

ETSI/TC SMG

Date : April 1992

Released by : ETSI/PT 12

UPDATE NOTE

Recommendation GSM 07.01

General on Terminal Adaptation Functions for MSs

Released version February 1992: 3.13.0

Updated version April 1992: 3.14.0

1. Reason for Change

Change Request 07.01-25r1 for GSM Phase 1 - approved at SMG#2 - is included.

2. Details of Change

Pages 4-11, 16, 17, 20, 22 and 29 of Annex II have been changed and shall be replaced by the attached updated pages marked with the new version number and "Updated April 1992". The front sheet of the specification has also been updated to highlight the new version number.

In addition, the attached 'Document Change Control Record' (a list with the "history" of the recommendation) should be appended to the recommendation, and PT12 will update it when necessary.

3. Instructions to update GSM Recommendation

to remove		to insert	
old pages	no. of sheets	new pages	no. of sheets
		Document Change Control Record	1 1)
1 and 2	1	1 and 2	1
AII 4 to 11	5	AII 3 to 12	5
AII 16 and 17	1	AII 16 and 17	1
AII 20 to 23	2	AII 20 to 23	2
AII 28 and 29	1	AII 28 and 29	1

1) To be inserted after Release Note

The version 3.13.0 together with these changes constitutes version 3.14.0.

ETSI/TC SMG

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DOCUMENT CHANGE CONTROL RECORD

Specification GSM 07.01

General on Terminal Adaptation Functions for MSs

Released version February 1992: 3.13.0

Updated version April 1992: 3.14.0

Subject	Decided at	Pages Marked	Doc GSM	Pages affected
<hr/>				
Change Request				
N° GSM 07.01-25r1	SMG#2	April 92	169/92r1	Anx II: 4-11, 16, 17, 20, 22, 29

END OF DOCUMENT CHANGE CONTROL RECORD

ETSI/GSM

Released by: ETSI PT12

Date: April 1992

Recommendation: GSM 07.01

Title: General on Terminal Adaptation Functions for
Mobile Stations

List of Contents:

1. Scope
 2. Access Reference Configuration
 3. Functions to Support Data Services
 4. Support of Non Transparent Bearer Services
 - 4.1 Functions of the Layer 2 Relay
 - 4.2 Radio Link Services Used
 5. Structure of the GSM 07-series of Recommendations
 6. Functions Common to All Interfaces
 - 6.1 Synchronization of the Traffic Channel
 - 6.2 Filtering of Channel Control Information
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 - 6.4 Test Loops
 - 6.5 Alternate speech/data and speech/facsimile Group 3
- Annex 1: List of Bearer Capability Elements
- Annex 2: Setting of BC, LLC and HLC Information Elements

Original Language: English

Number of Pages: 49 (11 + 2 + 36)

1. SCOPE

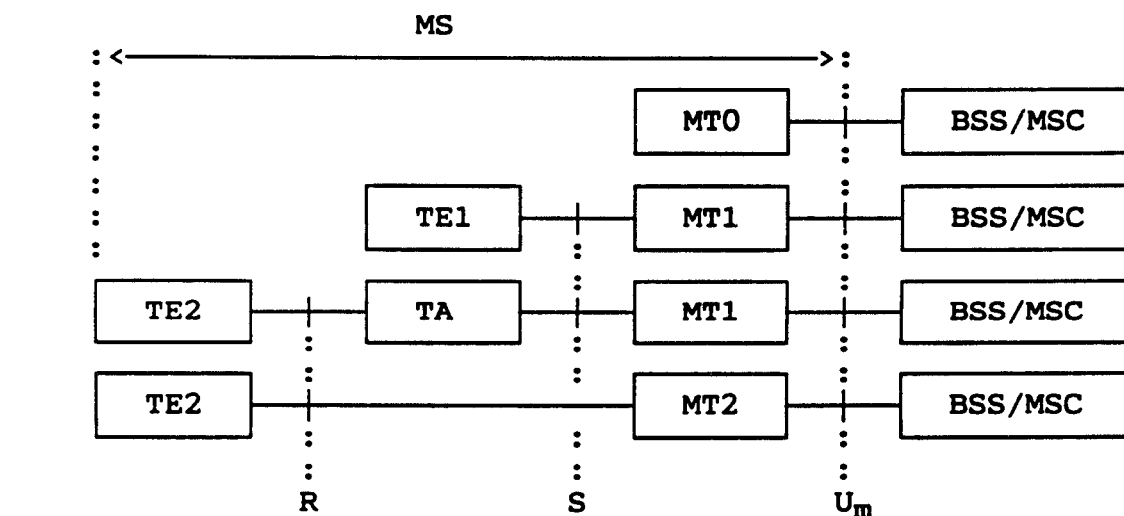
This recommendation is based on the principles of terminal adaptor functions presented in the CCITT I-series of recommendations (I.460 - I.463).

The GSM PLMN supports a wide range of voice and non-voice services in the same network. In order to enable non-voice traffic in the GSM PLMN there is a need to connect various kinds of terminal equipments to the Mobile Termination (MT). The target of this recommendation is to outline the functions needed for the terminal adaptation.

In the GSM recommendation 02.02 the bearer services are described. The general network configuration is described in GSM 03.02 and the GSM PLMN access reference configuration is defined in GSM 04.02. The various connection types used in the GSM PLMN are presented in GSM 03.10. Terminology used in this recommendation is presented in GSM 01.04. For support of data services between GSM PLMN and other networks see GSM 09-series of recommendations.

2. ACCESS REFERENCE CONFIGURATION

Figure 1 presents the reference configuration for access to a GSM PLMN (see GSM 04.02).



⊕ = reference point

TE1 = ISDN terminal
 TE2 = V- or X-type terminal
 TA = Terminal Adaptor
 BSS = Base Station System
 MSC = Mobile Switching Centre

Figure 1: GSM PLMN Access Reference Configuration

Within the scope of this recommendation the Mobile Termination MTO means a fully integrated MS including data terminal and its adaptation functions. MT1 includes ISDN terminal adaptation

- Mobile-terminated call set up to a MS consisting of a MT with R interface:
The BC related part of the compatibility check is carried out according to the knowledge of the MT concerning its implemented functions (i.e. answering the call). The requested field values of the non-negotiable parameters and the selected field values of the negotiable parameters determine the selection of the terminal function to be used for the intended connection.
- Mobile-terminated call set up to a MS consisting of a MT with S interface:
The GSM BC received from the MSC is mapped by the MT onto an applicable ISDN BC. In some cases a HLC may be generated, if it is not otherwise available (e.g. for group 3 facsimile). The BC related part of the compatibility check is up to the terminal connected to the S interface of the MT, as is the selection of the terminal function (i.e. answering the call) to be used for the intended connection.

1.1.2 Interpretation of the Diagrams

The purpose of the subsequent diagrams is to achieve unambiguous representation of the individual contents of the GSM BC-IE for the various occurrences during the call set-up phase, covering all bearer services and teleservices according to GSM 02.02 and GSM 02.03.

The basic principle adopted is a graphic scheme, or mask, wherein the ordinate designates the individual parameters of the GSM BC-IE and the abscissa gives the possible field values of these parameters. The abbreviations used in these sections are defined in table II.4. The allowed content of any GSM BC-IE is represented by a number of graphs connecting parameter values (abscissa points) of all parameters (ordinate points). Each graphic scheme is subdivided into two independent parts:

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

The generation of all GSM BC-IEs in all call set-up messages shall be in accordance with these graphs. Sections 1.2 through 1.14 show individual sets of graphs for each service group (BS/TS) and for each type of applicable Information Transfer Capability.

In addition, the following rules apply:

- Those parameters which have only one possible field value for all recognized services are shown in table II.4, where they are marked accordingly in the column "common setting of field values". They are not represented in the graphic scheme.
- Not all parameters of the GSM BC-IE are relevant for each service (BS/TS). This is represented by specific abscissa points with a value of "NA" (Not Applicable) allocated to these parameters. The graphs pass through these points for each such parameter. The actual field value to be used in the GSM BC-IE is marked in the column "default setting of field values (NA)" of table II.4. An abscissa point with a value of "NAV" (Not Available) indicates that the entire octet carrying this parameter (ref. table II.2 "General Structure of the GSM BC-Information Element") shall be omitted.

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

Table II.1

BC-Parameters subject to negotiation procedure

Mobile Originated Call:

BC-parameter	Message	
	SETUP	CALL PROC
NDB	requested value	as requested
NPB	requested value	as requested
NSB	requested value	as requested
CE	requested value (T/NT)	as requested
	"both" with the preferred value indicated(e.g. bothNT)	selected value (T/NT)
RCR	requested value (HR/FR)	as requested
	"dual" with the preferred value indicated(e.g. dualFR)	as requested 1.)
UIL2P	requested value 3.) or NAV 2.)	as requested or NAV 4.)

Mobile Terminated Call:

BC-parameter	Message	
	SETUP	CALL CONF
NDB	offered value	selected value (free choice)
NPB	offered value	selected value (free choice)
NSB	offered value	selected value (free choice)
CE	requested value (T/NT)	as requested
	"both" with the preferred value indicated(e.g. bothNT)	selected value (T/NT)
RCR	arbitrary value (HR / FR / "dual" with the preferred value indicated (e.g. dualFR))	requested value (FR/HR) or "dual" with the preferred value indicated (e.g. dualHR) 1.)
UIL2P	offered value 3.) or NAV 4)	selected or NAV 2.)

- 1.) the final decision, which radio channel is choosen, is done by the ASSIGNMENT COMMAND message. This message doesn't contain a BC-IE, but other parameters which define the radio channel.
- 2.) for CE:T or if out-band flow control requested by the MS
- 3.) not for CE:T
- 4.) "NAV" shall not be interpreted as an out-band flow control request by the MS

Table II.2

General Structure of the BC-Information Element

OCTET	INFORMATION ELEMENT FIELD
3	Radio channel requirements Coding standard Transfer mode Information Transfer Capability
4	Structure Duplex mode Configuration Establishment 2.)
5	Rate adaption Signalling access protocol 2.)
6	User information layer 1 protocol Synchronous / asynchronous 2.)
6a	Number of stop bits Negotiation Number of data bits User rate 2.)
6b	Intermeditate rate NIC on transmission NIC on reception Parity information 2.)
6c	Connection element Modem type 2.)
7	User information layer 2 protocol 1.) 2.)

1.) octets optional

2.) octets only available if the parameter "Information Transfer Capability" does not indicate "Speech".

Table II.3

Selection of flow control method (for CE:NT with SA:A only)

information element	flow control method		
	in-band	out-band ^{3.)}	none
number of data bits	7 or 8	7 or 8	7 or 8
user information layer 2 protocol	IA5 ^{1.)}	NAV	VIP3 ^{2.)}

1.) "IA5" stands for "ISO 6429, codeset 0, DC1/DC3" and is applicable for 7 and 8 bit codes.

2.) "VIP3" stands for "no flow control" and is not related to the use of TS 43

3.) "out-band" flow control requires V.42 in case of PSTN or V.110 in case of ISDN. If these functions are not supported, where required, the call pending shall be terminated, or an existing connection shall be cleared.

GSM 07.01 - version 3.14.0 - Annex 2 page 8
 Updated April 1992

Table II.4 (part 1):

Abbreviations for Parameters and Values:		common setting of field values	
		default setting of field values (NA)	
ITC...Information Transfer Capability:	- Speech - UDI..Unrestricted Digital - FAX3..Group 3 Facsimile - 3.1 kHz..3.1 kHz Ex PLMN		
TM....Transfer Mode:	- ci..Circuit	X	X
S.....Structure:	- SDU..Service Data Unit Integrity - Unstructured	X	
C.....Configuration:	- pp..Point to point	X	X
E.....Establishment:	- de..Demand	X	X
SA....Sync/Async:	- S..Synchronous - A..Asynchronous		
N.....Negotiation	- ibn..in band negotiation not possible	X	X
UR....User Rate:	- 0.3..0.3 kbit/s - 1.2..1.2 kbit/s - 1.2/0.75..1200/75 bit/s - 2.4..2.4 kbit/s - 4.8..4.8 kbit/s - 9.6..9.6 kbit/s - 12..12 kbit/s		
IR....Intermediate Rate:	- 4.. 4 kbit/s - 8.. 8 kbit/s - 16.. 16 kbit/s - not_used..not used	X	
NICT..Network Independent Clock on Tx:	- not_required.. Not required - required	X	X
NICR..Network Independent Clock on Rx:	- not_accepted..not accepted - accepted	X	X
NSB...Number of Stop Bits:	- 1..1 bit - 2..2 bit	X	
NDB...Number of Data Bits Excluding Parity If Present:	- 7.. 7 bit - 8.. 8 bit	X	
NPB...Parity Information:	- Odd - Even - None - 0.. Forced to 0 - 1.. Forced to 1	X	
UIL1P.User Information Layer 1 Protocol	- def..default layer 1 protocol	X	X

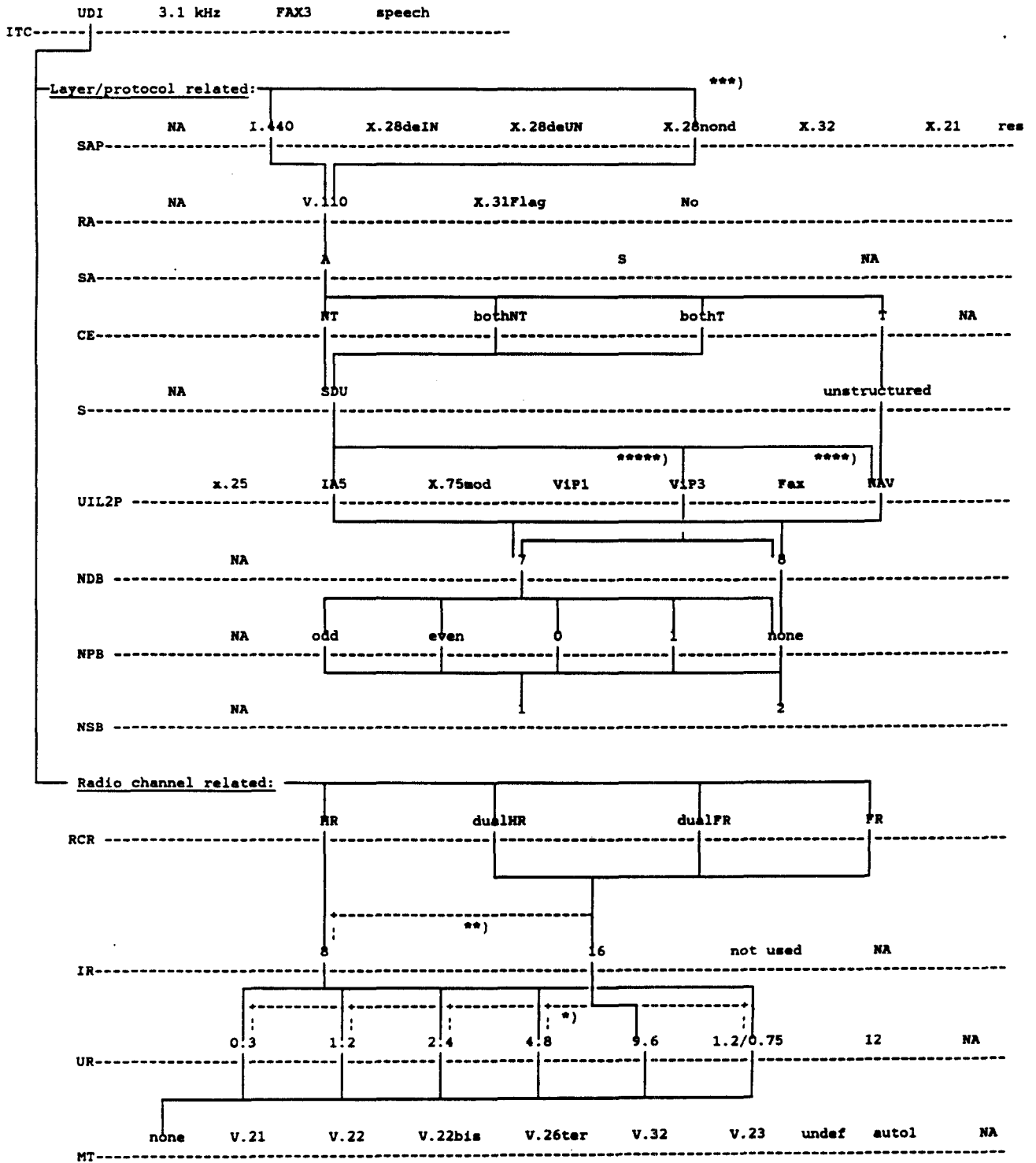
Table II.4 (part 2):

Abbreviations for Parameters and Values		common setting of field values	
			default setting of field values (NA)
DM....Duplex Mode:	- hd.. half Duplex - fd.. Full Duplex	X	X
MT....Modem Type:	- V.21 - V.22 - V.22 bis - V.23 - V.26 ter - V.32 - autol.. autobauding type 1 - none - undef.. modem for undefined interface	X	
RCR...Radio Channel Requirement:	- FR.. Full Rate Channel (B_m) - HR..Half Rate Channel (L_m) - dualHR..Dual Rate/Half Rate preferred - dualFR..Dual Rate/Full Rate preferred		
CE....Connection Element:	- T.. Transparent - NT.. Non Transparent - bothT both transparent preferred - bothNT both non Transparent preferred		
UIL2P.User Information Layer 2 Protocol:	- IA5 1.) - X.25 - X.75mod.. X.75 layer 2 modified (Teletex) - ViP1.. Videotex profile 1 - ViP3.. Videotex profile 3 2.) - Fax.. Facsimile group 3		
SAP...Signalling Access Protocol:	- I.440.. I.440/450 - X.21 - X.28deIN.. X.28, dedicted PAD,individual NUI - X.28deUN.. X.28, dedicted PAD,universal NUI - X.28nond.. X.28, non dedicated PAD - X.32	X	
RA....Rate Adaptation:	- V.110.. V.110/X.30 - X.31Flag.. X.31 flagstuffing - NO.. no rate adaptation	X	
CS....Coding Standard:	- GSM	X	X

1.) "IA5" stands for "ISO 6429, codeset 0, DC1/DC3" and is applicable for 7 and 8 bit codes.

