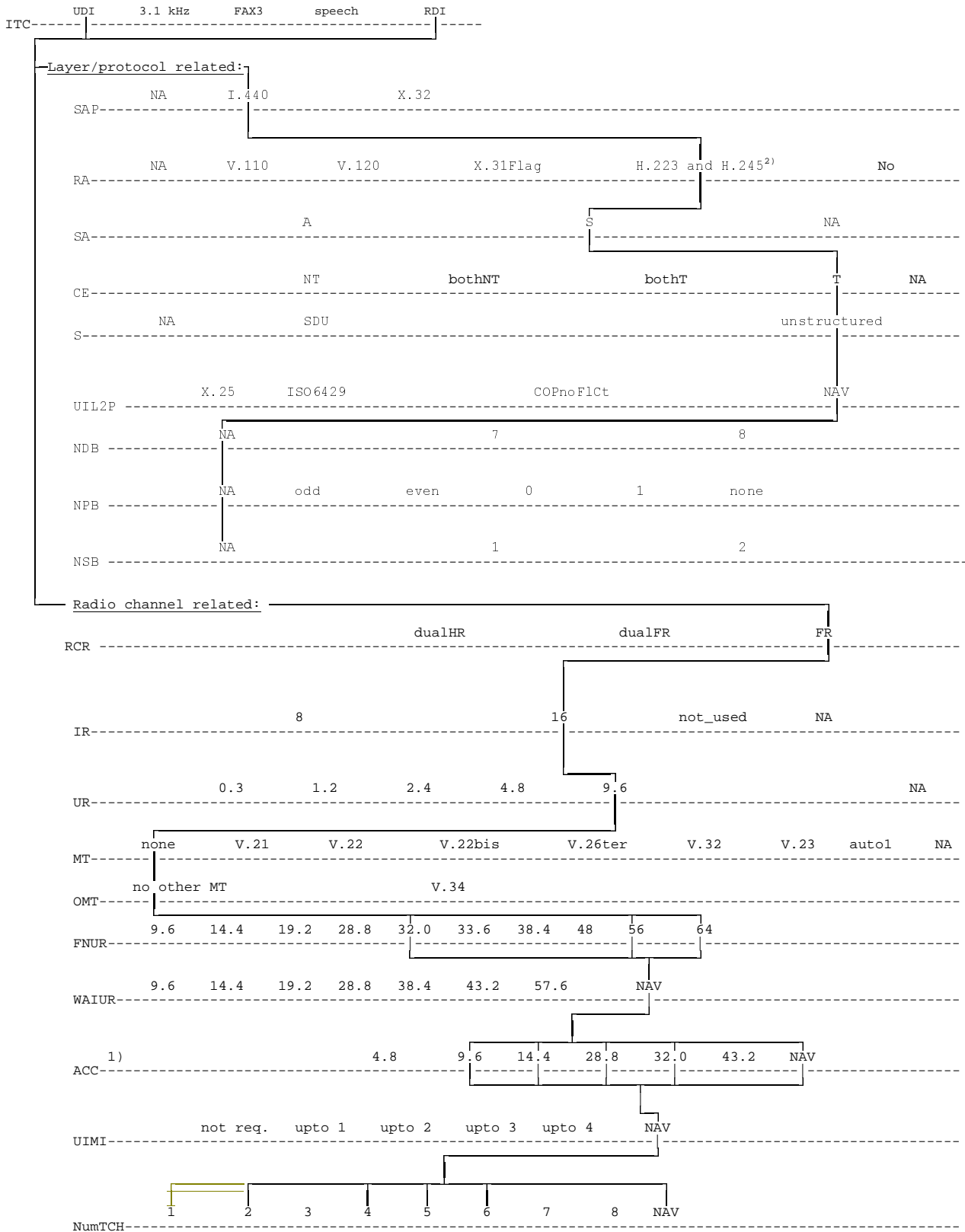
For CE:T, the padding procedure described in GSM 04.21 can be applied.

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

Parameter / value	GSM	UMTS
Radio Channel Requirements / <i>any</i>	valid	ignored
User rate / <i>any</i>	valid	ignored
Intermediate Rate / <i>any</i>	valid	ignored
NIC on transmission / <i>any</i>	valid	ignored
NIC on reception / <i>any</i>	valid	ignored
Negotiation of IR requested / <i>any</i>	valid	ignored
Acceptable Channel Codings / <i>any</i>	valid	ignored
Maximum number of traffic channels / <i>any</i>	valid	ignored
User initiated modification indication / <i>any</i>	valid	ignored
Asymmetry preference indication/ <i>any</i>	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 /		
<u>32 kbit/s</u>	<u>Invalid for CE = NT</u>	<u>valid</u>
32, 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 this specification.

B.1.3.1.6 3G-H.324/M Case



- 1) ACC may have several values simultaneously (bit map coding).
- 2) This value is interpreted as "No rate adaptation" in GSM.

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 3G 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 3G TS 24.008.

Values: - GSM

User Information Layer 1 Protocol:

This element characterizes the layer 1 protocol to be used between MT and BSS (Um interface) according to GSM 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 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 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 (note11)
- 8 TCH (note11)

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

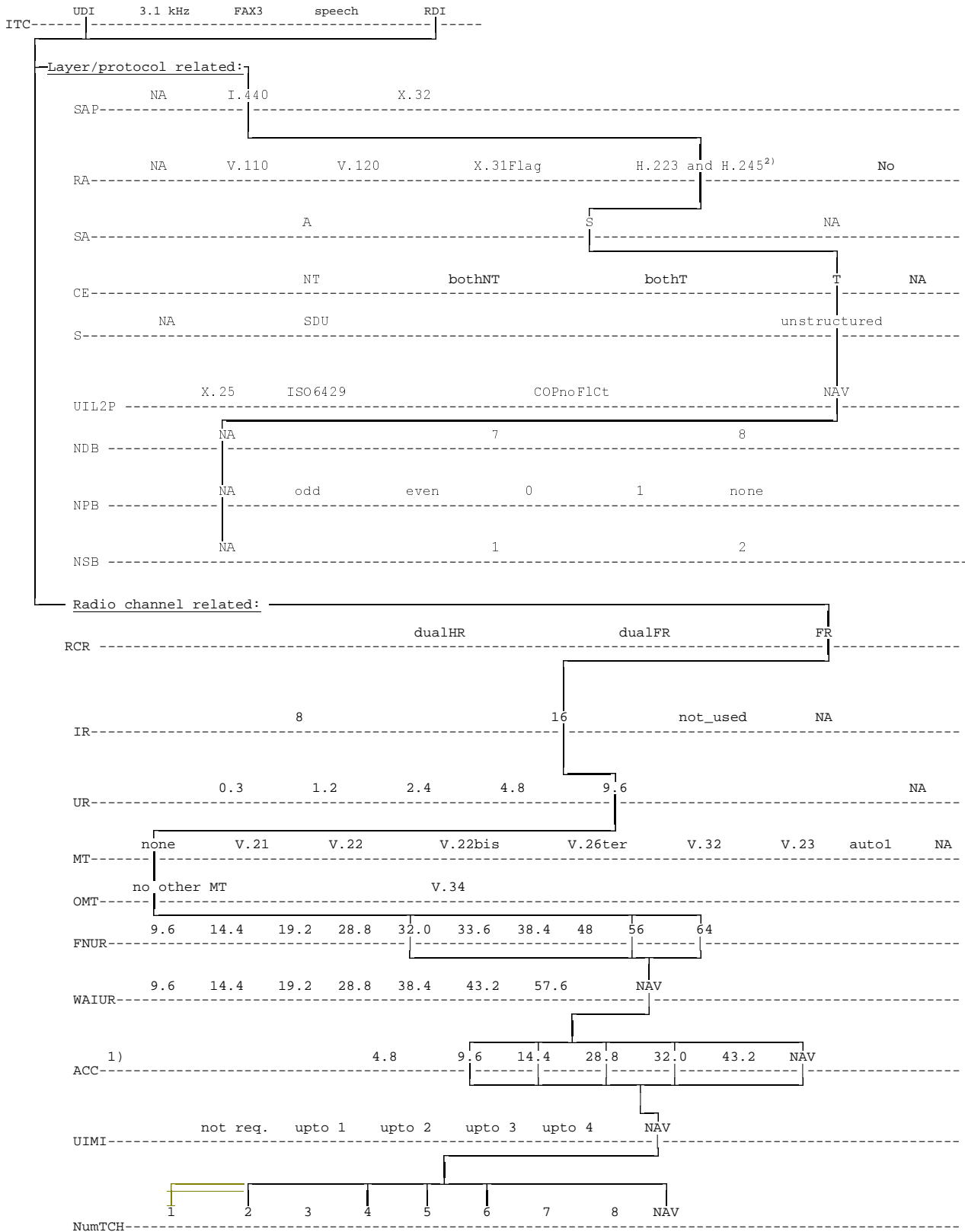
For CE:T, the padding procedure described in GSM 04.21 can be applied.

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

Parameter / value	GSM	UMTS
Radio Channel Requirements / <i>any</i>	valid	ignored
User rate / <i>any</i>	valid	ignored
Intermediate Rate / <i>any</i>	valid	ignored
NIC on transmission / <i>any</i>	valid	ignored
NIC on reception / <i>any</i>	valid	ignored
Negotiation of IR requested / <i>any</i>	valid	ignored
Acceptable Channel Codings / <i>any</i>	valid	ignored
Maximum number of traffic channels / <i>any</i>	valid	ignored
User initiated modification indication / <i>any</i>	valid	ignored
Asymmetry preference indication/ <i>any</i>	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 /		
<u>32 kbit/s</u>	Invalid for CE = NT	valid
32, 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 this specification.