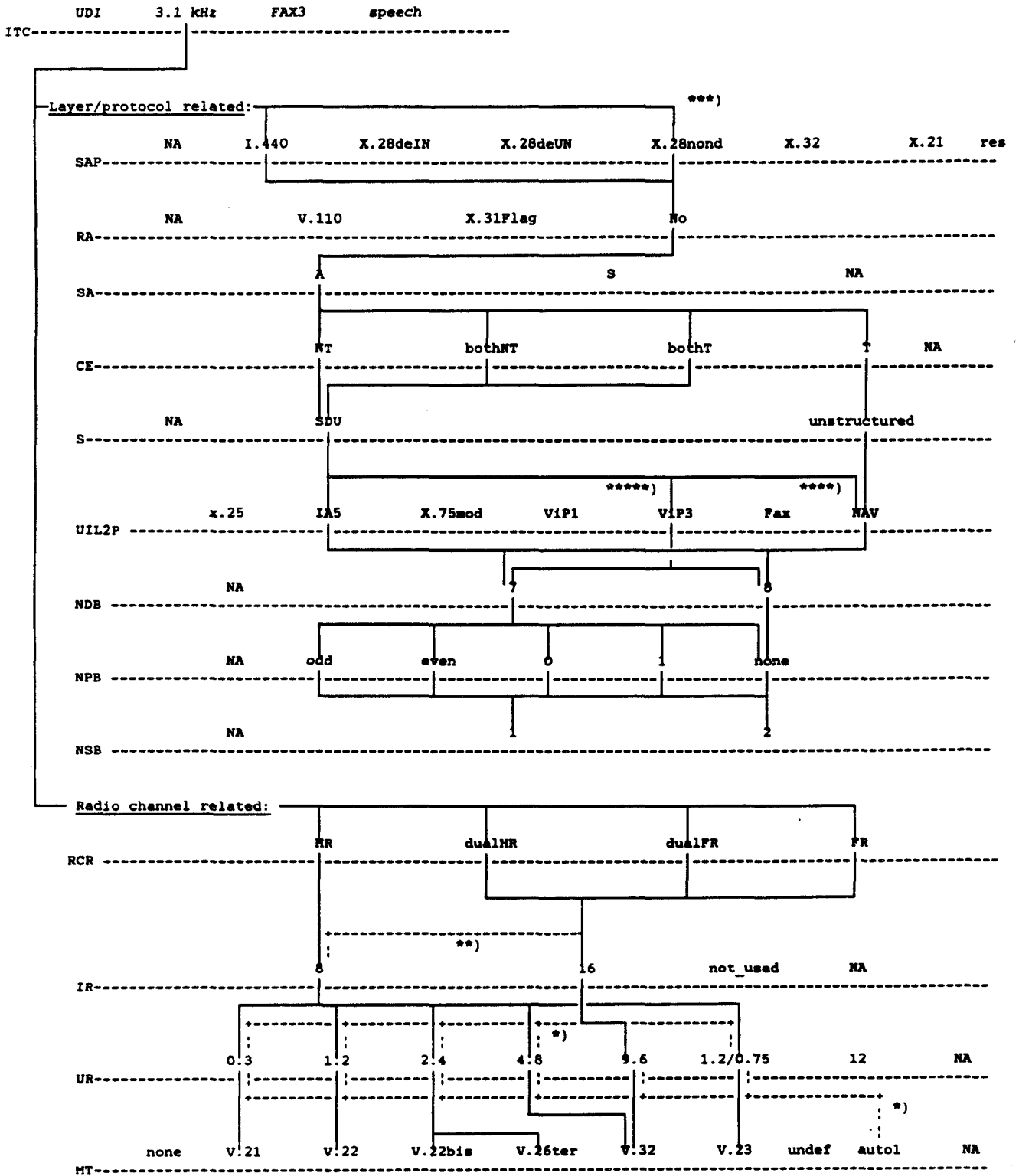
2.) "ViP3" stands for "no flow control" and is not related to the use of TS 43

1.2. Bearer Service 21 ... 26, Data Circuit Duplex Asynchronous
 1.2.1 Unrestricted digital information transfer capability



*) for CE:NT or "both"
 **) for CE:T only
 ***) for MOC only
 ****) for MTC in the SETUP message or MOC/MTC with "out-band" flow control requested
 *****) for MOC/MTC with no flow control requested

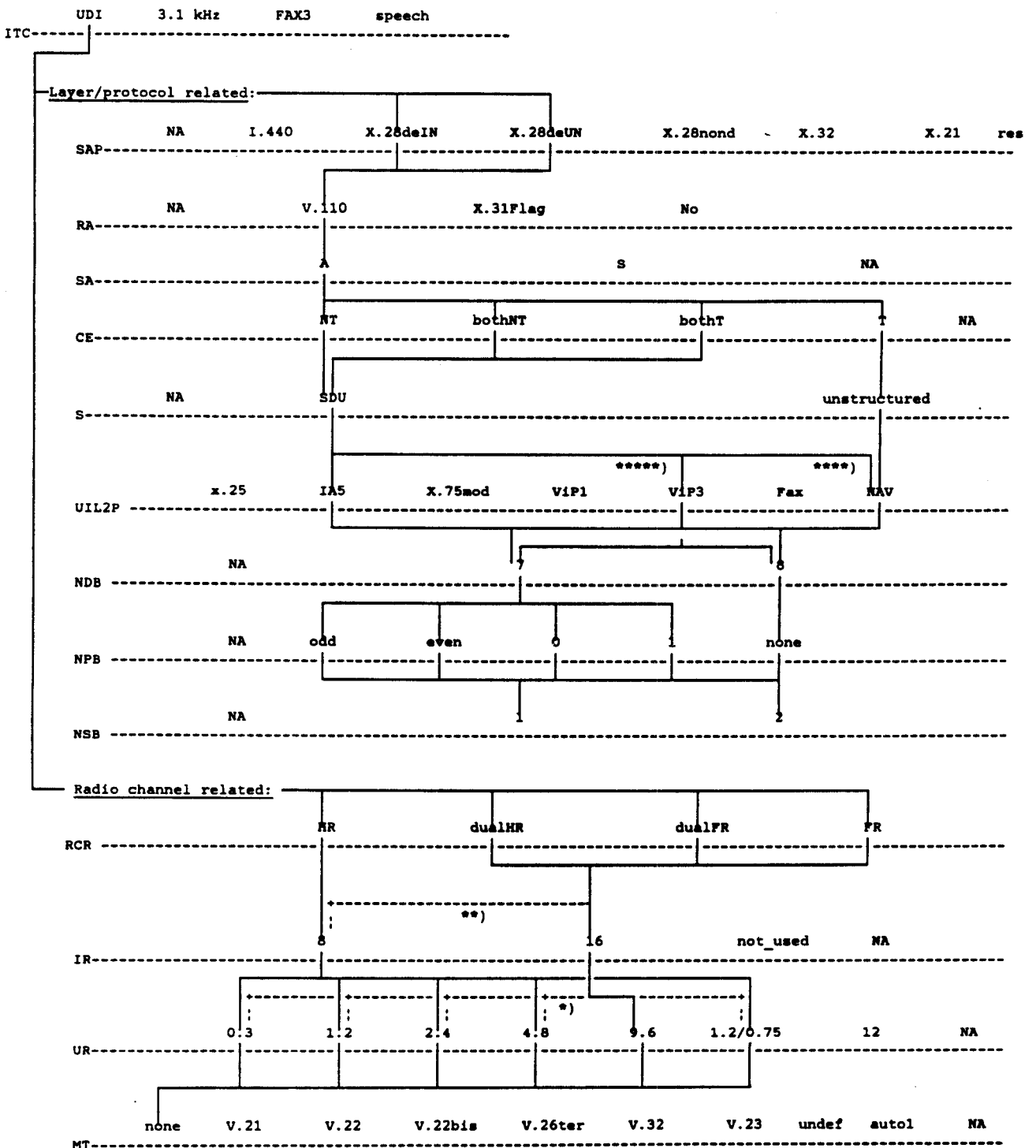
1.2.2 3.1 kHz audio ex-PLMN information transfer capability



*) for CE:NT or "both"
 **) for CE:T only
 ***) for MOC only
 ****) for MTC in the SETUP message or MOC/MTC with "out-band" flow control requested
 *****) for MOC/MTC with no flow control requested

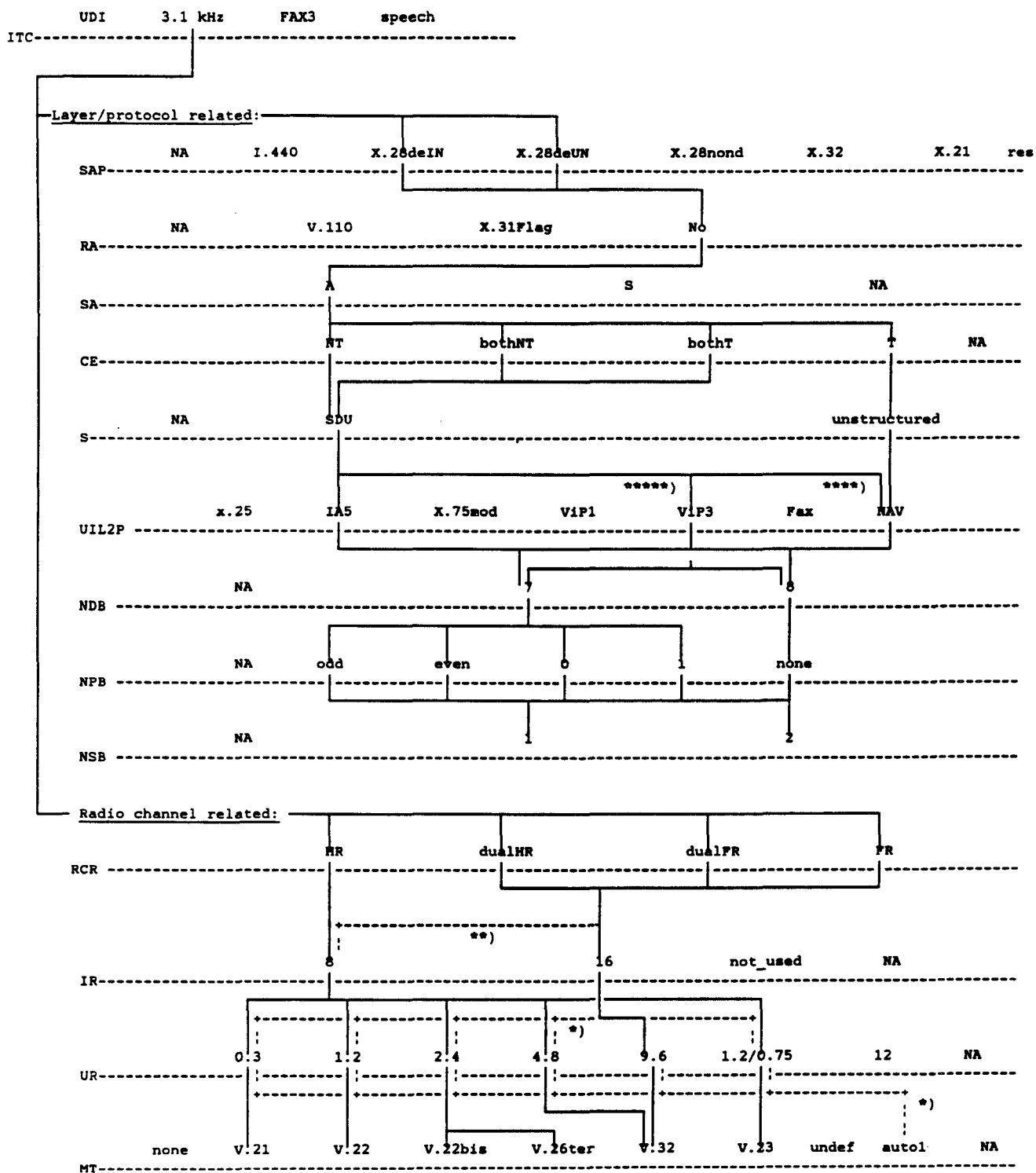
1.4. Bearer Service 41 ... 46, PAD Access Asynchronous

1.4.1 Unrestricted digital information transfer capability



*) for CE:NT or "both"
 **) for CE:T only
 ***) for MOC with "out-band" flow control requested
 *****) for MOC with no flow control requested

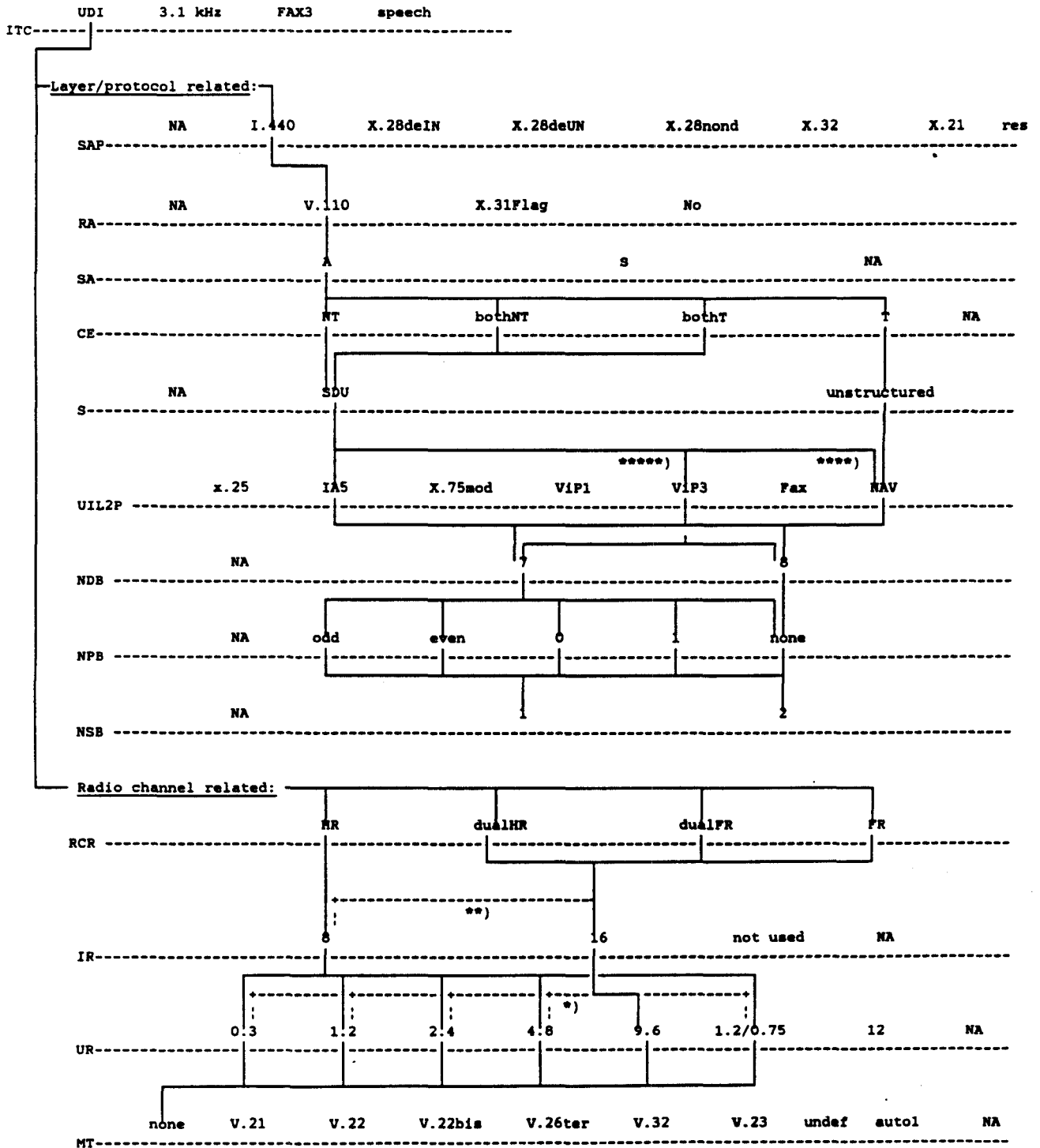
1.4.2 3.1 kHz audio ex-PLMN information transfer capability



*) for CE:NT or "both"
 **) for CE:T only
 ***) for MOC with "out-band" flow control requested
 *****) for MOC with no flow control requested

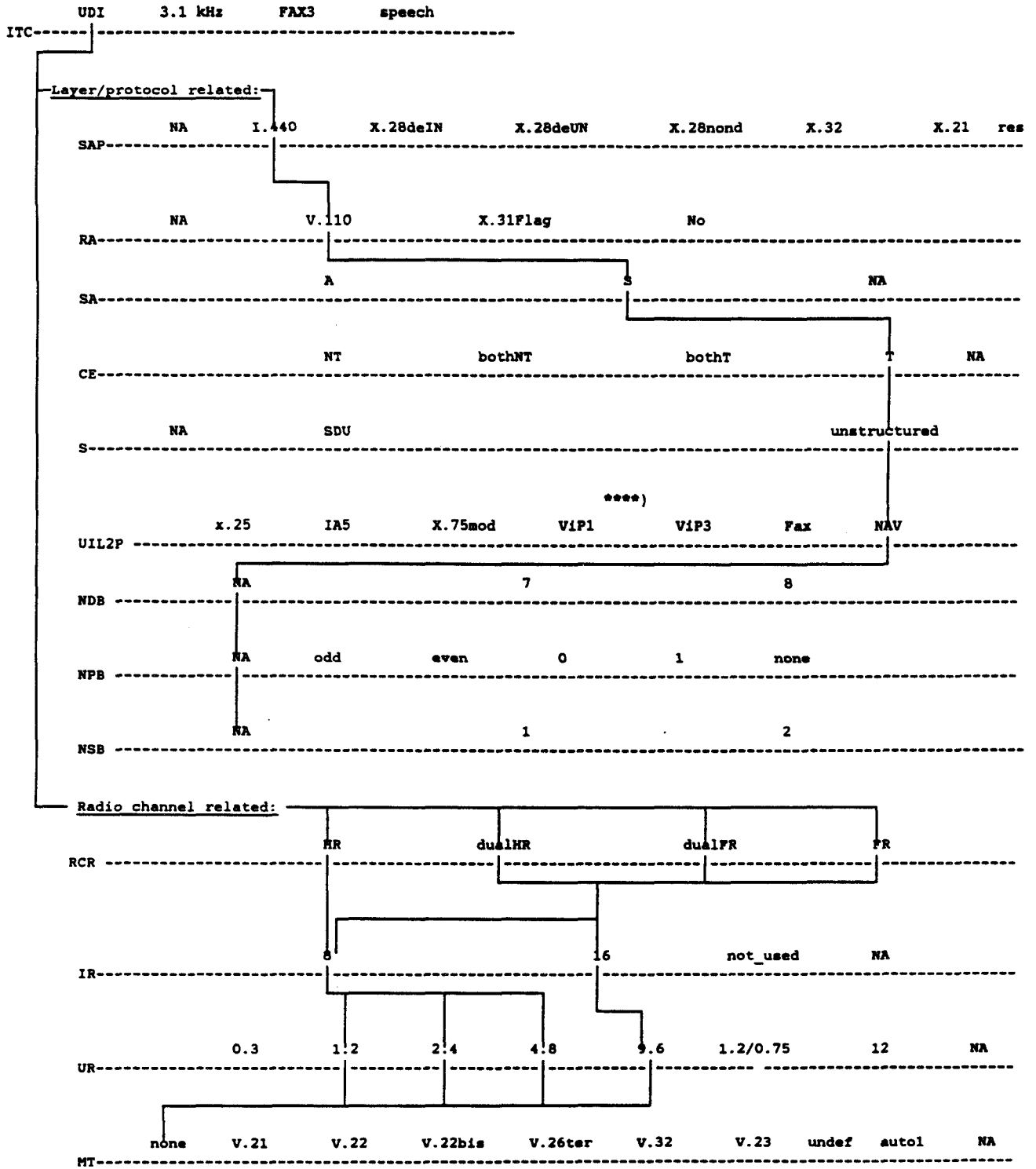
1.6.2 Bearer Service 61, Unrestricted digital information transfer capability

1.6.2.1 Asynchronous



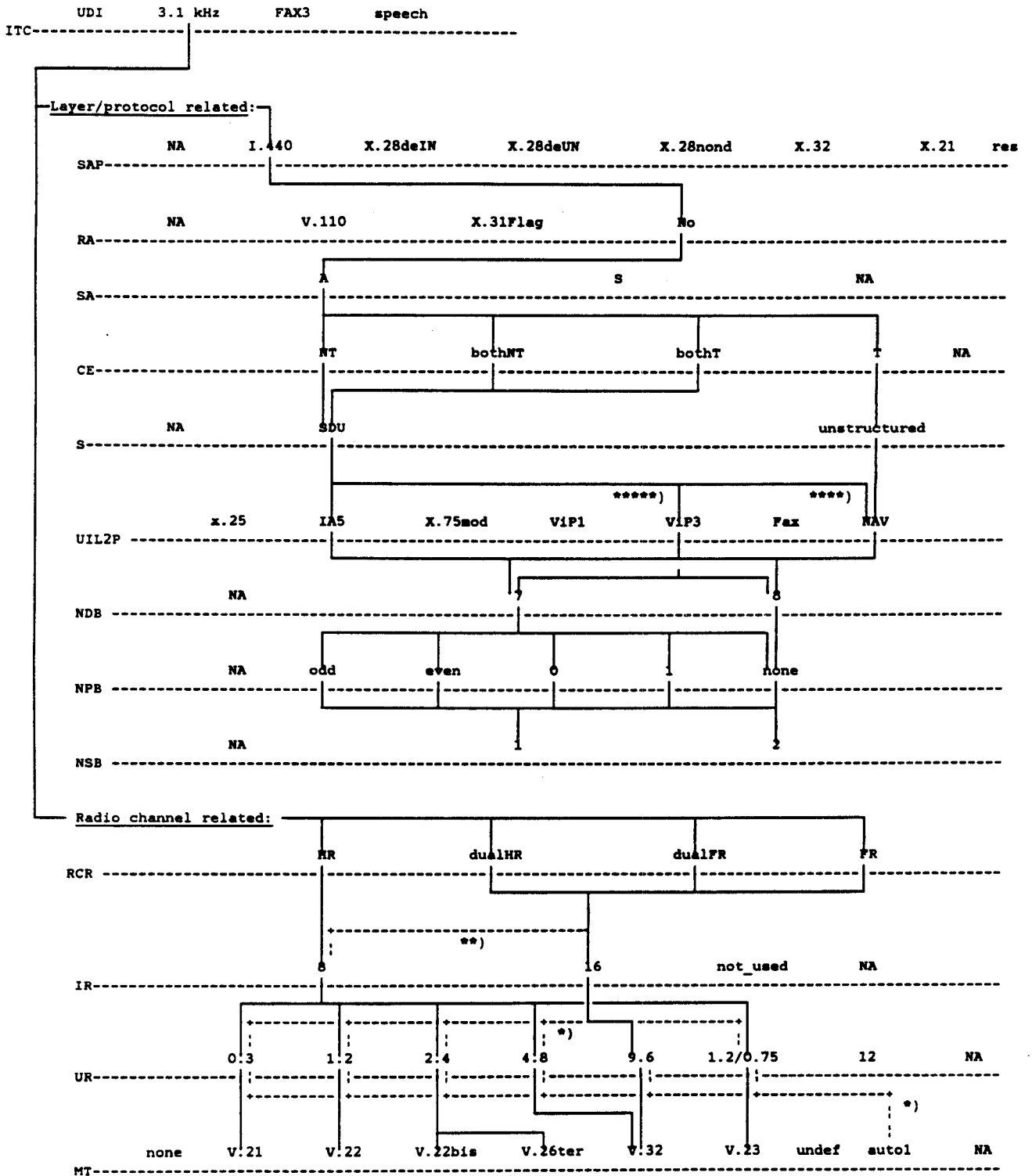
*) for CE:NT or "both"
 **) for CE:T only
 ***) for MTC in the SETUP message or MOC/MTC with "out-band" flow control requested
 ****) for MOC/MTC with no flow control requested

1.6.2.2 Synchronous



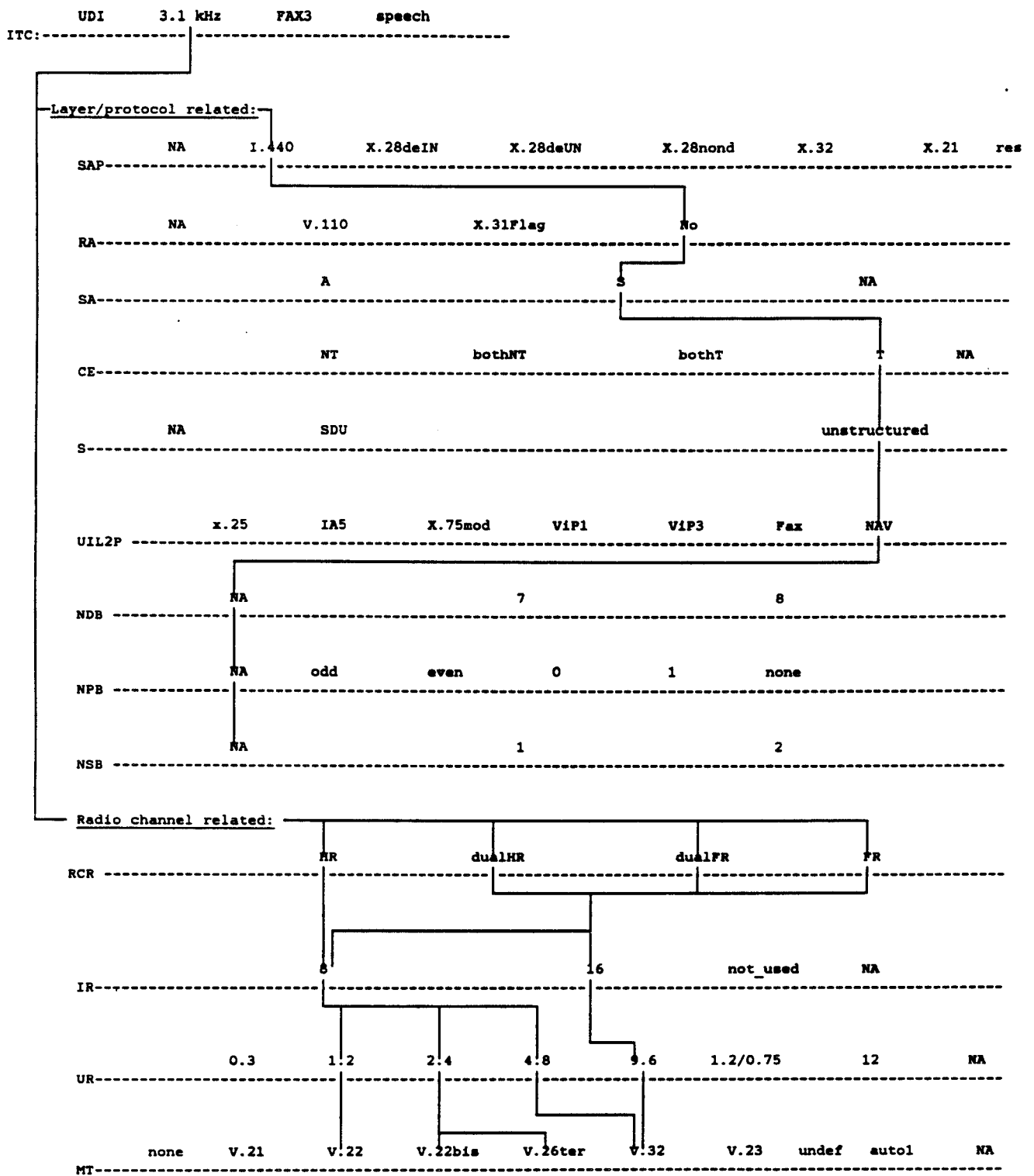
1.6.3 Bearer Service 61, 3.1 kHz audio ex-PLMN information transfer capability

1.6.3.1 Asynchronous



*) for CE:NT or "both"
 **) for CE:T only
 ****) for MTC in the SETUP message or MOC/MTC with "out-band" flow control requested
 *****) for MOC/MTC with no flow control requested

1.6.3.2 Synchronous



2.1.2 Interpretation of the Tables

The individual contents of the LLC/HLC-IE are represented in the following tables. The indication of the applicable service group defines the link between the GSM BC-IE and its associated LLC/HLC-IEs.

Only one LLC/HLC-IE is included in the appropriate messages, regardless of a possible dual GSM bearer capability indication. In this case, the LLC/HLC is always related to the bearer capability representing the data phase of a connection.

Legend: { xxxx | yyyy }....choice of values
-----not relevant for this service (set to
 appropriate value)
[zzzz].....optional

2.2 LLC Bearer Service 21 ... 26

2.2.1 Unrestricted digital informaton transfer capability

Low layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Information transfer capability	CCITT unrestricted digital
4	Transfer mode Information transfer rate	circuit mode 64 kbit/s
5	User information layer 1 protocol	V.110/X.30
5a	Synchronous / asynchronous Negotiation User rate	asynchronous in-band not possible { 0.3 ; 1.2 ; 2.4 ; 4.8 ; 9.6 ; 1.2/0.075 } kbit/s
5b	Intermediate rate NIC on Tx NIC on Rx Flow control on Tx Flow control on Rx	{ 8 ; 16 } kbit/s ----- ----- { not required ; required } { not accepted ; accepted }
5c	Number of stop bits Number of data bits Parity	{ 1 ; 2 } bits { 7 ; 8 } bits { odd ; even ; none ; forced to 0 ; forced to 1 }
5d	Duplex mode Modem type	[duplex] [{ V.21 ; V.22 ; V.22bis ; V.23 ; V.26ter ; V.32 }]

ETSI/TC SMG
Released by : ETSI/PT 12
Release date: February 1992

RELEASE NOTE

Recommendation GSM 07.01

General on Terminal Adaptation Functions for MSs

Previously distributed version : 3.12.0 (Updated Release 1/90)
New Released version February 92 : 3.13.0 (Release 92, Phase 1)

1. Reason for changes

Change Request 07.01-21 agreed at SMG#1 (Lisbon) is included.

INTERIM
EUROPEAN
TELECOMMUNICATION
STANDARD

2nd FINAL DRAFT
pr I-ETS 300 041

February 1992

Source: ETSI TC-SMG

Reference: GSM 07.01

UDC: 621.396.21

Key words: European Digital Cellular Telecommunications System, Global System for Mobile Communications (GSM)

**European digital cellular
telecommunications system (phase 1);
General on terminal adaptation functions
for mobile stations**

ETSI

European Telecommunications Standards Institute

ETSI Secretariat: B.P.152 . F - 06561 Valbonne Cedex . France

TP. + 33 92 94 42 00 TF. + 33 93 65 47 16 Tx. 47 00 40 F

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Foreword

This second Final draft Interim European Telecommunication Standard (I-ETS) has been produced by the Special Mobile Group (SMG), a Technical Committee of the European Telecommunications Standards Institute (ETSI).

The final drafts dealing with the GSM system were adopted by vote in May 1991 but were not published. This was because amendments, agreed by ETSI TC-SMG at subsequent meetings, were made to some of the drafts. However, other drafts have not been amended since the first vote.

This updated draft is now considered to be stable enough for submission to second vote.

This I-ETS specifies the terminal adaptor functions required for connecting terminal equipments to Mobile Terminations (MT) within the European digital cellular telecommunications system (phase 1).

The terminal adaptor function principles contained in this draft are based on CCITT I-series Recommendations (I.460-I.463).

Reference is made within this I-ETS to the following technical specifications (NOTE 1):

GSM 02.02	Bearer services supported by a GSM PLMN.
GSM 03.02	Network architecture.
GSM 03.10	PLMN connection types.
GSM 04.02	GSM PLMN access reference configuration.
GSM 04.08	Mobile radio interface - layer 3 specification.
GSM 04.21	Rate adaptation on the Mobile Station - Base Station System (MS-BSS) interface.
GSM 04.21	Rate adaptation on the Mobile Station - Base Station System (MS-BSS) interface.
GSM 04.22	Radio link protocol for data and telematic services on the MS-BSS interface.
GSM 07.02	Terminal adaptation functions for services using asynchronous bearer capabilities.
GSM 07.03	Terminal adaptation functions for services using synchronous bearer capabilities.

The above specifications, together with annexes 1 and 2 of this standard, are normative.

NOTE 1: ETSI has constituted stable and consistent documents which give technical specifications for the implementation of the European digital cellular telecommunications system. Historically, these documents have been identified as "GSM recommendations".

Some of these recommendations may subsequently become Interim European Telecommunication Standards (I-ETSS) or European Telecommunication Standards (ETSS), whilst the others will be renamed ETSI-GSM Technical Specifications. These ETSI-GSM Technical Specifications are, for editorial reasons, still referred to as GSM recommendations in some current GSM documents.

The numbering and version control system used for ETSI-GSM Technical Specifications is the same as that used for GSM recommendations.