B.1.3.1.6 3G-H.324/M Case



- 1) ACC may have several values simultaneously (bit map coding).
- 2) This value is interpreted as "No rate adaptation" in GSM.

CHANGE REQUEST		Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.	
29.007	CR	029	Current Version: 3.5.0
GSM (AA.BB) or 3G (AA.BBB) specification number ↑		↑ CR number as allocated by MCC support team	
For submission to: TSG_N #9	for approval <input checked="" type="checkbox"/>	strategic <input type="checkbox"/>	(for SMG use only)
<i>list expected approval meeting # here ↑</i>	for information <input type="checkbox"/>	non-strategic <input type="checkbox"/>	

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

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

Source: TSG_N3 **Date:** 28/08/00

Subject: 32 kbit/s UDI/RDI multimedia in GSM

Work item: Technical enhancements and improvements (TEI)

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

Reason for change: Removal of barriers to use the 32 kbit/s UDI/RDI multimedia in GSM.

Clauses affected: Table 7A and 7B.

Other specs Affected:	Other 3G core specifications <input checked="" type="checkbox"/> Other GSM core specifications <input checked="" type="checkbox"/> MS test specifications <input type="checkbox"/> BSS test specifications <input type="checkbox"/> O&M specifications <input type="checkbox"/>	→ List of CRs: 22.002, 27.001, 48.008 → List of CRs: 03.10, 04.21, 08.08, 08.20, 08.58 → List of CRs: → List of CRs:
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Other comments:



help.doc

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

Table 7A: Comparable setting of parameters in PLMN and ISDN: Mobile Originated

Octet	PLMN BC parameter value	Octet	ISDN BC parameter value
1	Bearer Capability IEI	1	Bearer Capability IEI
2	Length of BC contents	2	Length of BC contents
3 #7..6	Radio channel requirement half rate channel full rate channel dual, full, rate preferred dual, half rate preferred		No comparable field
3 #5	Coding Standard GSM standard coding	3 #7..6	Coding Standard CCITT standardized coding
3 #4	Transfer mode circuit mode packet mode (note7)	4 #7..6	Transfer mode circuit mode packet mode
3 #3..1	Information transfer capability speech unrestricted digital 3,1 kHz audio ex PLMN facsimile group 3 (note 1) other ITC (see octet 5a)	3 #5..1	Information transfer capability speech unrestricted digital 3,1 kHz audio 3,1 kHz audio no comparable value
5a #7..6	Other ITC restricted digital		(note 18)
4 #7	Compression (note 14) data compression allowed data compression not allowed		No comparable field
4 #6..5	Structure SDU integrity unstructured	4a #7..5	Structure (note 4)
4 #4	Duplex mode half duplex full duplex	5d #7	Duplex mode half duplex full duplex
4 #3	Configuration point to point	4a #4..3	Configuration (note 4)
4 #1	Establishment demand	4a #2..1	Establishment (note 4)
4	NIRR (note 12) no meaning Data ≤ 4.8kbit/s, FR nt, 6kbit/s radio interface is requested		No comparable field

(continued)

Table 7A (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Originated

Octet	PLMN BC parameter value	Octet	ISDN BC parameter value
5 #5..4	Rate adaptation no rate adaptation (note 2) V.110, I.460/X.30 rate adaptation CCITT X.31 flag stuffing No comparable value (note 11) No comparable value (note 11) No comparable value (note 11) other rate adaptation (see octet 5a)	5 #5..1	User information layer 1 protocol no comparable value CCITT standardized rate adaption V.110, I.460/X.30 CCITT standardized rate adaption X.31 flag stuffing Recommendation G.711 μ -law Recommendation G.711 A-law (note 3) Recommendation G.721 32 kbit/s ADPCM and I.460 No comparable value No comparable value H.223 & H.245 (note 26)
5a #5..4	Other rate adaptation V.120 (note 17) PIAFS (note 27) H.223 & H.245		No comparable field
5 #3..1	Signalling access protocol I.440/I.450 X.21 X.28, ded.PAD, indiv.NUI (note 24) X.28, ded PAD, univ.NUI (note 24) X.28, non-ded PAD X.32		No comparable field
6 #1	Synchronous/asynchronous synchronous asynchronous	5a #7	Synchronous/asynchronous synchronous asynchronous (note 25)
6 #5..2	User info. layer 1 protocol default layer 1 protocol	5 #5..1	User info. layer 1 protocol see section under rate adaptation for 3G TS 24.008 above
6a #7	Number of stop bits 1 bit 2 bits	5c #7..6	Number of stop bits 1 bit 2 bits
6a #6	Negotiation In band neg. not possible no comparable value	5a #6	Negotiation In band neg. not possible In band neg. possible (note 10)
6a #5	Number of data bits 7 bits 8 bits	5c #5..4	Number of data bits excluding parity if present 7 bits 8 bits
6a #4..1	User rate 0.3 kbit/s 1.2 kbit/s 2.4 kbit/s 4.8 kbit/s 9.6 kbit/s 12 kbit/s (note 7) 1.2 kbit/s / 75 bit/s (note 24) any value no comparable value	5a #5..1	User rate 0.3 kbit/s 1.2 kbit/s 2.4 kbit/s 4.8 kbit/s 9.6 kbit/s 12 kbit/s 75 bit/s / 1.2 kbit/s 19.2 kbit/s (note 14) Ebits or inband negotiation (note 10)

(continued)

Table 7A (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Originated

Octet	PLMN BC parameter value	Octet	ISDN BC parameter value
6b #7..6	Intermediate rate 8 kbit/s 16 kbit/s any value	5b #7..6	Intermediate rate (note 13) 8 kbit/s or not used 16 kbit/s or not used 32 kbit/s or not used (note 14)
6b #5	NIC on Tx does not require requires (note7)	5b #5b	NIC on Tx does not require requires (note 8)
6b #4	NIC on Rx cannot accept can accept (note 7)	5b #4	NIC on Rx cannot accept can accept (note 8)
6b #3..1	Parity information odd even none forced to 0 forced to 1	5c #3..1	Parity information odd even none forced to 0 forced to 1
6c #7..6	Connection element transparent non-transparent (RLP) both, transp. preferred both, non-transp. preferred		No comparable field
6c #5..1	Modem type none V.21 V.22 V.22bis V.23 (note 24) V.26ter V.32 modem for undef. interface autobauding type 1	5d #6..1	Modem type no comparable value (note 5) V.21 V.22 V.22bis V.23 V.26ter V.32 No comparable value (note 5) No comparable value (note 5, note 10)
7 #5..1	User info. layer 2 protocol X.25 link level ISO 6429, codeset 0 COPnoFIcT videotex profile 1 (note 7) X.75 layer 2 modified (CAPI)	6	User info. layer 2 prot. (note 6) X.25 link level no comparable value no comparable value no comparable value X.25 link level
6d #5..1	Fixed network user rate (note 15) FNUR not applicable (note 7) 9,6 kbit/s 12 kbit/s (note 7) 14,4 kbit/s 19,2 kbit/s 28,8 kbit/s 32,0 kbit/s 33,6 kbit/s 38,4 kbit/s 48,0 kbit/s 56,0 kbit/s 64,0 kbit/s	5a #5..1	User rate no comparable value 9,6 kbit/s 12 kbit/s 14,4 kbit/s 19,2 kbit/s 28,8 kbit/s 32,0 kbit/s no comparable value 38,4 kbit/s 48,0 kbit/s 56,0 kbit/s no comparable value (note 16)

(continued)

Table 7A (concluded): Comparable setting of parameters in PLMN and ISDN: Mobile Originated

Octet	PLMN BC parameter value	Octet	ISDN BC parameter value
6e #3..1	Maximum number of traffic channels 1 TCH 2 TCH 3 TCH 4 TCH 5 TCH 6 TCH 7 TCH (note 7) 8 TCH (note 7)		No comparable field
6f #4..1	Wanted air interface user rate (note 23) air interface user rate not applicable (note 7) 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 7)		No comparable field
6d #7..6	Other modem type (note 15) No other modem type V.34	5d #6..1	Modem type no comparable value V.34
6e #7..4	Acceptable channel coding(s) TCH/F4.8 acceptable (note 19) TCH/F9.6 acceptable TCH/F14.4 acceptable		No comparable field
6f #7..5	User initiated modification indicator (note 23) User initiated modification not required User initiated modification upto 1 TCH/F may be requested User initiated modification upto 2 TCH/F may be requested User initiated modification upto 3 TCH/F may be requested User initiated modification upto 4 TCH/F may be requested		No comparable field
6g #7..5	Acceptable channel coding(s) (note 20) TCH/F28.8 acceptable TCH/F32.0 acceptable (note 21) TCH/F43.2 acceptable (note 22)		No comparable field
6g #4..3	Asymmetry preference indication (Note 23) no preference up link biased asymmetry preference down link biased asymmetry preference		No comparable field

The application rules for coding the information elements ISDN-BC/LLC/HLC as set out in ETR 018 and Q.931 (05/98) shall apply.

Other field values in the ISDN BC-IE not supported in 3G TS 24.008 are:

Information transfer rate: In this case default 64 kbit/s is selected.

Flow control on transmission: This shall be selected if outband flow control applies.

Flow control on reception: This shall be selected if outband flow control applies.

NOTE: Outband flow control is indicated by the absence of the UIL2P parameter for non-transparent connections.