NOTE 2: Items in this draft indicated as not complete, or requiring further study or work, are not required for the Phase 1 implementation of the European digital cellular telecommunications system.

ETSI/GSM

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1. SCOPE

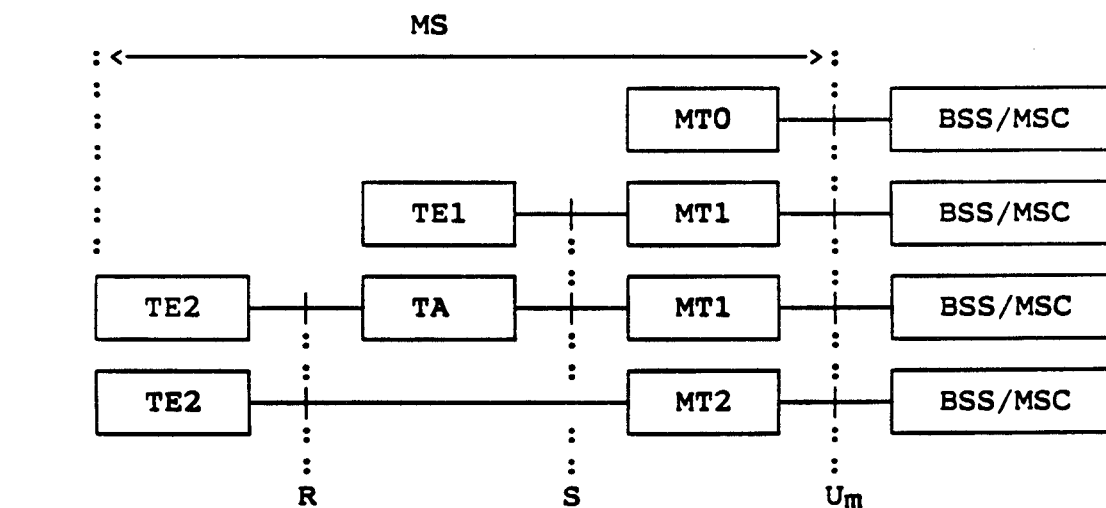
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In the GSM recommendation 02.02 the bearer services are described. The general network configuration is described in GSM 03.02 and the GSM PLMN access reference configuration is defined in GSM 04.02. The various connection types used in the GSM PLMN are presented in GSM 03.10. Terminology used in this recommendation is presented in GSM 01.04. For support of data services between GSM PLMN and other networks see GSM 09-series of recommendations.

2. ACCESS REFERENCE CONFIGURATION

Figure 1 presents the reference configuration for access to a GSM PLMN (see GSM 04.02).



⊕ = reference point

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 TE2 = V- or X-type terminal
 TA = Terminal Adaptor
 BSS = Base Station System
 MSC = Mobile Switching Centre

Figure 1: GSM PLMN Access Reference Configuration

Within the scope of this recommendation the Mobile Termination MT0 means a fully integrated MS including data terminal and its adaptation functions. MT1 includes ISDN terminal adaptation

functions and MT2 includes CCITT V- or X-series terminal adaptation functions among other MT functions.

3. FUNCTIONS TO SUPPORT DATA SERVICES

The main functions of the MT to support data services are:

- functions to ensure conformity of terminal service requests to network capability
- physical connection of the reference points R and S
- flow control of signalling and mapping of user signalling to/from GSM PLMN access signalling
- rate adaptation of user data (see GSM 04.21)
- flow control of non-transparent user data and mapping of flow control for asynchronous data services
- support of data integrity between the MS and the interworking function in the GSM PLMN
- end-to-end synchronization between terminals
- filtering of status information
- functions to support non-transparent bearer services e.g. termination of the Radio Link Protocol (RLP) and the Layer 2 Relay function (L2R) (where applicable)
- terminal compatibility checking
- optional support of local test loops

In addition, functions to support autocalling and autoanswering are optionally specified in accordance with CCITT Rec. X.25 bis (although the use of other autocalling/autoanswering procedures is not prohibited provided that mapping in a functionally equivalent way to GSM 04.08 call control is also provided).

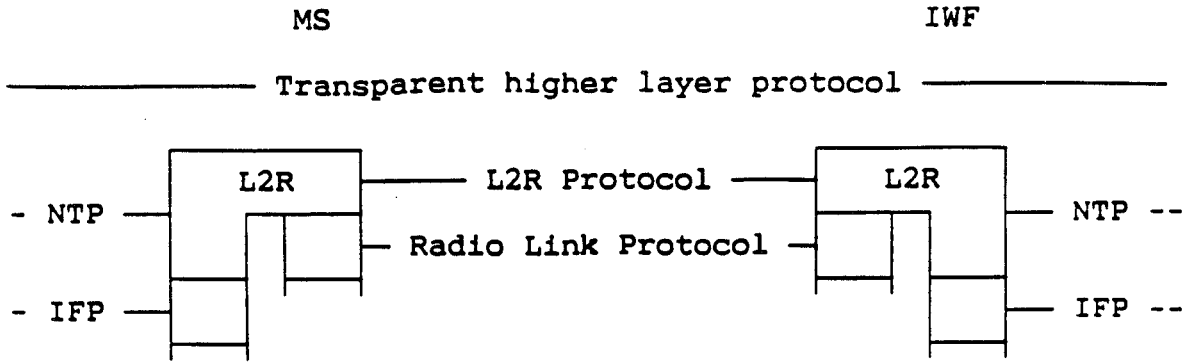
4. SUPPORT OF NON TRANSPARENT BEARER SERVICES

In order to support non transparent bearer services a Layer 2 Relay (L2R) function is included in the mobile termination. The details of the particular L2R function for the different non transparent bearer services are contained in the appropriate GSM 07-series recommendation. This section describes the general aspects of the L2R function.

The Layer 2 Relay (L2R) function provides for the reliable transportation of known, i.e. non transparent, user protocols across the radio interface of a GSM PLMN. The L2R functions are located in the Mobile Termination (MT) and the Interworking Function (IWF) associated with a Mobile Switching Centre (MSC). The L2R uses the services provided by the Radio Link Protocol (RLP) to transport the non transparent protocol information between the MS and the IWF.

4.1 Functions of the Layer 2 Relay

The complete protocol reference models for data and telematic services are described in GSM Recommendation 03.10. The subset of those protocol reference models relating to the L2R function is reproduced in Figure 2.



NTP - Non Transparent Protocol
 IFP - Interface Protocol

Figure 2

The Non Transparent Protocol (NTP) will normally be a layer 2 protocol for OSI conformant protocols or an equivalent in the case of non OSI protocols. The Interface Protocol (IFP) will normally be a layer 1 protocol for OSI conformant systems or equivalent for non OSI systems.

The L2R can be considered to consist of 3 sub-functions, see figure 3.

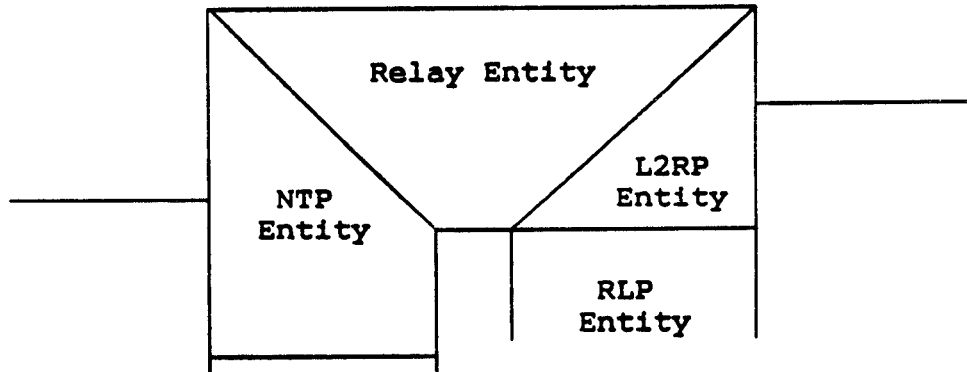


Figure 3

The 3 sub-functions are:

- * A Non Transparent Protocol Entity
- * A L2R Protocol Entity
- * A Relay Entity

The NTP-entity interfaces the L2R to the IFP-entity and provides an interface to the particular NTP.

The L2RP-entity interfaces the L2R to the RLP-entity and provides an interface to the appropriate L2R protocol.

The Relay-entity provides the mapping between the NTP-entity and the L2R-entity.

It should be noted that the inter-layer interfaces within the MS and the IWF and within the L2R will not be specified by GSM, any description given is for explanatory purposes only and is not intended to indicate a method of implementation. Therefore, the specification of the L2R is in terms of the peer-peer protocols. Generally, the non transparent and interface protocols will be specified elsewhere, e.g. CCITT Recommendation X.25 Layer 2 and 1. Thus the main specification for the L2R will consist of the L2R peer-peer protocols.

4.2 Radio Link Services Used

The L2R function uses services defined in GSM Recommendation 04.22 (Radio Link Protocol).

5. STRUCTURE OF THE GSM 07-SERIES OF RECOMMENDATIONS

The structure of the recommendations is as follows:

07.01 General on Terminal Adaptation Functions for Mobile Stations

07.02 Terminal Adaptation Functions for Services using Asynchronous Bearer Capabilities

This recommendation defines the interfaces and terminal adaptation functions integral to a MT which enable the attachment of Asynchronous Terminals to a MT.

07.03 Terminal Adaptation Functions for Services using Synchronous Bearer Capabilities

This recommendation defines the interfaces and terminal adaptation functions integral to a MT which enable the attachment of Synchronous Terminals to a MT.

6. FUNCTIONS COMMON TO ALL INTERFACES

6.1 Synchronization of the Traffic Channel

As long as there is no connection between the traffic channel and the interface to the TE this interface must be terminated in the appropriate way.

Prior to exposing the traffic channel of a GSM PLMN connection to transmission of user data, the controlling entities of the connection have to assure of the availability of the traffic channel. This is done by the so called synchronization process

- starting on the indication of "physical connection established" resulting from the PLMN inherent outband signalling procedure or starting on the indication of "modify acknowledgement" (see GSM 04.08)

- ending by indicating the successful execution of this process to the controlling entity, which then takes care of the further use of the inband information (data, status).

With respect to the TAF for the transparent bearer capability support the synchronization procedure is as follows:

- sending of synchronization pattern 1/OFF (all data bits "1" / all status bits "OFF") to the IWF
- searching for detection of the synchronization pattern 1/OFF received from the IWF.
- holding CT106, 107 and 109 in the OFF condition.

When the 1/OFF from the IWF has been recognized as a steady state, the TAF continues sending the synchronization pattern 1/OFF to the IWF unless a timer T (=500ms) expires. From this time the information on the receiving lines CT106 and CT109 from the IWF are directly mapped to the respective sending lines. The condition on CT107 will be changed from "OFF" to "ON".

During the synchronization process described above i.e. while the synchronization pattern is being sent by the MT, the MT will not send the V.110 frame structure to the ISDN terminal. Once the timer T expires the synchronization pattern will continue to be transmitted from the MT to the IWF, however, the MT will start sending the V.110 frames received from the IWF to the ISDN terminal. The MT will start looking for the ISDN frame alignment to be received from the ISDN terminal. On recognizing frame alignment the MT will cease sending its synchronization pattern to the IWF and connect the ISDN terminal through to the IWF.

With respect to the TAF for non-transparent bearer capability support the synchronization procedure is as follows:

- initiating the RLP link establishment by sending a RLP-SABM across the radio interface.
- holding CT106, 107, 109 in the OFF condition.

When the RLP link has been established, CT107 will be changed from "OFF" to "ON". From this time the information from/to the RLP, including status changes, will be mapped by the L2R entity applicable to the particular bearer capability. The MT will not send V.110 frame structure to the ISDN terminal and will not start looking for ISDN frame alignment to be received from the ISDN terminal unless the RLP link has been established. On recognizing frame alignment the information from/to the RLP will be mapped by the L2R entity.

It should be noted that in a GSM PLMN V.-series and X.-series interfaces are only supported in full duplex mode. Thus the call control phase can be mapped almost completely to the signalling procedure (the S-bits during the call control phase are irrelevant). However, the "ready for data" condition (i.e. CT 106/109, in the case of V.-series interface, and I-circuit, in the case of X.-series interface) is derived directly from the traffic channel (see also filtering of channel information).

6.2 Filtering of Channel Control Information

6.2.1 General

The DTEs taken into account for the PLMN at the MS side conform to CCITT's DTE/DCE interface specifications, which assume basically an error-free environment, i.e.

- limited distance, point-to-point local interconnection of the interface circuits for data and status
- steady state signalling.

The envisaged use of these DTEs in the PLMN environment leads to the exposure of these "interconnections" to the PLMN radio channel. To assure proper operation even under these conditions appropriate measures have to be taken. In the non transparent case the RLP satisfies the requirement for both data and status lines.

In the transparent case the

- data line aspects have to be dealt with end-to-end between the users, while
- status line aspects are of concern to the network, which are dealt with in the following.

6.2.2 Filtering Process to Be Applied

Filtering of channel control information is only relevant at the MS side in the transparent mode of operation. By applying filtering measures the condition of a DTE/DCE control interchange circuit, for which the DTE constitutes the information sink, will be preserved until another condition is signalled for an "integration time" period by the channel control information (status bits) of the rate adaptation scheme.

The filtering mechanism is understood to reside between the rate adaptation function (information source) and the DTE (information sink). It receives the unfiltered condition of the respective control interchange circuit set according to the actual sequential appearance of the individual associated status bit and forwards the filtered condition to the DTE.

V.-series interface

CT 106

In the transparent mode the remote inband control of this circuit is needed to support a modem retrain procedure.

OFF-ON transition at the MS will authorize the DTE to send data; if wrongly set, loss of data may occur.

ON-OFF transition at the MS will cause the DTE to cease transmitting data; set wrongly may impair the performance in connection usage.

CT 109

In the transparent mode the remote inband control of this circuit is needed to

- trigger the interpretation of received data
- indicate to the DTE the state of the connection.

OFF-ON transition at the MS will authorize the DTE to rely on the condition of the received data interchange circuit, set wrongly may cause receipt of wrong data, while setting late may cause loss of data.

ON-OFF transition at the MS

- will cause the DTE to cease receiving data
- may initiate release of the connection during a data phase by the DTE giving an ON-OFF transition on circuit 108/2.

Setting this condition wrongly may cause loss of data and potentially release the connection.

X.-series interface

I-circuit

The OFF-ON transition of this circuit in connection with the appropriate conditions of the other interchange circuit will indicate the "ready for data" status of the connection. As received data may commence immediately following this status change, the delay in conveying this condition should be kept shortest possible.

As a clear request/indication will be directly mapped to the PLMN outband signalling the ON-OFF integration time should be rather long.

Filtering mechanism

A filtering mechanism shall be provided by an integration process on the SB and X datastreams carried in the V.110 frame. The integration periods applied are:

<u>V-series</u>	<u>Transition</u>	<u>Integration period</u>	<u>Status stream</u>
CT 106	Off-On	1 s	X
CT 106	On-Off	1 s	X
CT 109	Off-On	200 ms	SB
CT 109	On-Off	5 s	SB

<u>X-series</u>	<u>Transition</u>	<u>Integration period</u>	<u>Status stream</u>
I-circuit	Off-On	40 ms	SB
I-circuit	On-Off	5 s	SB

The integration process shall ensure that the interchange circuits do not change state in response to spurious transitions of the status bits during the integration period.

The integration process shall operate reliably with error characteristics as specified in GSM 05.05.

6.3 Terminal Compatibility Decision

The establishment of a mobile terminated connection depends on a positive decision on the terminal compatibility. The Mobile Station (MS) contributes to this process by performing (depending on the individual call set-up condition)

- a compatibility check
- the selection of the appropriate terminal function, and
- the indication of compatibility requirements to the PLMN.

initiated by a call set-up request from the PLMN. The aforementioned functions shall be carried out as follows.

6.3.1 Compatibility Check

Annex B of GSM 04.08 applies, particularly paragraphs B.3, B.3.1 and B.3.2. As regards the therein mentioned user-to-user compatibility checking the following applies:

When the calling user requests a service with user-to-user compatibility significance indicated by the presence of HLC and LLC information element in the call set-up request, the MS shall check that the service supported by the called user matches concerning the contents of the HLC/LLC information element. If a mismatch is detected, then the MS shall either ignore or reject the offered call using the cause No.88 "Incompatible Destination".

6.3.2 Selection of Appropriate Terminal Function

The MS shall select the appropriate terminal functions following a positive result of the compatibility check and/or forwarding the indication of compatibility requirements to the PLMN.

6.3.3 Indication of Compatibility Requirements to the PLMN

In support of

- PSTN originated calls and
- ISDN originated calls using 3.1 kHz audio Bearer Capability (BC) as well as
- mobile specific requirements to be dealt with in the Bearer Capability information element

the call confirmed message has been introduced in the call control protocol (GSM 04.08). This also allows for renegotiation of specific parameters at the beginning of the connection set-up process. The specific parameters are:

- Radio channel requirement
- Connection element (transparent/non transparent)
- Number of databits
- Number of stop bits
- Parity.

If the Network proposes optional support of both Transparent and Non-Transparent connection elements but does not indicate a user information layer 2 protocol, the MS shall set the appropriate value, if choosing Non-Transparent in the Call Confirmed Message.

The following cases can be deduced from the individual call set-up request conditions

a) If the set-up message does not contain a BC information element (PSTN/ISDN originated calls with 3.1 kHz audio and no further specification), the MS in the call confirmed message may include any BC information (single or multiple BC-IE).

b) If the set-up message contains a single BC-IE, the MS in the call confirm message shall use either a single BC-IE, if it wants to negotiate mobile specific parameter values, or no BC-IE, if it agrees with the requested ones.

c) If the set-up contains a multiple BC-IE, the MS in the call confirmed message shall use either a multiple BC-IE, if it wants to negotiate mobile specific parameter values, or no BC-IE, if it agrees with the requested ones.

If the BC-IE contains 3.1 kHz ex PLMN and a modem type, the MS is allowed to negotiate all mobile specific parameter values listed above. If the BC-IE contains facsimile group 3, the MS is allowed to negotiate the connection element (transparent/non transparent) only. In any case, if the set-up message requests a "single service", the MS must not answer in the call confirm message requesting a "dual service" and vice versa. However, the MS may change the sequence of dual BC-IEs, if any, within the Call Confirmed message, if it wants to start with a different Bearer Capability than proposed by the network as the initial one.

6.4 Test Loops

In principle, both V.-series and X.-series interfaces allow for an activation of local or remote test loops by the terminal (ref. CCITT V.54/X.150). A comprehensive solution of such test loops in a GSM system has to consider the special conditions of the interface between the terminal (part of the MS) and the transmission equipment (part of the modem pool of a particular IWF within the MSC). In addition, the impact of the radiolink is to be taken into account with respect to the test objectives. Due to those special conditions a GSM system is not capable to support remote test loops. It is an implementation choice to what extent the activation of local test loops by the terminal is supported in the MT.

6.5. Alternate speech/data and speech/facsimile group 3

These alternate services may be initiated by either V.25bis or manual procedures. In the former case, standard call establishment procedures will apply. In the latter case, CT106, CT107 and CT109 are in the OFF condition. CT108.2 may or may not be in the OFF condition.

Selection of the speech phase (from the data phase) will be by manual intervention via the MT causing ICM.

During the ensuing speech phases, CT107 will be maintained in the ON condition, and CT106 and CT109 will be maintained in the OFF condition.

Subsequent re-selection of the data phase will be by manual intervention via the MT causing ICM and is conditional upon CT108.2 being ON. At this point, re-synchronisation will take place as described in section 6.1 above.

ANNEX 1

List of Bearer Capability Elements

Bearer capability elements which need to be provided on the Dm channel to support Terminal adaptation function to Interworking control procedures. Specific bearer capability elements associated with particular terminal adaptation functions are listed in recommendations GSM 07.02 and GSM 07.03.

- | | |
|----------------------------------|-------------------------------------------|
| Information Transfer Capability: | - Speech |
| | - Unrestricted Digital |
| | - Speech followed by Unrestricted Digital |
| | - Group 3 Facsimile |
| | - 3.1 kHz Ex PLMN |
| Transfer Mode: | - Circuit |
| | - Packet |
| Structure: | - Service Data Unit Integrity |
| | - Unstructured |
| Configuration: | - Point to point |
| Establishment: | - Demand |
| Sync/Async: | - Synchronous |
| | - Asynchronous |
| Negotiation: | - In band negotiation not possible |
| User Rate: | - 0.3 kbit/s |
| | - 1.2 kbit/s |
| | - 1200/75 bit/s |
| | - 2.4 kbit/s |
| | - 4.8 kbit/s |
| | - 9.6 kbit/s |
| Intermediate Rate: | - 4 kbit/s |
| | - 8 kbit/s |
| | - 16 kbit/s |
| Network Independent Clock on Tx: | - Not required |
| | - Required |
| Network Independent Clock on Rx: | - Not required |
| | - Required |
| Number of Stop Bits: | - 1 bit |
| | - 2 bit |

- Number of Data Bits Excluding Parity If Present:
- 7 bit
 - 8 bit
- Parity Information:
- Odd
 - Even
 - None
 - Forced to 0
 - Forced to 1
- Duplex Mode:
- Full Duplex
- Modem Type:
- V.21
 - V.22
 - V.22 bis
 - V.23
 - V.26 ter
 - V.32
 - autobauding type 1
 - none
- Radio Channel Requirement:
- Full Rate Channel (B_m)
 - Half Rate Channel (L_m)
 - Dual Rate/Half Rate preferred
 - Dual Rate/Full Rate preferred
- Connection Element:
- Transparent
 - Non Transparent
- User Information Layer 2 Protocol:
- IA5
 - X.25
 - X.75 layer 2 modified (Teletex)
 - Videotex profile 1
 - Videotex profile 3
 - Facsimile
- Signalling Access Protocol:
- I.440/450
 - X.21
 - X.28, dedicted PAD, individual NUI
 - X.28, dedicted PAD, universal NUI
 - X.28, non dedicted PAD
 - X.32
- Rate Adaptation:
- V.110/X.30
 - X.31 flagstuffing
 - no rate adaptation

Setting of Bearer Capability, Low Layer Compatibility and High Layer Compatibility Information Element for GSM Bearer Services and GSM TeleServices

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0. Scope

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

1. Bearer Capability Information Element

1.1 Introduction

1.1.1 General Consideration

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

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

During the call set-up phase the GSM BC-IE is included in

- the SETUP message generated by the requesting entity (either MS or MSC) to establish a mobile-originated or mobile-terminated call, respectively, and in
- the CALL CONFIRMED or CALL PROCEEDING messages, respectively, generated by the responding entity (either MS or MSC) in order to negotiate certain parameter values. If no BC-IE is contained in the SETUP message (PSTN-originated call with single-numbering scheme) the CALL CONFIRMED message indicates the complete applicable BC-IE.

During the established connection the GSM BC-IE is included in the MODIFY, MODIFY COMPLETE, and MODIFY REJECT messages in order to change the service (bearer capability).

The subsequent tables and subsections of section 1 deal with the representation of the individual contents of the GSM BC-IE during the call set-up phase. For the use during the established connection refer to GSM 04.08.

With respect to the individual parameter settings at the MS the following cases may be distinguished (ref. GSM 07.02 and GSM 07.03):

- Mobile-originated call set up by a MS consisting of a MT with R interface:
The setting results from respective MMI actions and/or MT internal settings.
- Mobile-originated call set up by a MS consisting of a MT with S interface:
The setting of the GSM BC is derived from the ISDN BC and LLC / HLC elements contained in the ISDN SETUP message received from the terminal. It is complemented by information resulting from respective MMI actions and/or MT internal settings.

- Mobile-terminated call set up to a MS consisting of a MT with R interface:
The BC related part of the compatibility check is carried out according to the knowledge of the MT concerning its implemented functions (i.e. answering the call). The requested field values of the non-negotiable parameters and the selected field values of the negotiable parameters determine the selection of the terminal function to be used for the intended connection.
- Mobile-terminated call set up to a MS consisting of a MT with S interface:
The GSM BC received from the MSC is mapped by the MT onto an applicable ISDN BC. In some cases a HLC may be generated, if it is not otherwise available (e.g. for group 3 facsimile). The BC related part of the compatibility check is up to the terminal connected to the S interface of the MT, as is the selection of the terminal function (i.e. answering the call) to be used for the intended connection.

1.1.2 Interpretation of the Diagrams

The purpose of the subsequent diagrams is to achieve unambiguous representation of the individual contents of the GSM BC-IE for the various occurrences during the call set-up phase, covering all bearer services and teleservices according to GSM 02.02 and GSM 02.03.

The basic principle adopted is a graphic scheme, or mask, wherein the ordinate designates the individual parameters of the GSM BC-IE and the abscissa gives the possible field values of these parameters. The abbreviations used in these sections are defined in table II.3. The allowed content of any GSM BC-IE is represented by a number of graphs connecting parameter values (abscissa points) of all parameters (ordinate points). Each graphic scheme is subdivided into two independent parts:

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

The generation of all GSM BC-IEs in all call set-up messages shall be in accordance with these graphs. Sections 1.2 through 1.14 show individual sets of graphs for each service group (BS/TS) and for each type of applicable Information Transfer Capability.

In addition, the following rules apply:

- Those parameters which have only one possible field value for all recognized services are shown in table II.3, where they are marked accordingly in the column "common setting of field values". They are not represented in the graphic scheme.
- Not all parameters of the GSM BC-IE are relevant for each service (BS/TS). This is represented by specific abscissa points with a value of "NA" (Not Applicable) allocated to these parameters. The graphs pass through these points for each such parameter. The actual field value to be used in the GSM BC-IE is marked in the column "default setting of field values (NA)" of table II.3. An abscissa point with a value of "NAV" (Not Available) indicates that the entire octet carrying this parameter (ref. table II.2 "General Structure of the GSM BC-Information Element") shall be omitted.

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

Table II.1

BC-Parameters subject to negotiation procedureMobile Originated Call:

BC-parameter	Message	
	SETUP	CALL PROC
NDB	requested value	as requested
NPB	requested value	as requested
NSB	requested value	as requested
CE	requested value (T/NT)	as requested
	"both" with the preferred value indicated(e.g. bothNT)	selected value (T/NT)
RCR	requested value (HR/FR)	as requested
	"dual" with the preferred value indicated(e.g. dualFR)	as requested 1.)
UIL2P	requested value or NAV 2.)	as requested or NAV 2.)

Mobile Terminated Call:

BC-parameter	Message	
	SETUP	CALL CONF
NDB	offered value	selected value (free choice)
NPB	offered value	selected value (free choice)
NSB	offered value	selected value (free choice)
CE	requested value (T/NT)	as requested
	"both" with the preferred value indicated(e.g. bothNT)	selected value (T/NT)
RCR	arbitrary value (HR / FR / "dual" with the preferred value indicated (e.g. dualFR))	requested value (FR/HR) or "dual" with the preferred value indicated (e.g. dualHR) 1.)
UIL2P	offered value 3.) or NAV	selected or NAV 2.)

- 1.) the final decision, which radio channel is chosen, is done by the ASSIGNMENT COMMAND message. This message doesn't contain a BC-IE, but other parameters which define the radio channel.
- 2.) for CE:T only
- 3.) not for CE:T

Table II.2

General Structure of the BC-Information Element

OCTET	INFORMATION ELEMENT FIELD
3	Radio channel requirements Coding standard Transfer mode Information Transfer Capability
4	Structure 2.) Duplex mode Configuration Establishment
5	Rate adaption 2.) Signalling access protocol
6	User information layer 1 protocol 2.) Synchronous / asynchronous
6a	Number of stop bits 2.) Negotiation Number of data bits User rate
6b	Intermeditate rate 2.) NIC on transmission NIC on reception Parity information
6c	Connection element 2.) Modem type
7	User information layer 2 protocol 1.) 2.)

1.) octets optional

2.) octets only available if the parameter "Information Transfer Capability" does not indicate "Speech".

Table II.3 (part 1):

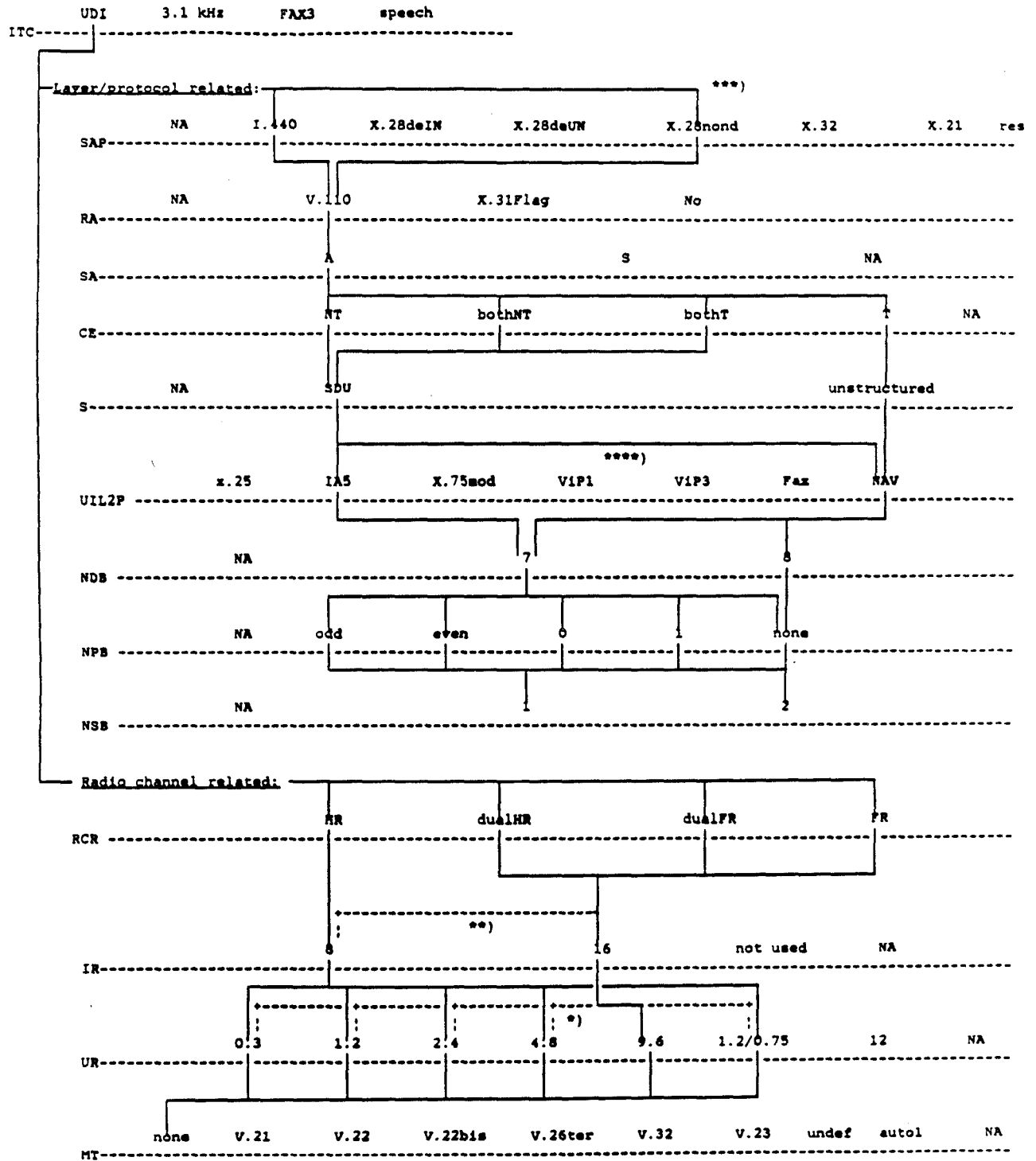
Abbreviations for Parameters and Values:		common setting of field values	
		default setting of field values (NA)	
ITC...Information Transfer Capability:	- Speech - UDI..Unrestricted Digital - FAX3..Group 3 Facsimile - 3.1 kHz..3.1 kHz Ex PLMN		
TM....Transfer Mode:	- ci..Circuit	X	X
S.....Structure:	- SDU..Service Data Unit Integrity - Unstructured	X	
C.....Configuration:	- pp..Point to point	X	X
E.....Establishment:	- de..Demand	X	X
SA....Sync/Async:	- S..Synchronous - A..Asynchronous		
N....Negotiation	- ibn..in band negotiation not possible	X	X
UR....User Rate:	- 0.3..0.3 kbit/s - 1.2..1.2 kbit/s - 1.2/0.75..1200/75 bit/s - 2.4..2.4 kbit/s - 4.8..4.8 kbit/s - 9.6..9.6 kbit/s - 12..12 kbit/s		
IR....Intermediate Rate:	- 4.. 4 kbit/s - 8.. 8 kbit/s - 16.. 16 kbit/s - not_used..not used	X	
NICT..Network Independent Clock on Tx:	- not_required.. Not required - required	X	X
NICR..Network Independent Clock on Rx:	- not_accepted..not accepted - accepted	X	X
NSB...Number of Stop Bits:	- 1..1 bit - 2..2 bit	X	
NDB...Number of Data Bits Excluding Parity If Present:	- 7.. 7 bit - 8.. 8 bit	X	
NPB...Parity Information:	- Odd - Even - None - 0.. Forced to 0 - 1.. Forced to 1	X	
UIL1P>User Information Layer 1 Protocol	- def..default layer 1 protocol	X	X

Table II.3 (part 2):