User information layer 3 protocol:

Octet 7 shall not be sent unless specific application rules are given for particular cases (to be defined by PLMN). End-to-end significant User Information layer 3 protocol shall be sent by LLC.

NOTE 1: In the case where PLMN BC "Information Transfer Capability" indicates "Facsimile group 3" and only a single PLMN BC is contained in the call set-up request then this shall be mapped to an ISDN BC with:

Coding standard:	CCITT
Information Transfer capability:	3,1 kHz audio
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User layer 1 protocol:	G711 A-law or μ -law (PCS-1900)

and

- If an HLC is not present, the network will insert a "Facsimile group 2/3" HLC.
- If an HLC element is present, the network will pass it through unmodified.

In the case where PLMN BC "Information Transfer Capability" indicates "Facsimile group 3" and two PLMN BCs are contained in the call set-up request, then the same ISDN BC as mentioned above is created. If the first PLMN BC indicates "facsimile group 3" an HLC "facsimile group 2/3" will be inserted by the network (if not received from the MS). However if the first PLMN BC indicates "speech", the network will not send a HLC, irrespective where a HLC was received from the MS or not.

NOTE 2: This value is present in combination with information transfer capability parameter value "3,1 kHz audio Ex PLMN" or "facsimile group 3" and will therefore be mapped to the value "Recommendation G.711 A-law" or "Recommendation G.711 μ -law" (PCS-1900) of the Q.931 (05/98) parameter user layer 1 protocol (see note 3).

NOTE 3: The value "Recommendation G.711 A-law" or "Recommendation G.711 μ -law" (PCS-1900) applies only when the Q.931 (05/98) parameter information transfer capability indicates "3,1 kHz audio" or "speech".

NOTE 4: When interworking with an ISDN according to ETS 300 102-1 octets 4a and 4b shall not be included because default values apply. In an ISDN according to Q.931 (05/98) these octets no more exist.

NOTE 5: In this case octet 5d shall not be included.

NOTE 6: Octet 6 shall not be sent unless specific application rules are given for a particular case (PLMN specified). End-to-end significant user information layer 2 protocol shall be sent by LLC.

NOTE 7: Not used for currently defined Bearer Services and Teleservices.

NOTE 8: These values will only be set if the "Information Transfer Capability" indicates "3,1 kHz audio", synchronous data transmission is used and octet 5b of the ISDN BC is present.

NOTE 9: (VOID).

NOTE 10: The PLMN BC-IE parameter value "autobauding modem type 1" will be mapped to the ISDN BC-IE parameter values "inband negotiation possible" and "user rate indicated by E-bits specified in ITU-T Recommendation I.460 or may be negotiated inband" (octet 5a of ISDN BC-IE). In case of data compression high speed modems, like V.32bis, V.34 and/or V.90 may be used in the IWF. Autobauding may also be used to support user rates less than 9.6 kbit/s towards the PSTN.

NOTE 11: The ITC value of the PLMN BC-IE "speech", "3,1 kHz audio Ex PLMN" will indicate these requirements.

NOTE 12: For the use of NIRR see 3G TS 27.001.

NOTE 13: The value of the Intermediate Rate field of the ISDN Bearer Capability information element shall only depend on the values of the User Rate and the Information Transfer Capability in the same information element. The correspondence is:

Intermediate Rate = not used if User Rate > than 19.2 kbit/s.
Intermediate Rate = 32 kbit/s if User Rate = 19,2 kbit/s or 14.4 kbit/s.

Intermediate Rate = 16 kbit/s if User Rate = 9,6 kbit/s.
Intermediate Rate = 8 kbit/s otherwise.

In case of Audio calls the value of the Intermediate Rate may be set to "not used".

NOTE 14: If compression is supported by the MSC and "data compression allowed" is indicated, then the ISDN user rate for UDI calls shall be set as follows. If the parameter "FNUR" is present the ISDN user rate shall be set to this value. Otherwise the PLMN user rate shall be mapped to an equal or any higher ISDN user rate value (in case of V.110 the highest ISDN user rate shall be 19,2 kbit/s). The Intermediate Rate shall be set to an appropriate value. (see subclause 10.2.4.11).

In case of "3,1 kHz audio" the modem shall try to negotiate data compression and flow control (see subclause 9.2.4.11). In case of "autobauding type 1" high speed modems may be used (see note 10).

NOTE 15: User rate of the PLMN -BC is overridden by the fixed network user rate of the PLMN BC-IE if available. When the MT indicates „autobauding“, „modem for undefined interface“ or „none“, the other modem type shall be set to „no other modem type“; any other value of the modem type is overridden by the other modem type value (see 3G TS 27.001). In UMTS, if octet 6d is not present in the PLMN BC, the MSC shall reject the call. The support of user rates lower than 9.6 kbit/s in UMTS are only possible in the scope of autobauding (see note 10).

NOTE 16: The ISDN-BC will consist of the octets 1 to 4 only, coded:

Coding standard:	CCITT
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s

NOTE 17: V.120 interworking is selected.

If an LLC element is not present, the network will insert an LLC. If an LLC is present it may be modified. The PLMN -BC parameters negotiated with the MS shall be mapped to the LLC parameters. The LLC parameter Rate Adaptation will be set to "V.120".

When interworking with unrestricted 64 kbit/s networks the ISDN BC shall be coded according to note 16.

NOTE 18: When the MSC is directly connected to a restricted 64 kbit/s network, the ISDN BC-IE is coded with an ITC = RDI.

When indirectly interworking with a restricted 64 kbit/s network the ISDN BC-IE shall be coded according to ETR 018, as shown below:

Coding standard:	CCITT
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	V.110/X.30
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
User rate:	56 kbit/s

If an LLC element is not present, the network will insert an LLC. If an LLC is present it may be modified. The PLMN -BC parameters negotiated with the MS shall be mapped to the LLC parameters according to the rules in this table. The LLC parameter Information Transfer Capability will be set to „restricted digital“

NOTE 19: In case the MS signals an ACC containing TCH/F4.8 only and the network does not support TCH/F4.8 channel coding, then the MSC may act as if TCH/F9.6 were included in the ACC.

NOTE 20: Extension of the 'Acceptable channel codings' field in octet 6e in case EDGE channel codings are supported.

NOTE 21: ~~Void Only applicable for bit transparent 56 and 64 kbit/s services.~~

NOTE 22: Only applicable for non-transparent services.

NOTE 23: This parameter shall be included if EDGE channel codings are indicated in ACC. In cases where this parameter would not otherwise be included, the value is set to 'Air interface user rate not applicable' or 'User initiated modification not requested' or 'No preference'.

NOTE 24: This value was used by services defined for former GSM releases and does not need to be supported.

NOTE 25: The case of FTM is identified by Rate adaptation in the PLMN BC-IE set to "CCITT X.31 flag stuffing", Connection element set to "non-transparent", and Synchronous/asynchronous set to "asynchronous". The parameter values shall be set according to Note 16 in case FNUR is 64 kbit/s and according to Note 18 if Other ITC is RDI.

NOTE 26: In the case FNUR=64 kbit/s the ISDN BC-IE shall be coded as follows:

Coding standard:	ITU-T
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	H.223 and H.245

In the case FNUR=56 kbit/s the ISDN BC-IE shall be coded as in note 18.

In the case FNUR=32 kbit/s the ISDN BC-IE shall be coded as follows:

Coding standard:	ITU-T
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	V.110, I.460 & X.30
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
User rate:	32 kbit/s

In the case FNUR=28.8 kbit/s the ISDN BC-IE shall be coded as follows:

Coding standard:	ITU-T
Information Transfer capability:	3.1 kHz Audio
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	G.711 A-law or μ -law
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
Modem type:	V.34
User rate:	28.8 kbit/s

In the case FNUR=33.6 kbit/s the ISDN BC-IE shall be coded as follows:

Coding standard:	ITU-T
Information Transfer capability:	3.1 kHz Audio
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	G.711 A-law or μ -law

NOTE 27: In the case the FNUR=32 kbit/s the ISDN BC-IE shall be coded for PIAFS as follows:

Coding standard:	ITU-T
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	V.110, I.460 and X.30
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
User rate:	32 kbit/s

In the case of a FNUR=64 kbit/s the ISDN BC-IE shall be coded for PIAFS as in note 16.

Table 7B: Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
1	Bearer Capability IEI	1	Bearer Capability IEI
2	Length of BC contents	2	Length of BC contents
	no comparable field	3 #7..6	Radio channel requirement (note 1) half rate channel full rate channel both, half rate preferred both, full rate preferred
3 #7..6	Coding standard CCITT standardized coding	3 #5	Coding standard GSM standardized coding
3 #5..1	Information transfer capability speech unrestricted digital 3,1 kHz audio no comparable value no comparable value 7 kHz audio video (note 23)	3 #3..1	Information transfer capability speech unrestricted digital 3,1 kHz audio ex PLMN (note2) facsimile group 3 (note 3) other ITC (see octet 5a) not supported not supported
		5a #7..6	Other ITC restricted digital
4 #7..6	Transfer mode circuit mode packet mode	3 #4	Transfer mode circuit mode circuit mode
4 #5..1	Information transfer rate 64 kbit/s		no comparable field
	No comparable field	4 #7	Compression (note 18) data compression possible data compression not possible
	No comparable field (note 4)	(4) 4 #6..5	Structure (note 9) SDU integrity unstructured
4a #4..3	No comparable field (note 4)	4 #3	Configuration point-to-point (note 5)
	No comparable field	4 #2	NIRR (note 17) No meaning Data ≤ 4.8 kbit/s, FR nt, 6 kbit/s radio interface requested
4a #2..1	No comparable field (note 4)	4 #1	Establishment demand (note 5)
4b #7..6			
4b #5..1			

(continued)

Table 7B (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
5 #5..1	User information layer 1 protocol no comparable value CCITT V.110, I.460 / X.30 G.711 A-law CCITT X.31 flag stuffing no comparable value No comparable value H.221 & H.242(note 28) H.223 & H.245	5 #5..4	Rate adaption no rate adaption (note 11) V.110, I.460/X.30 rate adaption no comparable value CCITT X.31 flag stuffing other rate adaption (see octet 5a)
		5a #5..4	Other rate adaptation V.120 (note 24) PIAFS H.223 & H.245 H.223 & H.245
	no comparable field	5 #3..1	Signalling access protocol I.440/I.450 X.21 X.28, ded.PAD, indiv.NUI (note 26) X.28, ded.PAD, univ.NUI (note 26) X.28, non-ded.PAD X.32
	see above	6 #5..2	User information layer 1 protocol default layer 1 protocol
5a #7	Synchronous / asynchronous synchronous asynchronous	6 #1	Synchronous/asynchronous synchronous asynchronous
5a #6	Negotiation not possible inband neg, possible (note 16)	6a #6	Negotiation not possible no comparable value

(continued)

Table 7B (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
5a #5..1	User rate 0,3 kbit/s 1,2 kbit/s 2,4 kbit/s 4,8 kbit/s 9,6 kbit/s 12 kbit/s rate is indicated by Ebit as specified in rec. I.460 0,6 kbit/s 3,6 kbit/s 7,2 kbit/s 8 kbit/s 14,4 kbit/s 16 kbit/s 19.2 kbit/s 28.8 kbit/s 32 kbit/s 38.4 kbit/s 48 kbit/s 56 kbit/s 57.6 kbit/s 0,1345 kbit/s 0,1 kbit/s 75 bit/s / 1,2 kbit/s 1,2 kbit/s / 75 bit/s 0,110 kbit/s 0,2 kbit/s	6a #4..1	User rate (note 18 and 29) 0,3 kbit/s 1,2 kbit/s 2,4 kbit/s 4,8 kbit/s 9,6 kbit/s 12 kbit/s (note 13) (note 16) not supported not supported not supported not supported (note 20) not supported (note 20) (note 20) (note 20) (note 20) (note 20) (note 20) not supported not supported not supported not supported not supported not supported not supported
5b #7..6	Intermediate rate not used (note 19) 8 kbit/s 16 kbit/s 32 kbit/s	6b #7..6	Intermediate rate (note 6) (note 18) 8 or 16 kbit/s 8 kbit/s 16 kbit/s
5b #5	NIC on Tx (note 14) does not require requires	6b #5	NIC on Tx does not require requires (note 13)
5b #4	NIC on Rx (note 14) cannot accept can accept	6b #4	NIC on Rx cannot accept can accept (note 13)
5b #3	Flow control on Tx (note 15) Not Required Required		no comparable field
5b #2	Flow control on Rx (note 15) Cannot Accept Accept		no comparable field
5c #7..6	Number of stop bits 1 bit 2 bits not used 1.5 bits	6a #7	Number of stop bits 1 bit 2 bits no comparable value not supported

(continued)

Table 7B (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
5c #5..4	Number of data bits 7 bits 8 bits not used 5 bits	6a #5	Number of data bits 7 bits 8 bits no comparable value not supported
5c #3..1	Parity information odd even none forced to 0 forced to 1	6b #3..1	Parity information odd even none forced to 0 forced to 1
	no comparable field	6c #7..6	Connection element (note 1) transparent non-transparent (RLP) both, transp. preferred both, non-transp preferred
5d #7	Duplex mode half duplex full duplex	4 #4	Duplex mode half duplex (note 13) full duplex (note 5)
5d #6..1	Modem type reserved V.21 V.22 V.22bis V.23 V.26ter V.32 V.26 V.26bis V.27 V.27bis V.29 no comparable value	6c #5..1	Modem type (note 12) none (note 7) V.21 V.22 V.22bis not supported V.26ter V.32 not supported not supported not supported not supported not supported autobauding type 1 (note 16)
5a #5..1	User rate no comparable value 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 kbit/s 56 kbit/s no comparable value	6d #5..1	Fixed network user rate (note 20) FNUR not applicable 9,6 kbit/s 14,4 kbit/s 19,2 kbit/s 28,8 kbit/s 32,0 kbit/s (note 27) 38,4 kbit/s 48,0 kbit/s 56,0 kbit/s 64,0 kbit/s (note 22)
	Modem type no comparable value (note 21) V.34	6d #7..6	Other modem type No other modem type V.34

(continued)

Table 7B (concluded): Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
	No comparable field	6f #7..5	User initiated modification indicator (note 1) (note 25) User initiated modification not required User initiated modification upto 1 TCH/F may be requested User initiated modification upto 2 TCH/F may be requested User initiated modification upto 3 TCH/F may be requested User initiated modification upto 4 TCH/F may be requested
6 #5..1	User information layer 2 protocol (note 10) Q.921 (I.441) X.25, link level no comparable value	7	User information layer 2 protocol (note 8) no comparable value X.25, link level ISO 6429, codeset 0
7	User information layer 3 protocol (note 10) Q.931 (I.451) X.25, packet level		not supported not supported

General notes:

- 1) Other ISDN BC parameter values than those listed in the table, if indicated in the BC-IE, will be rejected by clearing the call, exception see mapping note 4.
- 2) Only the PLMN BC parameter values listed in the table may be generated (comparable values) during a mobile-terminated call by mapping the ISDN BC parameter values, exception see (10).
- 3) According to Q.931 (05/98) and 3G TS 24.008, respectively, the octets are counted from 1 to n onwards; the bit position in a particular octet is indicated by #x..y, with {x,y} = 1..8 (bit 1 is the least and bit 8 the most significant bit).
- 4) If octets 5 to 5d of the ISDN BC are absent but present in the LLC, the LLC octets should apply for the mapping as indicated above. In the case of V.120 interworking (see note 24) these LLC octets shall apply.
- 5) If within the ISDN BC the parameters information transfer capability indicates "3,1 kHz audio" and user layer 1 protocol indicates "G711 A-law" or "G.711 μ -law" (PCS-1900) but no modem type is available and the HLC does not indicate "facsimile group 3", octets 5 to 5d of the LLC, if available, apply for the above mapping procedure.
- 6) The number of octets which shall be encoded for the PLMN BC-IE must comply to encoding rules in 3G TS 24.008 and the combination of the different parameter values shall be in accordance to 3G TS 27.001.

NOTES regarding the mapping:

- 1) This PLMN parameter value is inserted according to user rate requirements and network capabilities / preferences.
- 2) This PLMN parameter value is inserted, if the information transfer capability in ISDN BC is "3,1kHz audio" and a comparable modem type is specified.
- 3) This PLMN parameter value is inserted, if the information transfer capability is "3,1 kHz audio" and the content of the HLC-IE, if any, indicates "facsimile group 2/3", (for details refer to subclause 10.2.2 case 3 for HLR action and case 5 for VMSC action). Note that via MAP the value "alternate speech/facsimile group 3 - starting with speech" shall be used, when TS 61 applies.
- 4) When interworking with an ISDN according to ETS 300 102-1, octets 4a and 4b may be present. The values are ignored and PLMN values are set according to notes 5 and 9.
- 5) This PLMN parameter value is inserted if the comparable ISDN parameter value is missing.

- 6) The value of the Intermediate Rate field of the GSM Bearer Capability information element shall only depend on the values of the user rate or the radio channel requirement in the same information element. If the connection element is "transparent", the value is 16 kbit/s, if the user rate is 9.6 or 12 kbit/s, and 8 kbit/s otherwise. For any other connection element setting the value is 16 kbit/s, if the radio channel requirements are "full rate" or "dual, full rate preferred", or "dual, half rate preferred", and 8 kbit/s, if the radio channel requirements is "half rate".
- 7) This PLMN BC parameter value is inserted, if the PLMN BC parameter "Information Transfer Capability" indicates "Unrestricted digital information", "facsimile group 3" or "alternate speech/facsimile group 3, starting with speech".
- 8) Where the network indicates "asynchronous" and connection elements "non-transparent", "both, transparent preferred" or "both, non-transparent preferred", then the GSM BC should be forwarded without parameter user information layer 2 protocol, see also (10).
- 9) The PLMN parameter value shall be set to "unstructured" where the network indicates connection element "transparent". Where the network indicates connection elements "non transparent" "both, transparent preferred" or "both, non transparent preferred" the value of the parameter structure shall be set to "SDU Integrity".
- 10) Mapping of parameter values of this octet to PLMN BC parameters and values are subject to specific application rules, i.e. unless otherwise explicitly stated in an appropriate TS mapping to PLMN BC parameters shall not take place.
- 11) This value shall be used when the value of the PLMN BC parameter "Information Transfer Capability" indicates the value "3,1 kHz audio ex PLMN", "facsimile group 3" or "alternate speech/facsimile group 3, starting with speech" which is reserved for MAP operations.
- 12) The modem encoding of both Q.931 (05/98) and ETS 300 102-1 version 1 shall be accepted and mapped according to 3G TS 24.008.
- 13) Value not used for currently defined bearer services and Teleservices.
- 14) NIC is only supported in GSM for "3,1 kHz Ex PLMN audio" interworking with synchronous data transmission.
- 15) Because the required flow control mechanism can not be indicated to the MS (refer to 3G TS 27.001), the network shall check if the flow control mechanism selected by the MS and indicated in the CALL CONFIRMED message suits to the requirements requested by the ISDN terminal adaptor. In case of a mismatch the call shall be released in the IWF.