Abbreviations for Parameters and Values		common setting of field values	
		default setting of field values (NA)	
DM....Duplex Mode:	<ul style="list-style-type: none"> - hd.. half Duplex - fd.. Full Duplex 	X	X
MT....Modem Type:	<ul style="list-style-type: none"> - V.21 - V.22 - V.22 bis - V.23 - V.26 ter - V.32 - autol.. autobauding type 1 - none - undef.. modem for undefined interface 	X	
RCR...Radio Channel Requirement:	<ul style="list-style-type: none"> - FR.. Full Rate Channel (B_m) - HR.. Half Rate Channel (L_m) - dualHR.. Dual Rate/Half Rate preferred - dualFR.. Dual Rate/Full Rate preferred 		
CE....Connection Element:	<ul style="list-style-type: none"> - T.. Transparent - NT.. Non Transparent - bothT both transparent preferred - bothNT both non Transparent preferred 		
UIL2P.User Information Layer 2 Protocol:	<ul style="list-style-type: none"> - IA5 - X.25 - X.75mod.. X.75 layer 2 modified (Teletax) - ViP1.. Videotex profile 1 - ViP3.. Videotex profile 3 - Fax.. Facsimile group 3 		
SAP...Signalling Access Protocol:	<ul style="list-style-type: none"> - I.440.. I.440/450 - X.21 - X.28deIW.. X.28, dedicted PAD,individual NUI - X.28deUN.. X.28, dedicted PAD,universal NUI - X.28nond.. X.28, non dedicated PAD - X.32 	X	
RA....Rate Adaptation:	<ul style="list-style-type: none"> - V.110.. V.110/X.30 - X.31Flag.. X.31 flagstuffing - NO.. no rate adaptation 	X	
CS....Coding Standard:	<ul style="list-style-type: none"> - GSM 	X	X

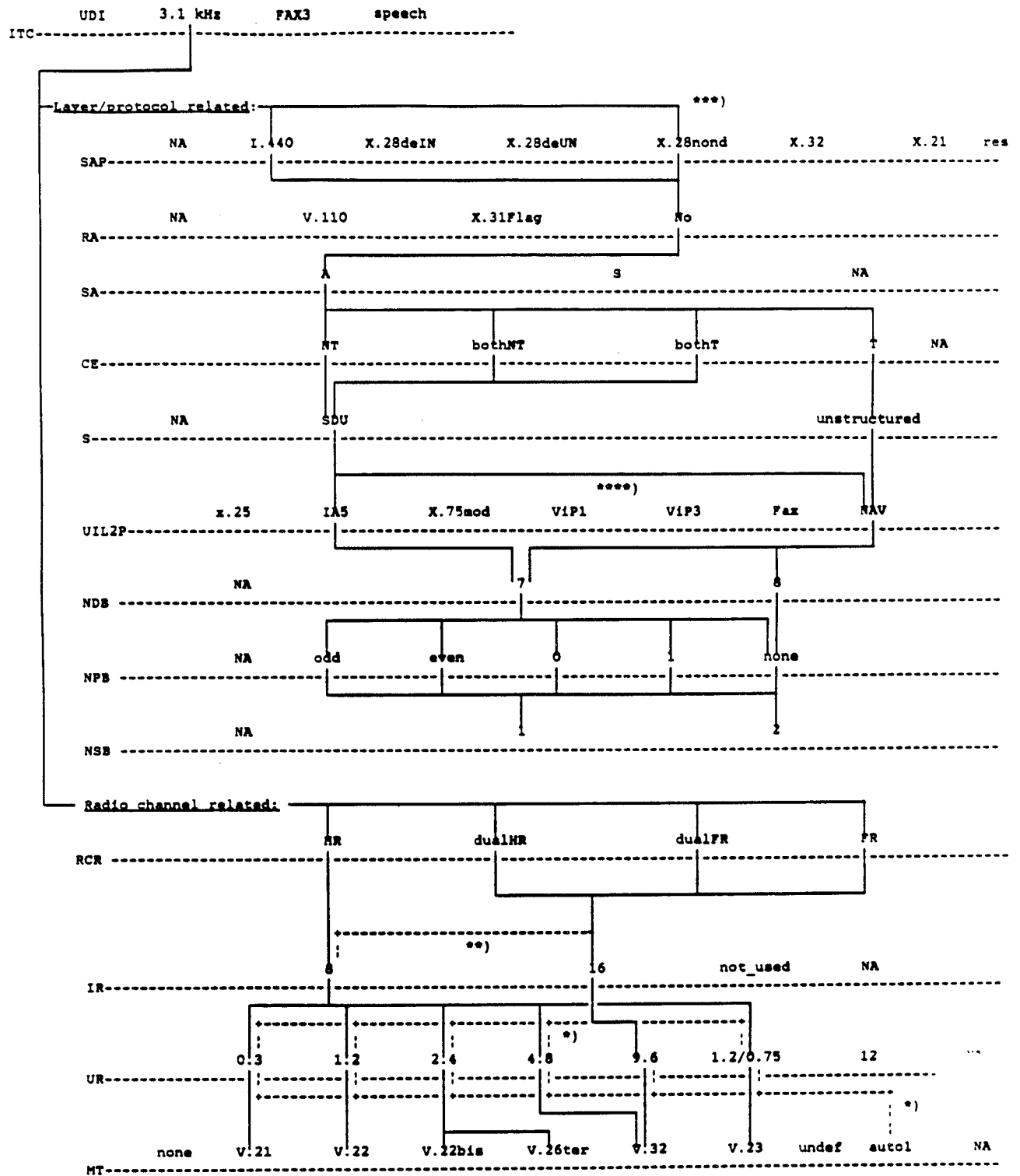
1.2. Bearer Service 21 ... 26, Data Circuit Duplex Asynchronous

1.2.1 Unrestricted digital information transfer capability



*) for CE:NT or "both"
 **) for CE:T only
 ***) for MOC only
 ****) for MTC in the SETUP message only

1.2.2 3.1 kHz audio ex-PLMN information transfer capability

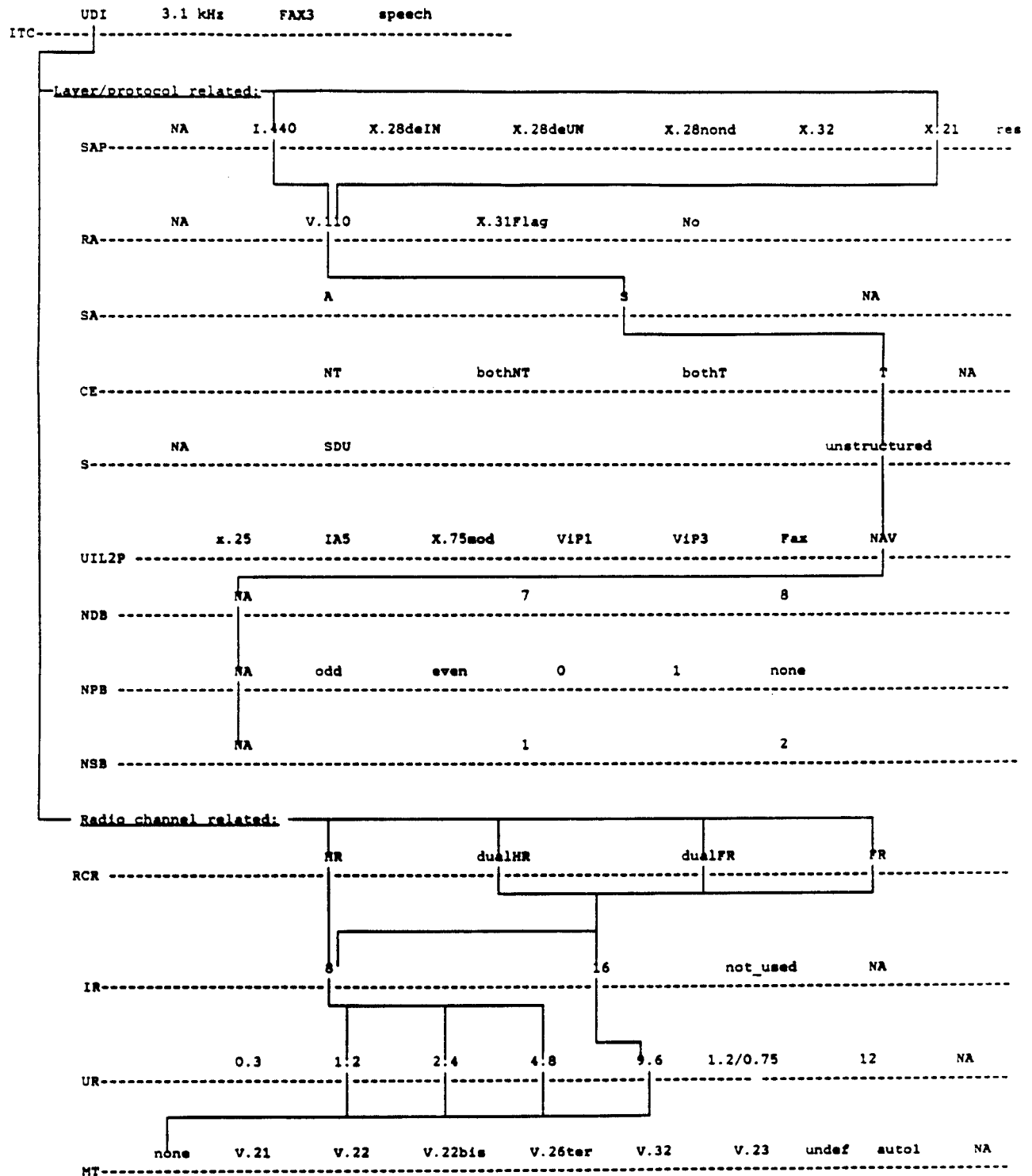


*) for CE:NT or "both"
 **) for CE:T only
 ***) for MOC only
 ****) for MTC in the SETUP message only