Because an asymmetric flow control mechanism (with respect to transmitting and receiving side) is not supported in the PLMN, the different values of the ISDN BC-IE parameters "flow control on Tx" and "flow control on Rx" shall be interpreted in the following way:

- "Flow control on Rx" set to "accepted" matches with "outband flow control", irrespective of the value of the parameter "flow control on Tx".
 - "Flow control on Rx" set to "not accepted" and "flow control on Tx" set to "not required" matches with "inband flow control" and "no flow control".
 - where "Flow control on Rx" is set to "not accepted" and "flow control on Tx" to "required" the call shall be released by the IWF.
- 16) If in case of 3,1 kHz audio interworking "inband negotiation possible" is indicated and the parameter user rate is set to "rate is indicated by E bits specified in Recommendation I.460 or may be negotiated inband" the user rate in the PLMN BC-IE shall be set according to a network preferred value, whereas the preferred value of the Radio Channel Requirement shall be considered. If ISDN-BC parameter modem type is present, its value shall be ignored. The PLMN-BC parameter modem type shall be set according to the user rate in case of connection element "transparent" and to "autobauding type 1" in case of connection element "non transparent", "both, transparent preferred" or "both, non transparent preferred". In case of data compression high speed modems, like V.32bis, V.34 and/or V.90 may be used in the IWF. Autobauding may also be used to support user rates less than 9.6 kbit/s towards the PSTN.

For unrestricted digital interworking the call shall be rejected if these values are indicated.

If the PLMN-BC parameter modem type indicates "autobauding type 1" or "none", then the PLMN-BC parameter other modem type shall be set to "no other modem type".

- 17) For the use of NIRR see 3G TS 27.001. The VMSC shall set this parameter dependent upon its capabilities and preferences.
- 18) If compression is supported by the MSC, the value "data compression possible" may be set. Depending on the capabilities of the MSC, the user rate value and the intermediate rate value is set to an appropriate value.
- 19) Only applicable if the parameter ISDN-BC ITC indicates "3,1 kHz audio" and for "UDI" calls if User Rate > "19.2 kbit/s".
- 20) The user rate of the PLMN BC is set to the value for the fall-back bearer service. In case the mobile station does not support the fixed network user rate (i.e. the call confirmation message does not contain the fixed network user rate parameter), the network may release the call for a transparent connection element.
- 21) The modem type parameter of the PLMN -BC is taken into account, only.
- 22) In case no LLC is received and the ISDN-BC received consists of octets 1 to 4 only, coded:

Coding standard:	CCITT
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64kbit/s

the following PLMN -BC parameters, shall be set to:

fixed network user rate:	64 kbit/s
connection element:	transparent bothNT or bothT (If IWF supports FTM or PIAFS)

The other parameters of the PLMN -BC shall be set to values indicating a fall-back service.

- 23) When the MSC is directly connected to a restricted 64 kbit/s network, the ISDN BC-IE is coded with an ITC = RDI.

An ISDN BC-IE, as specified in ETR 018 and shown below, shall be taken to indicate that interworking with an indirectly connected restricted 64 kbit/s network is required:

Coding standard:	CCITT
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	V.110/X.30
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
User rate:	56 kbit/s

In this case the PLMN BC parameter Information Transfer Capability is set to „Other ITC“ and Other ITC parameter is set to „restricted digital“. If ISDN LLC exists, all the corresponding fields in the PLMN BC shall be derived from the ISDN LLC. Otherwise, the corresponding fields in the UMTS BC shall be derived from the ISDN BC. In the above both case, Connection element is set as follows.

Connection element:	transparent bothNT or bothT (If IWF supports FTM)
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- 24) V.120 interworking is required if the ISDN LLC parameter User Information Layer 1 Protocol is set to „V.120“. In this case the PLMN BC parameter Rate Adaptation is set to „Other rate adaptation“ and Other Rate Adaptation parameter is set to „V.120“. All the corresponding fields in the GSM BC shall be derived from the ISDN LLC.
- 25) This parameter is only included in case of non-transparent multislot connections.
- 26) This value was used by services defined for former GSM releases and does not need to be supported.

27) Following UMTS-BC parameters in SETUP message shall be set to:

Fixed network user rate	32 kbit/s
Connection element	transparent (for multimedia) bothNT or bothT (If IWF supports PIAFS, UMTS only)

28) UIL1P is set to “H.221 & H.242” or “H.223 & H.245” by H.324/I. In the case where UIL1P is set to “H.221 & H.242”, this should be mapped to “H.223 & H.245”.

29) In UMTS, if the User Rate of the ISDN BC is less than 9.6 kbit/s and the Connection Element is mapped to “NT”, then FNUR is fixed to 9.6 kbit/s.

CHANGE REQUEST		Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.	
29.007	CR	030	Current Version: 3.5.0
GSM (AA.BB) or 3G (AA.BBB) specification number ↑		↑ CR number as allocated by MCC support team	
For submission to: TSG_N #9	for approval <input checked="" type="checkbox"/>	strategic <input type="checkbox"/>	(for SMG use only)
<small>list expected approval meeting # here ↑</small>	for information <input type="checkbox"/>	non-strategic <input type="checkbox"/>	

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

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

Source: TSG_N3 **Date:** 28/08/00

Subject: 32 kbit/s UDI/RDI multimedia in GSM

Work item: Technical enhancements and improvements (TEI)

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

Reason for change: Removal of barriers to use the 32 kbit/s UDI/RDI multimedia in GSM.

Clauses affected: Table 7A and 7B.

Other specs Affected:	Other 3G core specifications <input checked="" type="checkbox"/> Other GSM core specifications <input checked="" type="checkbox"/> MS test specifications <input type="checkbox"/> BSS test specifications <input type="checkbox"/> O&M specifications <input type="checkbox"/>	→ List of CRs: 22.002, 27.001, 48.008 → List of CRs: 03.10, 04.21, 08.08, 08.20, 08.58 → List of CRs: → List of CRs:
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Other comments:



help.doc

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

Table 7A: Comparable setting of parameters in PLMN and ISDN: Mobile Originated

Octet	PLMN BC parameter value	Octet	ISDN BC parameter value
1	Bearer Capability IEI	1	Bearer Capability IEI
2	Length of BC contents	2	Length of BC contents
3 #7..6	Radio channel requirement half rate channel full rate channel dual, full, rate preferred dual, half rate preferred		No comparable field
3 #5	Coding Standard GSM standard coding	3 #7..6	Coding Standard CCITT standardized coding
3 #4	Transfer mode circuit mode packet mode (note7)	4 #7..6	Transfer mode circuit mode packet mode
3 #3..1	Information transfer capability speech unrestricted digital 3,1 kHz audio ex PLMN facsimile group 3 (note 1) other ITC (see octet 5a)	3 #5..1	Information transfer capability speech unrestricted digital 3,1 kHz audio 3,1 kHz audio no comparable value
5a #7..6	Other ITC restricted digital		(note 18)
4 #7	Compression (note 14) data compression allowed data compression not allowed		No comparable field
4 #6..5	Structure SDU integrity unstructured	4a #7..5	Structure (note 4)
4 #4	Duplex mode half duplex full duplex	5d #7	Duplex mode half duplex full duplex
4 #3	Configuration point to point	4a #4..3	Configuration (note 4)
4 #1	Establishment demand	4a #2..1	Establishment (note 4)
4	NIRR (note 12) no meaning Data ≤ 4.8kbit/s, FR nt, 6kbit/s radio interface is requested		No comparable field

(continued)

Table 7A (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Originated

Octet	PLMN BC parameter value	Octet	ISDN BC parameter value
5 #5..4	Rate adaptation no rate adaptation (note 2) V.110, I.460/X.30 rate adaptation CCITT X.31 flag stuffing No comparable value (note 11) No comparable value (note 11) No comparable value (note 11) other rate adaptation (see octet 5a)	5 #5..1	User information layer 1 protocol no comparable value CCITT standardized rate adaption V.110, I.460/X.30 CCITT standardized rate adaption X.31 flag stuffing Recommendation G.711 μ -law Recommendation G.711 A-law (note 3) Recommendation G.721 32 kbit/s ADPCM and I.460 No comparable value No comparable value H.223 & H.245 (note 26)
5a #5..4	Other rate adaptation V.120 (note 17) PIAFS (note 27) H.223 & H.245		No comparable field
5 #3..1	Signalling access protocol I.440/I.450 X.21 X.28, ded.PAD, indiv.NUI (note 24) X.28, ded PAD, univ.NUI (note 24) X.28, non-ded PAD X.32		No comparable field
6 #1	Synchronous/asynchronous synchronous asynchronous	5a #7	Synchronous/asynchronous synchronous asynchronous (note 25)
6 #5..2	User info. layer 1 protocol default layer 1 protocol	5 #5..1	User info. layer 1 protocol see section under rate adaptation for 3G TS 24.008 above
6a #7	Number of stop bits 1 bit 2 bits	5c #7..6	Number of stop bits 1 bit 2 bits
6a #6	Negotiation In band neg. not possible no comparable value	5a #6	Negotiation In band neg. not possible In band neg. possible (note 10)
6a #5	Number of data bits 7 bits 8 bits	5c #5..4	Number of data bits excluding parity if present 7 bits 8 bits
6a #4..1	User rate 0.3 kbit/s 1.2 kbit/s 2.4 kbit/s 4.8 kbit/s 9.6 kbit/s 12 kbit/s (note 7) 1.2 kbit/s / 75 bit/s (note 24) any value no comparable value	5a #5..1	User rate 0.3 kbit/s 1.2 kbit/s 2.4 kbit/s 4.8 kbit/s 9.6 kbit/s 12 kbit/s 75 bit/s / 1.2 kbit/s 19.2 kbit/s (note 14) Ebits or inband negotiation (note 10)

(continued)

Table 7A (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Originated

Octet	PLMN BC parameter value	Octet	ISDN BC parameter value
6b #7..6	Intermediate rate 8 kbit/s 16 kbit/s any value	5b #7..6	Intermediate rate (note 13) 8 kbit/s or not used 16 kbit/s or not used 32 kbit/s or not used (note 14)
6b #5	NIC on Tx does not require requires (note7)	5b #5b	NIC on Tx does not require requires (note 8)
6b #4	NIC on Rx cannot accept can accept (note 7)	5b #4	NIC on Rx cannot accept can accept (note 8)
6b #3..1	Parity information odd even none forced to 0 forced to 1	5c #3..1	Parity information odd even none forced to 0 forced to 1
6c #7..6	Connection element transparent non-transparent (RLP) both, transp. preferred both, non-transp. preferred		No comparable field
6c #5..1	Modem type none V.21 V.22 V.22bis V.23 (note 24) V.26ter V.32 modem for undef. interface autobauding type 1	5d #6..1	Modem type no comparable value (note 5) V.21 V.22 V.22bis V.23 V.26ter V.32 No comparable value (note 5) No comparable value (note 5, note 10)
7 #5..1	User info. layer 2 protocol X.25 link level ISO 6429, codeset 0 COPnoFIcT videotex profile 1 (note 7) X.75 layer 2 modified (CAPI)	6	User info. layer 2 prot. (note 6) X.25 link level no comparable value no comparable value no comparable value X.25 link level
6d #5..1	Fixed network user rate (note 15) FNUR not applicable (note 7) 9,6 kbit/s 12 kbit/s (note 7) 14,4 kbit/s 19,2 kbit/s 28,8 kbit/s 32,0 kbit/s 33,6 kbit/s 38,4 kbit/s 48,0 kbit/s 56,0 kbit/s 64,0 kbit/s	5a #5..1	User rate no comparable value 9,6 kbit/s 12 kbit/s 14,4 kbit/s 19,2 kbit/s 28,8 kbit/s 32,0 kbit/s no comparable value 38,4 kbit/s 48,0 kbit/s 56,0 kbit/s no comparable value (note 16)

(continued)

Table 7A (concluded): Comparable setting of parameters in PLMN and ISDN: Mobile Originated

Octet	PLMN BC parameter value	Octet	ISDN BC parameter value
6e #3..1	Maximum number of traffic channels 1 TCH 2 TCH 3 TCH 4 TCH 5 TCH 6 TCH 7 TCH (note 7) 8 TCH (note 7)		No comparable field
6f #4..1	Wanted air interface user rate (note 23) air interface user rate not applicable (note 7) 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 7)		No comparable field
6d #7..6	Other modem type (note 15) No other modem type V.34	5d #6..1	Modem type no comparable value V.34
6e #7..4	Acceptable channel coding(s) TCH/F4.8 acceptable (note 19) TCH/F9.6 acceptable TCH/F14.4 acceptable		No comparable field
6f #7..5	User initiated modification indicator (note 23) User initiated modification not required User initiated modification upto 1 TCH/F may be requested User initiated modification upto 2 TCH/F may be requested User initiated modification upto 3 TCH/F may be requested User initiated modification upto 4 TCH/F may be requested		No comparable field
6g #7..5	Acceptable channel coding(s) (note 20) TCH/F28.8 acceptable TCH/F32.0 acceptable (note 21) TCH/F43.2 acceptable (note 22)		No comparable field
6g #4..3	Asymmetry preference indication (Note 23) no preference up link biased asymmetry preference down link biased asymmetry preference		No comparable field

The application rules for coding the information elements ISDN-BC/LLC/HLC as set out in ETR 018 and Q.931 (05/98) shall apply.

Other field values in the ISDN BC-IE not supported in 3G TS 24.008 are:

Information transfer rate: In this case default 64 kbit/s is selected.

Flow control on transmission: This shall be selected if outband flow control applies.

Flow control on reception: This shall be selected if outband flow control applies.

NOTE: Outband flow control is indicated by the absence of the UIL2P parameter for non-transparent connections.

User information layer 3 protocol:

Octet 7 shall not be sent unless specific application rules are given for particular cases (to be defined by PLMN). End-to-end significant User Information layer 3 protocol shall be sent by LLC.

NOTE 1: In the case where PLMN BC "Information Transfer Capability" indicates "Facsimile group 3" and only a single PLMN BC is contained in the call set-up request then this shall be mapped to an ISDN BC with:

Coding standard:	CCITT
Information Transfer capability:	3,1 kHz audio
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User layer 1 protocol:	G711 A-law or μ -law (PCS-1900)

and

- If an HLC is not present, the network will insert a "Facsimile group 2/3" HLC.
- If an HLC element is present, the network will pass it through unmodified.

In the case where PLMN BC "Information Transfer Capability" indicates "Facsimile group 3" and two PLMN BCs are contained in the call set-up request, then the same ISDN BC as mentioned above is created. If the first PLMN BC indicates "facsimile group 3" an HLC "facsimile group 2/3" will be inserted by the network (if not received from the MS). However if the first PLMN BC indicates "speech", the network will not send a HLC, irrespective where a HLC was received from the MS or not.

NOTE 2: This value is present in combination with information transfer capability parameter value "3,1 kHz audio Ex PLMN" or "facsimile group 3" and will therefore be mapped to the value "Recommendation G.711 A-law" or "Recommendation G.711 μ -law" (PCS-1900) of the Q.931 (05/98) parameter user layer 1 protocol (see note 3).

NOTE 3: The value "Recommendation G.711 A-law" or "Recommendation G.711 μ -law" (PCS-1900) applies only when the Q.931 (05/98) parameter information transfer capability indicates "3,1 kHz audio" or "speech".

NOTE 4: When interworking with an ISDN according to ETS 300 102-1 octets 4a and 4b shall not be included because default values apply. In an ISDN according to Q.931 (05/98) these octets no more exist.

NOTE 5: In this case octet 5d shall not be included.

NOTE 6: Octet 6 shall not be sent unless specific application rules are given for a particular case (PLMN specified). End-to-end significant user information layer 2 protocol shall be sent by LLC.

NOTE 7: Not used for currently defined Bearer Services and Teleservices.

NOTE 8: These values will only be set if the "Information Transfer Capability" indicates "3,1 kHz audio", synchronous data transmission is used and octet 5b of the ISDN BC is present.

NOTE 9: (VOID).

NOTE 10: The PLMN BC-IE parameter value "autobauding modem type 1" will be mapped to the ISDN BC-IE parameter values "inband negotiation possible" and "user rate indicated by E-bits specified in ITU-T Recommendation I.460 or may be negotiated inband" (octet 5a of ISDN BC-IE). In case of data compression high speed modems, like V.32bis, V.34 and/or V.90 may be used in the IWF. Autobauding may also be used to support user rates less than 9.6 kbit/s towards the PSTN.

NOTE 11: The ITC value of the PLMN BC-IE "speech", "3,1 kHz audio Ex PLMN" will indicate these requirements.

NOTE 12: For the use of NIRR see 3G TS 27.001.

NOTE 13: The value of the Intermediate Rate field of the ISDN Bearer Capability information element shall only depend on the values of the User Rate and the Information Transfer Capability in the same information element. The correspondence is:

Intermediate Rate = not used if User Rate > than 19.2 kbit/s.
Intermediate Rate = 32 kbit/s if User Rate = 19,2 kbit/s or 14.4 kbit/s.

Intermediate Rate = 16 kbit/s if User Rate = 9,6 kbit/s.
Intermediate Rate = 8 kbit/s otherwise.

In case of Audio calls the value of the Intermediate Rate may be set to "not used".

NOTE 14: If compression is supported by the MSC and "data compression allowed" is indicated, then the ISDN user rate for UDI calls shall be set as follows. If the parameter "FNUR" is present the ISDN user rate shall be set to this value. Otherwise the PLMN user rate shall be mapped to an equal or any higher ISDN user rate value (in case of V.110 the highest ISDN user rate shall be 19,2 kbit/s). The Intermediate Rate shall be set to an appropriate value. (see subclause 10.2.4.11).

In case of "3,1 kHz audio" the modem shall try to negotiate data compression and flow control (see subclause 9.2.4.11). In case of "autobauding type 1" high speed modems may be used (see note 10).

NOTE 15: User rate of the PLMN -BC is overridden by the fixed network user rate of the PLMN BC-IE if available. When the MT indicates „autobauding“, „modem for undefined interface“ or „none“, the other modem type shall be set to „no other modem type“; any other value of the modem type is overridden by the other modem type value (see 3G TS 27.001). In UMTS, if octet 6d is not present in the PLMN BC, the MSC shall reject the call. The support of user rates lower than 9.6 kbit/s in UMTS are only possible in the scope of autobauding (see note 10).

NOTE 16: The ISDN-BC will consist of the octets 1 to 4 only, coded:

Coding standard:	CCITT
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s

NOTE 17: V.120 interworking is selected.

If an LLC element is not present, the network will insert an LLC. If an LLC is present it may be modified. The PLMN -BC parameters negotiated with the MS shall be mapped to the LLC parameters. The LLC parameter Rate Adaptation will be set to "V.120".