1.3. Bearer Service 31 ... 34, Data Circuit Duplex Synchronous

1.3.1 Unrestricted digital information transfer capability

1.3.1.1 Non-X.32 Cases

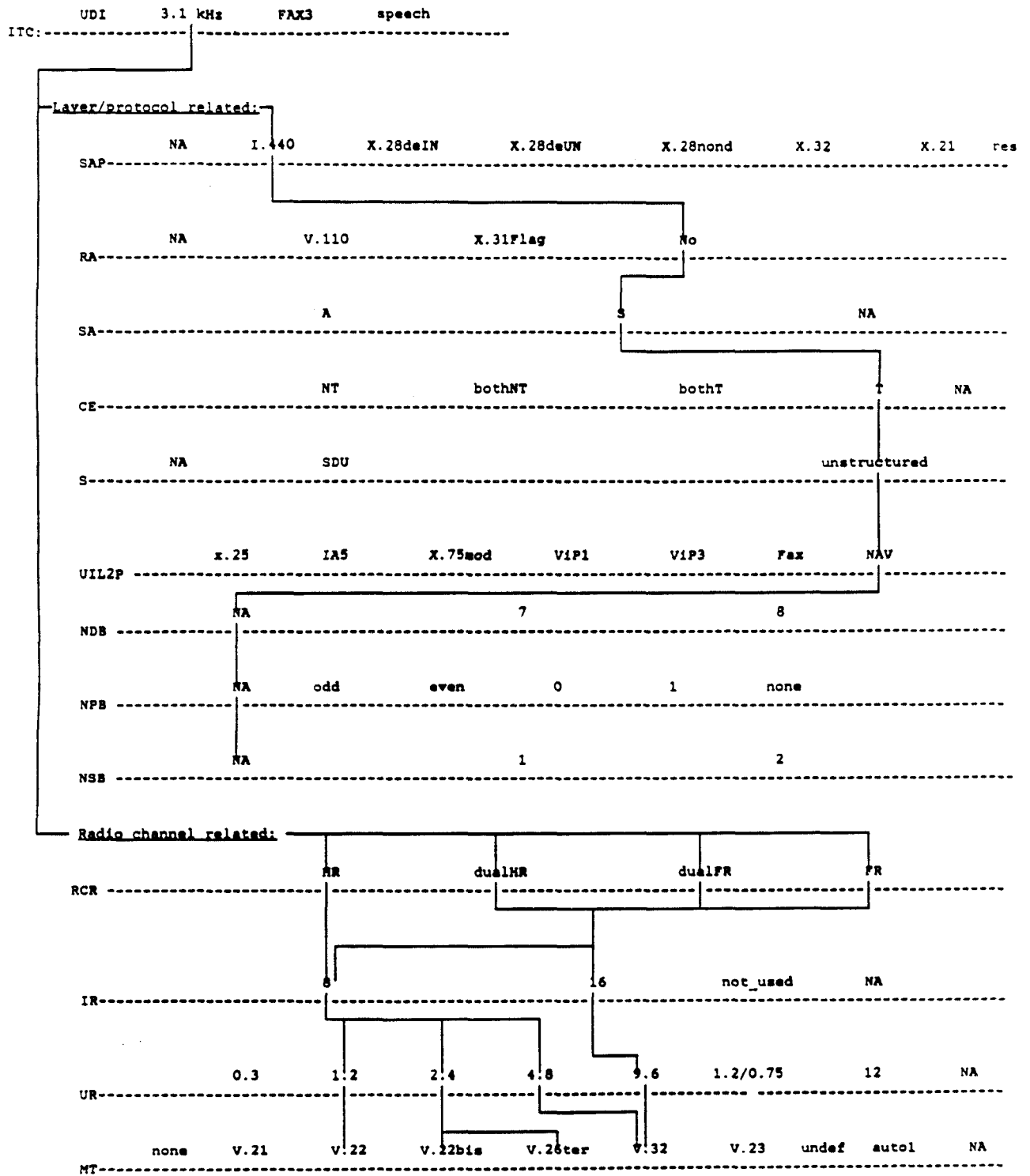


1.3.1.2 X.32 Case (Packet Service)

for further study

1.3.2 3.1 kHz audio ex-PLMN information transfer capability

1.3.2.1 Non-X.32 Cases

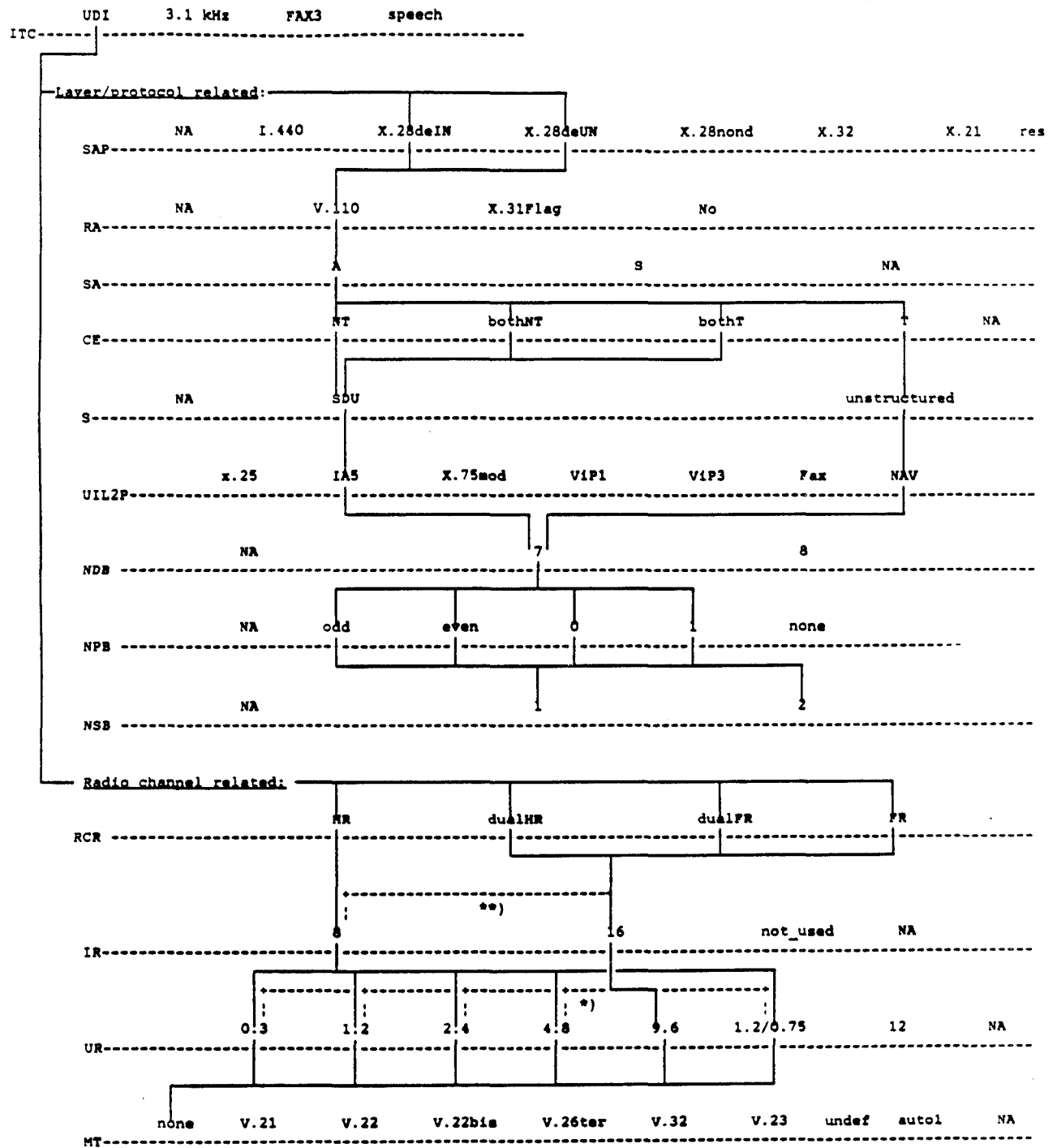


1.3.2.2 X.32 Case (Packet Service)

for further study

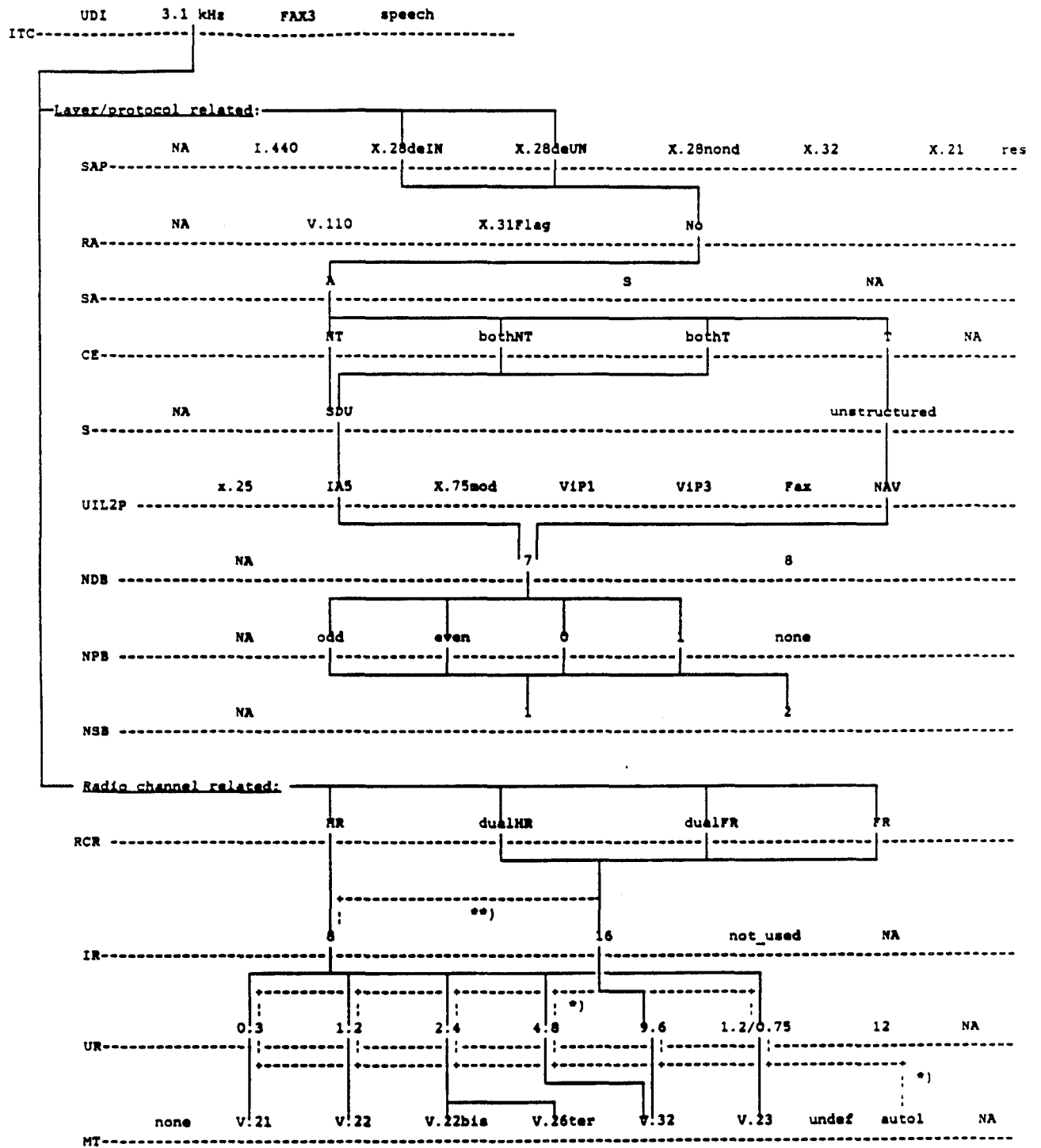
1.4. Bearer Service 41 ... 46, PAD Access Asynchronous

1.4.1 Unrestricted digital information transfer capability



*) for CE:NT or "both"
 **) for CE:T only

1.4.2 3.1 kHz audio ex-PLMN information transfer capability



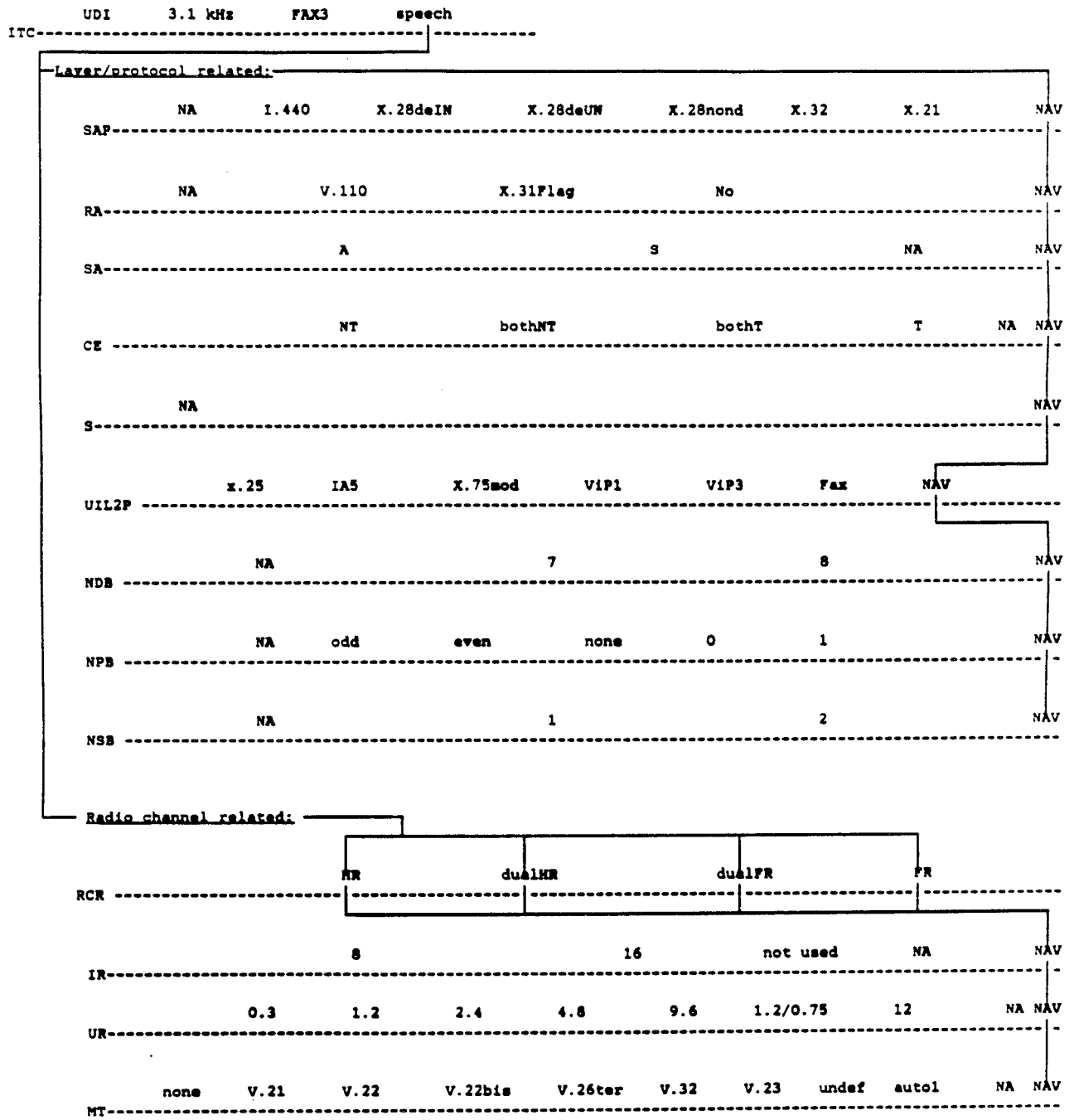
*) for CE:NT or "both"
 **) for CE:T only

- 1.5. Bearer Service 51 ... 53 Data Packet Duplex Synchronous
Unrestricted digital information transfer capability
for further study

1.6. Bearer Service 61, Alternate Speech/Data

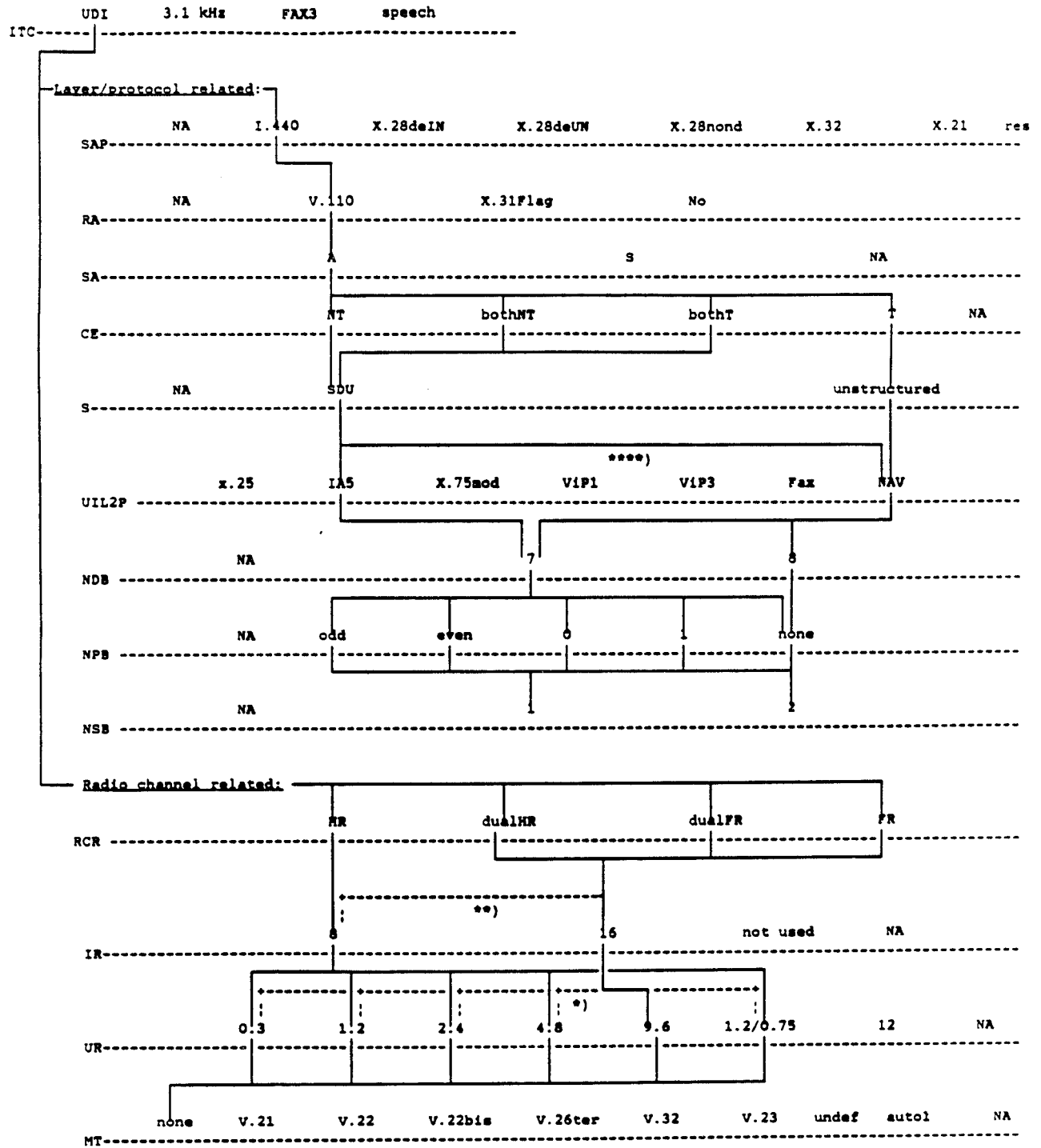
The information element of the "repeat indicator" is set to the value "circular for successive selection (alternate)".

1.6.1 Bearer Service 61, "Speech"



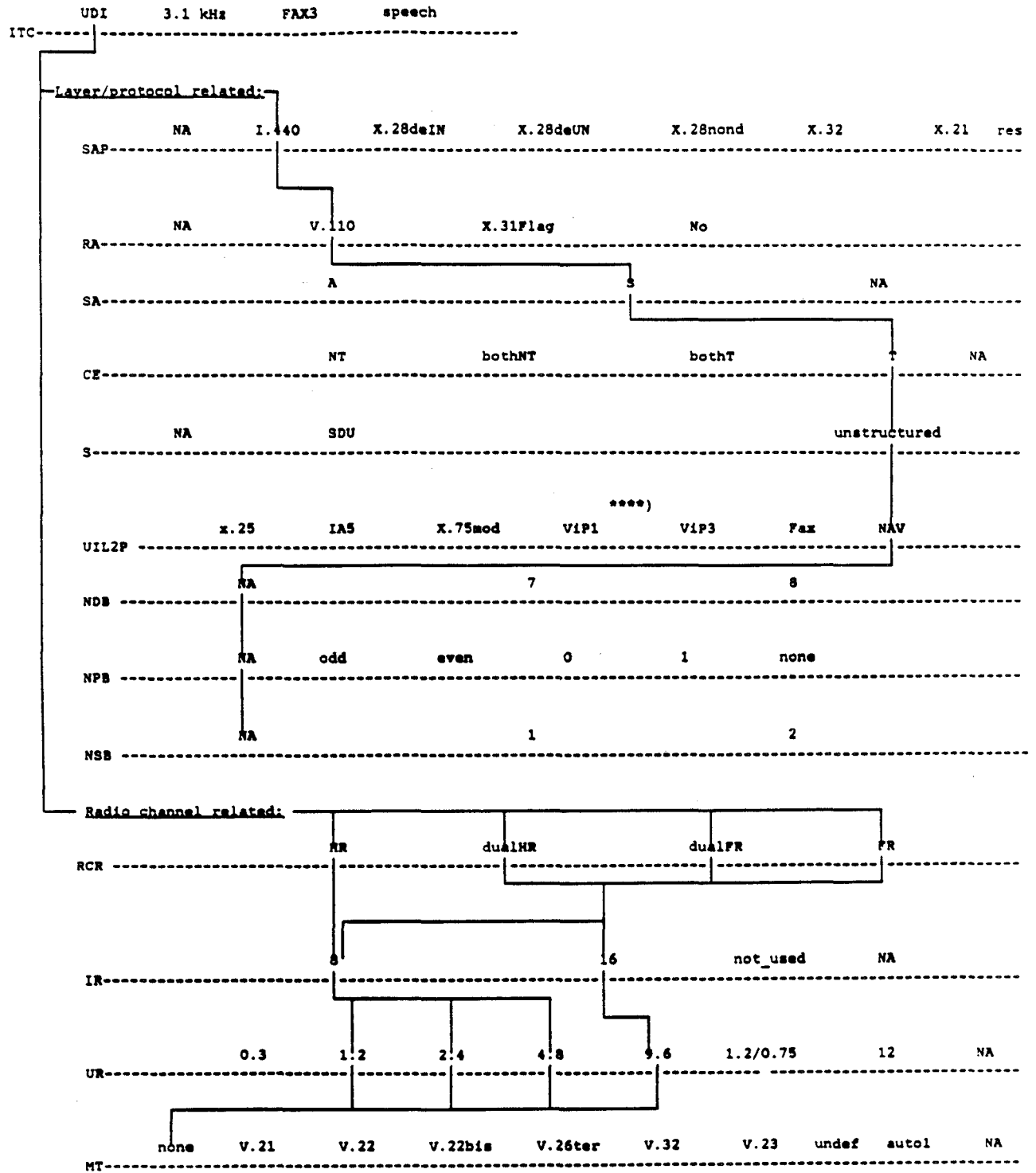
1.6.2 Bearer Service 61. Unrestricted digital information transfer capability