When interworking with unrestricted 64 kbit/s networks the ISDN BC shall be coded according to note 16.

NOTE 18: When the MSC is directly connected to a restricted 64 kbit/s network, the ISDN BC-IE is coded with an ITC = RDI.

When indirectly interworking with a restricted 64 kbit/s network the ISDN BC-IE shall be coded according to ETR 018, as shown below:

Coding standard:	CCITT
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	V.110/X.30
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
User rate:	56 kbit/s

If an LLC element is not present, the network will insert an LLC. If an LLC is present it may be modified. The PLMN -BC parameters negotiated with the MS shall be mapped to the LLC parameters according to the rules in this table. The LLC parameter Information Transfer Capability will be set to „restricted digital“

NOTE 19: In case the MS signals an ACC containing TCH/F4.8 only and the network does not support TCH/F4.8 channel coding, then the MSC may act as if TCH/F9.6 were included in the ACC.

NOTE 20: Extension of the 'Acceptable channel codings' field in octet 6e in case EDGE channel codings are supported.

NOTE 21: ~~Void Only applicable for bit transparent 56 and 64 kbit/s services.~~

NOTE 22: Only applicable for non-transparent services.

NOTE 23: This parameter shall be included if EDGE channel codings are indicated in ACC. In cases where this parameter would not otherwise be included, the value is set to 'Air interface user rate not applicable' or 'User initiated modification not requested' or 'No preference'.

NOTE 24: This value was used by services defined for former GSM releases and does not need to be supported.

NOTE 25: The case of FTM is identified by Rate adaptation in the PLMN BC-IE set to "CCITT X.31 flag stuffing", Connection element set to "non-transparent", and Synchronous/asynchronous set to "asynchronous". The parameter values shall be set according to Note 16 in case FNUR is 64 kbit/s and according to Note 18 if Other ITC is RDI.

NOTE 26: In the case FNUR=64 kbit/s the ISDN BC-IE shall be coded as follows:

Coding standard:	ITU-T
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	H.223 and H.245

In the case FNUR=56 kbit/s the ISDN BC-IE shall be coded as in note 18.

In the case FNUR=32 kbit/s the ISDN BC-IE shall be coded as follows:

Coding standard:	ITU-T
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	V.110, I.460 & X.30
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
User rate:	32 kbit/s

In the case FNUR=28.8 kbit/s the ISDN BC-IE shall be coded as follows:

Coding standard:	ITU-T
Information Transfer capability:	3.1 kHz Audio
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	G.711 A-law or μ -law
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
Modem type:	V.34
User rate:	28.8 kbit/s

In the case FNUR=33.6 kbit/s the ISDN BC-IE shall be coded as follows:

Coding standard:	ITU-T
Information Transfer capability:	3.1 kHz Audio
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	G.711 A-law or μ -law

NOTE 27: In the case the FNUR=32 kbit/s the ISDN BC-IE shall be coded for PIAFS as follows:

Coding standard:	ITU-T
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	V.110, I.460 and X.30
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
User rate:	32 kbit/s

In the case of a FNUR=64 kbit/s the ISDN BC-IE shall be coded for PIAFS as in note 16.

Table 7B: Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
1	Bearer Capability IEI	1	Bearer Capability IEI
2	Length of BC contents	2	Length of BC contents
	no comparable field	3 #7..6	Radio channel requirement (note 1) half rate channel full rate channel both, half rate preferred both, full rate preferred
3 #7..6	Coding standard CCITT standardized coding	3 #5	Coding standard GSM standardized coding
3 #5..1	Information transfer capability speech unrestricted digital 3,1 kHz audio no comparable value no comparable value 7 kHz audio video (note 23)	3 #3..1	Information transfer capability speech unrestricted digital 3,1 kHz audio ex PLMN (note2) facsimile group 3 (note 3) other ITC (see octet 5a) not supported not supported
		5a #7..6	Other ITC restricted digital
4 #7..6	Transfer mode circuit mode packet mode	3 #4	Transfer mode circuit mode circuit mode
4 #5..1	Information transfer rate 64 kbit/s		no comparable field
	No comparable field	4 #7	Compression (note 18) data compression possible data compression not possible
	No comparable field (note 4)	(4) 4 #6..5	Structure (note 9) SDU integrity unstructured
4a #4..3	No comparable field (note 4)	4 #3	Configuration point-to-point (note 5)
	No comparable field	4 #2	NIRR (note 17) No meaning Data ≤ 4.8 kbit/s, FR nt, 6 kbit/s radio interface requested
4a #2..1	No comparable field (note 4)	4 #1	Establishment demand (note 5)
4b #7..6			
4b #5..1			

(continued)

Table 7B (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
5 #5..1	User information layer 1 protocol no comparable value CCITT V.110, I.460 / X.30 G.711 A-law CCITT X.31 flag stuffing no comparable value No comparable value H.221 & H.242(note 28) H.223 & H.245	5 #5..4	Rate adaption no rate adaption (note 11) V.110, I.460/X.30 rate adaption no comparable value CCITT X.31 flag stuffing other rate adaption (see octet 5a)
		5a #5..4	Other rate adaptation V.120 (note 24) PIAFS H.223 & H.245 H.223 & H.245
	no comparable field	5 #3..1	Signalling access protocol I.440/I.450 X.21 X.28, ded.PAD, indiv.NUI (note 26) X.28, ded.PAD, univ.NUI (note 26) X.28, non-ded.PAD X.32
	see above	6 #5..2	User information layer 1 protocol default layer 1 protocol
5a #7	Synchronous / asynchronous synchronous asynchronous	6 #1	Synchronous/asynchronous synchronous asynchronous
5a #6	Negotiation not possible inband neg, possible (note 16)	6a #6	Negotiation not possible no comparable value

(continued)

Table 7B (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
5a #5..1	User rate 0,3 kbit/s 1,2 kbit/s 2,4 kbit/s 4,8 kbit/s 9,6 kbit/s 12 kbit/s rate is indicated by Ebit as specified in rec. I.460 0,6 kbit/s 3,6 kbit/s 7,2 kbit/s 8 kbit/s 14,4 kbit/s 16 kbit/s 19.2 kbit/s 28.8 kbit/s 32 kbit/s 38.4 kbit/s 48 kbit/s 56 kbit/s 57.6 kbit/s 0,1345 kbit/s 0,1 kbit/s 75 bit/s / 1,2 kbit/s 1,2 kbit/s / 75 bit/s 0,110 kbit/s 0,2 kbit/s	6a #4..1	User rate (note 18 and 29) 0,3 kbit/s 1,2 kbit/s 2,4 kbit/s 4,8 kbit/s 9,6 kbit/s 12 kbit/s (note 13) (note 16) not supported not supported not supported not supported (note 20) not supported (note 20) (note 20) (note 20) (note 20) (note 20) (note 20) not supported not supported not supported not supported not supported not supported not supported
5b #7..6	Intermediate rate not used (note 19) 8 kbit/s 16 kbit/s 32 kbit/s	6b #7..6	Intermediate rate (note 6) (note 18) 8 or 16 kbit/s 8 kbit/s 16 kbit/s
5b #5	NIC on Tx (note 14) does not require requires	6b #5	NIC on Tx does not require requires (note 13)
5b #4	NIC on Rx (note 14) cannot accept can accept	6b #4	NIC on Rx cannot accept can accept (note 13)
5b #3	Flow control on Tx (note 15) Not Required Required		no comparable field
5b #2	Flow control on Rx (note 15) Cannot Accept Accept		no comparable field
5c #7..6	Number of stop bits 1 bit 2 bits not used 1.5 bits	6a #7	Number of stop bits 1 bit 2 bits no comparable value not supported

(continued)

Table 7B (continued): Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
5c #5..4	Number of data bits 7 bits 8 bits not used 5 bits	6a #5	Number of data bits 7 bits 8 bits no comparable value not supported
5c #3..1	Parity information odd even none forced to 0 forced to 1	6b #3..1	Parity information odd even none forced to 0 forced to 1
	no comparable field	6c #7..6	Connection element (note 1) transparent non-transparent (RLP) both, transp. preferred both, non-transp preferred
5d #7	Duplex mode half duplex full duplex	4 #4	Duplex mode half duplex (note 13) full duplex (note 5)
5d #6..1	Modem type reserved V.21 V.22 V.22bis V.23 V.26ter V.32 V.26 V.26bis V.27 V.27bis V.29 no comparable value	6c #5..1	Modem type (note 12) none (note 7) V.21 V.22 V.22bis not supported V.26ter V.32 not supported not supported not supported not supported not supported autobauding type 1 (note 16)
5a #5..1	User rate no comparable value 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 kbit/s 56 kbit/s no comparable value	6d #5..1	Fixed network user rate (note 20) FNUR not applicable 9,6 kbit/s 14,4 kbit/s 19,2 kbit/s 28,8 kbit/s 32,0 kbit/s (note 27) 38,4 kbit/s 48,0 kbit/s 56,0 kbit/s 64,0 kbit/s (note 22)
	Modem type no comparable value (note 21) V.34	6d #7..6	Other modem type No other modem type V.34

(continued)

Table 7B (concluded): Comparable setting of parameters in PLMN and ISDN: Mobile Terminated

Octet	ISDN BC parameter value	Octet	PLMN BC parameter value
	No comparable field	6f #7..5	User initiated modification indicator (note 1) (note 25) User initiated modification not required User initiated modification upto 1 TCH/F may be requested User initiated modification upto 2 TCH/F may be requested User initiated modification upto 3 TCH/F may be requested User initiated modification upto 4 TCH/F may be requested
6 #5..1	User information layer 2 protocol (note 10) Q.921 (I.441) X.25, link level no comparable value	7	User information layer 2 protocol (note 8) no comparable value X.25, link level ISO 6429, codeset 0
7	User information layer 3 protocol (note 10) Q.931 (I.451) X.25, packet level		not supported not supported

General notes:

- 1) Other ISDN BC parameter values than those listed in the table, if indicated in the BC-IE, will be rejected by clearing the call, exception see mapping note 4.
- 2) Only the PLMN BC parameter values listed in the table may be generated (comparable values) during a mobile-terminated call by mapping the ISDN BC parameter values, exception see (10).
- 3) According to Q.931 (05/98) and 3G TS 24.008, respectively, the octets are counted from 1 to n onwards; the bit position in a particular octet is indicated by #x..y, with {x,y} = 1..8 (bit 1 is the least and bit 8 the most significant bit).
- 4) If octets 5 to 5d of the ISDN BC are absent but present in the LLC, the LLC octets should apply for the mapping as indicated above. In the case of V.120 interworking (see note 24) these LLC octets shall apply.
- 5) If within the ISDN BC the parameters information transfer capability indicates "3,1 kHz audio" and user layer 1 protocol indicates "G711 A-law" or "G.711 μ -law" (PCS-1900) but no modem type is available and the HLC does not indicate "facsimile group 3", octets 5 to 5d of the LLC, if available, apply for the above mapping procedure.
- 6) The number of octets which shall be encoded for the PLMN BC-IE must comply to encoding rules in 3G TS 24.008 and the combination of the different parameter values shall be in accordance to 3G TS 27.001.

NOTES regarding the mapping:

- 1) This PLMN parameter value is inserted according to user rate requirements and network capabilities / preferences.
- 2) This PLMN parameter value is inserted, if the information transfer capability in ISDN BC is "3,1kHz audio" and a comparable modem type is specified.
- 3) This PLMN parameter value is inserted, if the information transfer capability is "3,1 kHz audio" and the content of the HLC-IE, if any, indicates "facsimile group 2/3", (for details refer to subclause 10.2.2 case 3 for HLR action and case 5 for VMSC action). Note that via MAP the value "alternate speech/facsimile group 3 - starting with speech" shall be used, when TS 61 applies.
- 4) When interworking with an ISDN according to ETS 300 102-1, octets 4a and 4b may be present. The values are ignored and PLMN values are set according to notes 5 and 9.
- 5) This PLMN parameter value is inserted if the comparable ISDN parameter value is missing.

- 6) The value of the Intermediate Rate field of the GSM Bearer Capability information element shall only depend on the values of the user rate or the radio channel requirement in the same information element. If the connection element is "transparent", the value is 16 kbit/s, if the user rate is 9.6 or 12 kbit/s, and 8 kbit/s otherwise. For any other connection element setting the value is 16 kbit/s, if the radio channel requirements are "full rate" or "dual, full rate preferred", or "dual, half rate preferred", and 8 kbit/s, if the radio channel requirements is "half rate".
- 7) This PLMN BC parameter value is inserted, if the PLMN BC parameter "Information Transfer Capability" indicates "Unrestricted digital information", "facsimile group 3" or "alternate speech/facsimile group 3, starting with speech".
- 8) Where the network indicates "asynchronous" and connection elements "non-transparent", "both, transparent preferred" or "both, non-transparent preferred", then the GSM BC should be forwarded without parameter user information layer 2 protocol, see also (10).
- 9) The PLMN parameter value shall be set to "unstructured" where the network indicates connection element "transparent". Where the network indicates connection elements "non transparent" "both, transparent preferred" or "both, non transparent preferred" the value of the parameter structure shall be set to "SDU Integrity".
- 10) Mapping of parameter values of this octet to PLMN BC parameters and values are subject to specific application rules, i.e. unless otherwise explicitly stated in an appropriate TS mapping to PLMN BC parameters shall not take place.
- 11) This value shall be used when the value of the PLMN BC parameter "Information Transfer Capability" indicates the value "3,1 kHz audio ex PLMN", "facsimile group 3" or "alternate speech/facsimile group 3, starting with speech" which is reserved for MAP operations.
- 12) The modem encoding of both Q.931 (05/98) and ETS 300 102-1 version 1 shall be accepted and mapped according to 3G TS 24.008.
- 13) Value not used for currently defined bearer services and Teleservices.
- 14) NIC is only supported in GSM for "3,1 kHz Ex PLMN audio" interworking with synchronous data transmission.
- 15) Because the required flow control mechanism can not be indicated to the MS (refer to 3G TS 27.001), the network shall check if the flow control mechanism selected by the MS and indicated in the CALL CONFIRMED message suits to the requirements requested by the ISDN terminal adaptor. In case of a mismatch the call shall be released in the IWF.

Because an asymmetric flow control mechanism (with respect to transmitting and receiving side) is not supported in the PLMN, the different values of the ISDN BC-IE parameters "flow control on Tx" and "flow control on Rx" shall be interpreted in the following way:

- "Flow control on Rx" set to "accepted" matches with "outband flow control", irrespective of the value of the parameter "flow control on Tx".
 - "Flow control on Rx" set to "not accepted" and "flow control on Tx" set to "not required" matches with "inband flow control" and "no flow control".
 - where "Flow control on Rx" is set to "not accepted" and "flow control on Tx" to "required" the call shall be released by the IWF.
- 16) If in case of 3,1 kHz audio interworking "inband negotiation possible" is indicated and the parameter user rate is set to "rate is indicated by E bits specified in Recommendation I.460 or may be negotiated inband" the user rate in the PLMN BC-IE shall be set according to a network preferred value, whereas the preferred value of the Radio Channel Requirement shall be considered. If ISDN-BC parameter modem type is present, its value shall be ignored. The PLMN-BC parameter modem type shall be set according to the user rate in case of connection element "transparent" and to "autobauding type 1" in case of connection element "non transparent", "both, transparent preferred" or "both, non transparent preferred". In case of data compression high speed modems, like V.32bis, V.34 and/or V.90 may be used in the IWF. Autobauding may also be used to support user rates less than 9.6 kbit/s towards the PSTN.

For unrestricted digital interworking the call shall be rejected if these values are indicated.

If the PLMN-BC parameter modem type indicates "autobauding type 1" or "none", then the PLMN-BC parameter other modem type shall be set to "no other modem type".

- 17) For the use of NIRR see 3G TS 27.001. The VMSC shall set this parameter dependent upon its capabilities and preferences.
- 18) If compression is supported by the MSC, the value "data compression possible" may be set. Depending on the capabilities of the MSC, the user rate value and the intermediate rate value is set to an appropriate value.
- 19) Only applicable if the parameter ISDN-BC ITC indicates "3,1 kHz audio" and for "UDI" calls if User Rate > "19.2 kbit/s".
- 20) The user rate of the PLMN BC is set to the value for the fall-back bearer service. In case the mobile station does not support the fixed network user rate (i.e. the call confirmation message does not contain the fixed network user rate parameter), the network may release the call for a transparent connection element.
- 21) The modem type parameter of the PLMN -BC is taken into account, only.
- 22) In case no LLC is received and the ISDN-BC received consists of octets 1 to 4 only, coded:

Coding standard:	CCITT
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64kbit/s

the following PLMN -BC parameters, shall be set to:

fixed network user rate:	64 kbit/s
connection element:	transparent bothNT or bothT (If IWF supports FTM or PIAFS)

The other parameters of the PLMN -BC shall be set to values indicating a fall-back service.

- 23) When the MSC is directly connected to a restricted 64 kbit/s network, the ISDN BC-IE is coded with an ITC = RDI.

An ISDN BC-IE, as specified in ETR 018 and shown below, shall be taken to indicate that interworking with an indirectly connected restricted 64 kbit/s network is required:

Coding standard:	CCITT
Information Transfer capability:	UDI
Transfer mode:	circuit
Information transfer rate:	64 kbit/s
User information layer 1 protocol:	V.110/X.30
Synchronous/Asynchronous:	synchronous
Negotiation:	In-band negotiation not possible
User rate:	56 kbit/s

In this case the PLMN BC parameter Information Transfer Capability is set to „Other ITC“ and Other ITC parameter is set to „restricted digital“. If ISDN LLC exists, all the corresponding fields in the PLMN BC shall be derived from the ISDN LLC. Otherwise, the corresponding fields in the UMTS BC shall be derived from the ISDN BC. In the above both case, Connection element is set as follows.

Connection element:	transparent bothNT or bothT (If IWF supports FTM)
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- 24) V.120 interworking is required if the ISDN LLC parameter User Information Layer 1 Protocol is set to „V.120“. In this case the PLMN BC parameter Rate Adaptation is set to „Other rate adaptation“ and Other Rate Adaptation parameter is set to „V.120“. All the corresponding fields in the GSM BC shall be derived from the ISDN LLC.
- 25) This parameter is only included in case of non-transparent multislot connections.
- 26) This value was used by services defined for former GSM releases and does not need to be supported.

27) Following UMTS-BC parameters in SETUP message shall be set to:

Fixed network user rate	32 kbit/s
Connection element	transparent (for multimedia) bothNT or bothT (If IWF supports PIAFS, UMTS only)

28) UIL1P is set to “H.221 & H.242” or “H.223 & H.245” by H.324/I. In the case where UIL1P is set to “H.221 & H.242”, this should be mapped to “H.223 & H.245”.

29) In UMTS, if the User Rate of the ISDN BC is less than 9.6 kbit/s and the Connection Element is mapped to “NT”, then FNUR is fixed to 9.6 kbit/s.