1.6.2.1 Asynchronous



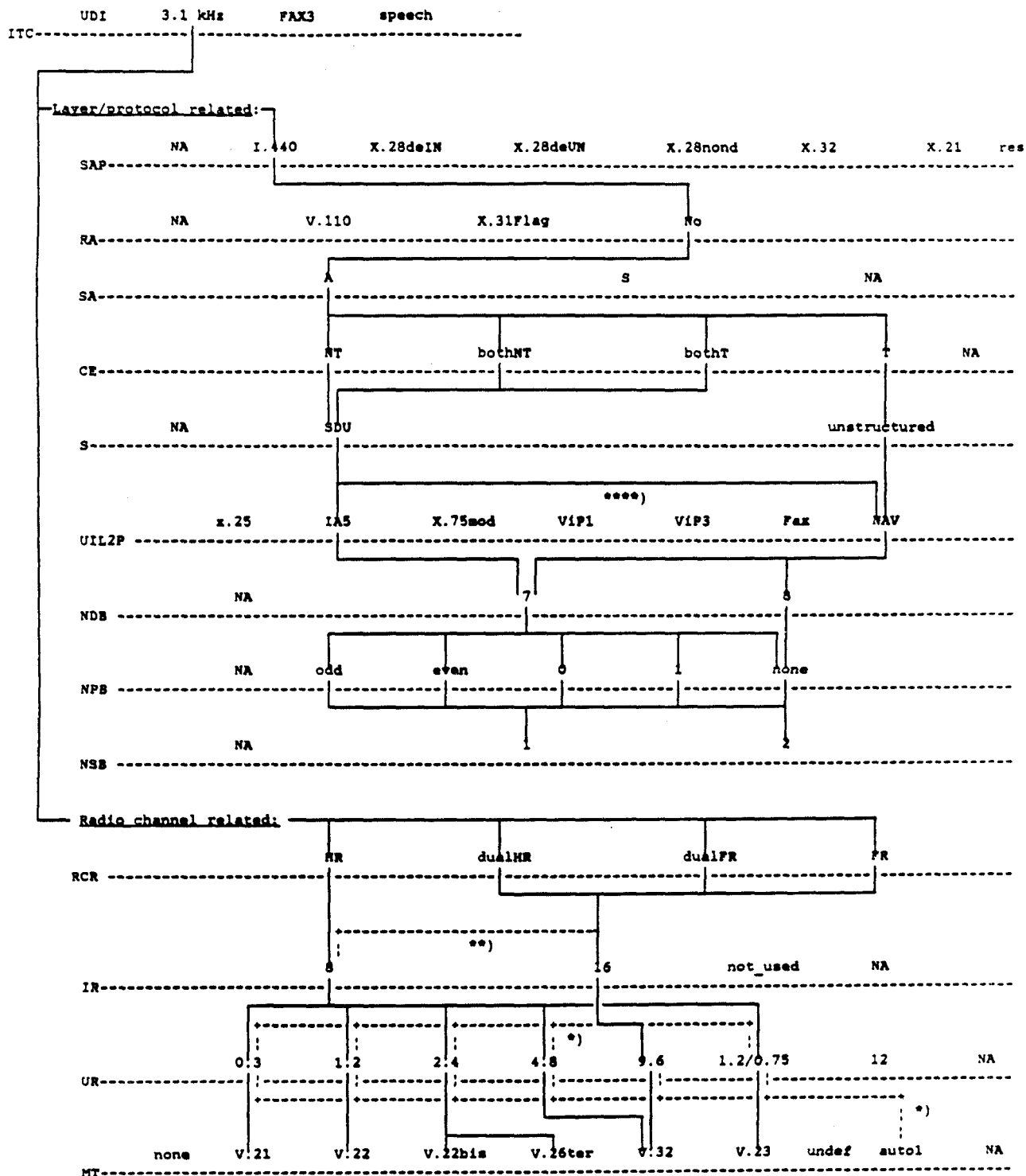
*) for CE:NT or "both"
 **) for CE:T only
 ****) for MTC in the SETUP message only

1.6.2.2 Synchronous



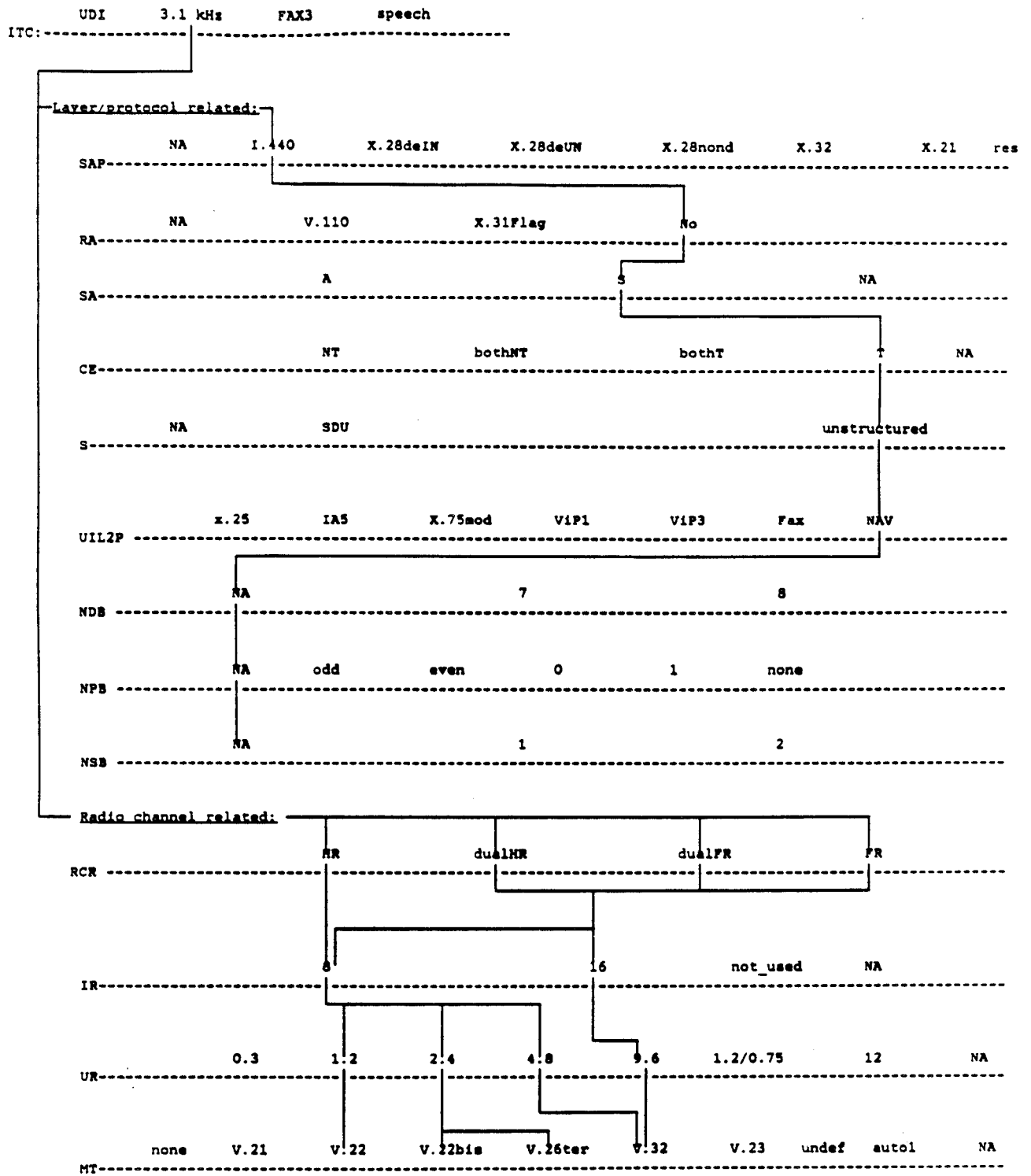
1.6.3 Bearer Service 61, 3.1 kHz audio ex-PLMN information transfer capability

1.6.3.1 Asynchronous



*) for CE:NT or "both"
 **) for CE:T only
 ***) for MTC in the SETUP message only

1.6.3.2 Synchronous



1.7. Bearer Service 71, 12 kBit/s Unrestricted digital information transfer capability

to be defined

1.8. Bearer Service 81, Speech followed by Data

The information element of the "repeat indicator" is set to the value "sequential for successive selection (followed by)".

1.8.1 Bearer Service 81, "Speech"

ref. section 1.6.1

1.8.2 Bearer Service 81, Unrestricted digital information transfer capability

1.8.2.1 Asynchronous

ref. section 1.6.2.1

1.8.2.2 Synchronous

ref. section 1.6.2.2

1.8.3 Bearer Service 81, 3.1 kHz audio ex-PLMN information transfer capability

1.8.3.1 Asynchronous

ref. section 1.6.3.1

1.8.3.2 Synchronous

ref. section 1.6.3.2

1.9. Teleservice 11 ... 12, Speech

ref. section 1.6.1

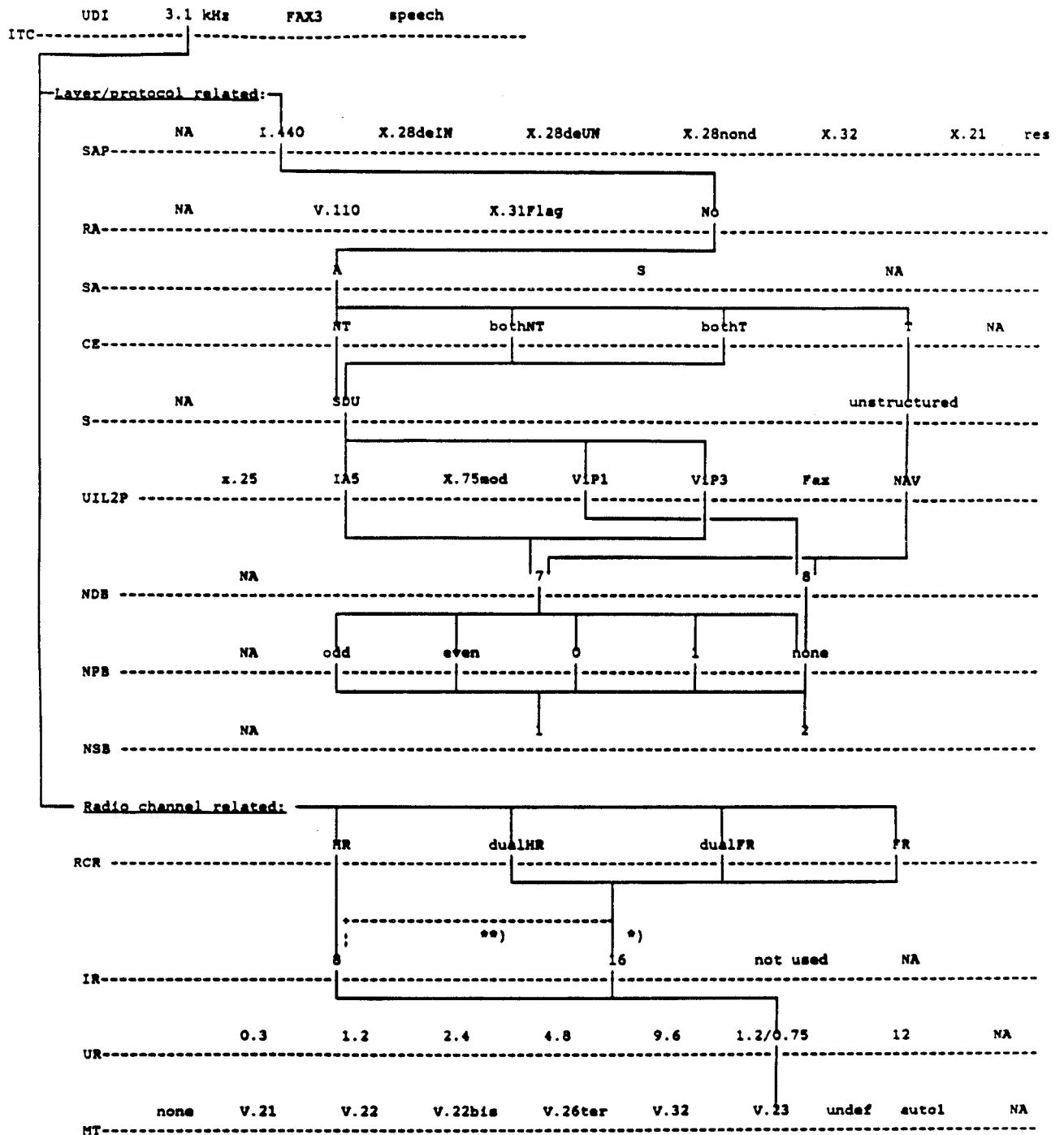
1.10. Teleservice 21 ... 22, Short Message

not applicable

1.11. Teleservice 31, Advanced MMS Access

Bearer capability information element of the supporting bearer service.

1.12. Teleservice 41 ... 43. Video Access Profile 1 to 3



*) for CE:NT or "both"
 **) for CE:T

1.13. Teleservice 51. Teletex

ref. section 1.3.1.2/1.3.2.2 (BC information elements 31 ... 34)
 and ref. section 1.5 (BC information elements 51 ... 53)

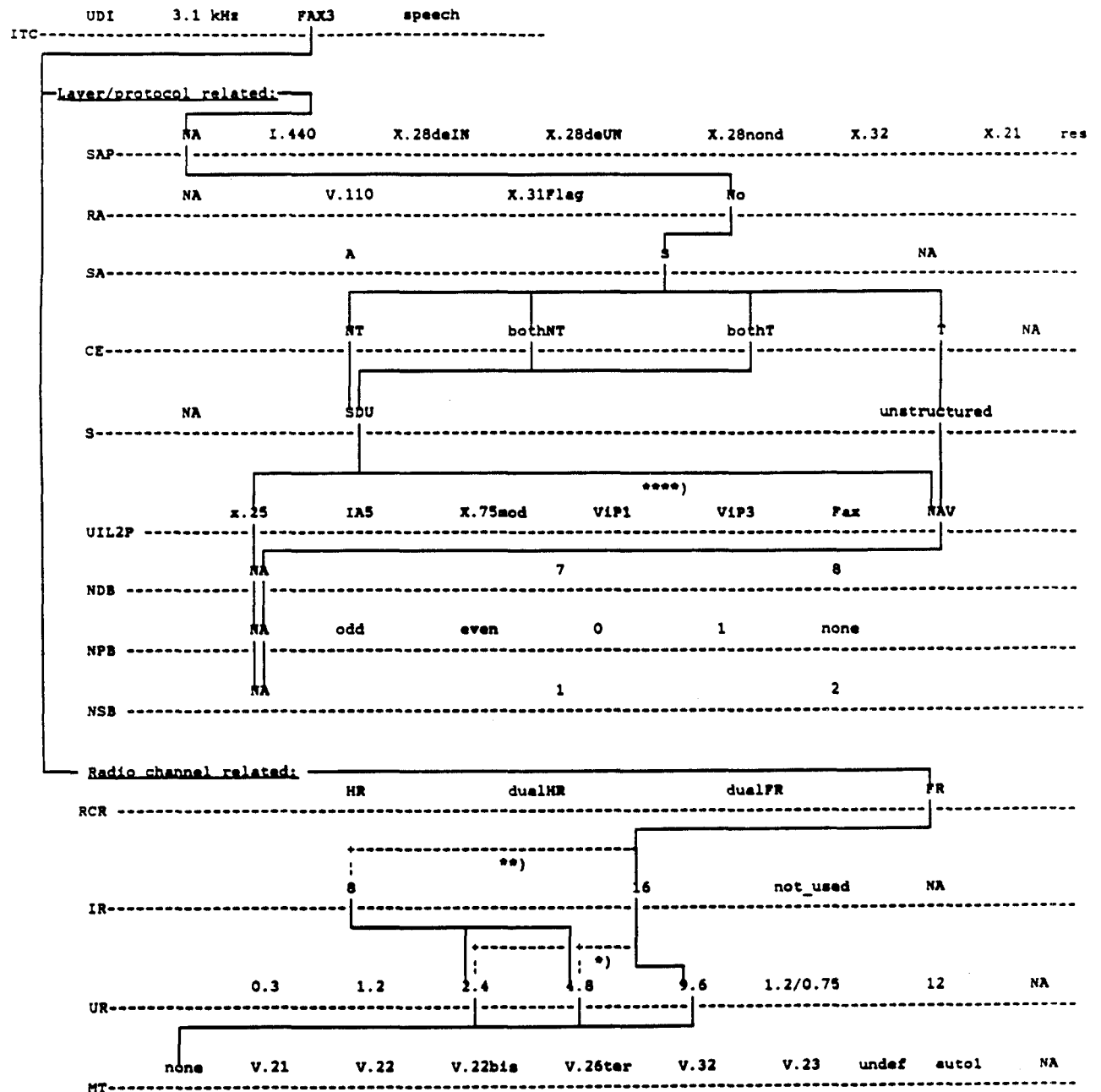
1.14. Teleservice 61. Alternate Speech and Facsimile group 3

The information element of the "repeat indicator" is set to the value "circular for successive selection (alternate)".

1.14.1 Teleservice 61, "Speech"

ref. section 1.6.1

1.14.2 Teleservice 61, "Facsimile group 3"



*) for CE:NT or "both"
 **) for CE:T only
 ***) for MTC in the SETUP message only

1.15 Teleservice 62, Automatic Facsimile Group 3

ref. section 1.14, the information element "repeat indicator" is not available/valid.

2. Low Layer / High Layer Compatibility Information Element

2.1 Introduction

2.1.1 General Consideration

The purpose of the Low Layer / High Layer Compatibility Information Element (LLC/HLC-IE) is to provide a means for additional end-to-end compatibility checking by an addressed entity (e.g. a remote user, an interworking unit or a high layer function network node). The LLC/HLC-IE is transferred transparently by the GSM PLMN and an ISDN between the call originating entity (e.g. the calling user) and the addressed entity.

With respect to the individual parameter settings at the MS the following cases may be distinguished (ref. GSM 07.02 and GSM 07.03):

- Mobile-originated call set up by a MS consisting of a MT with R interface:
The setting results from respective MMI actions and/or MT internal settings.
- Mobile-originated call set up by a MS consisting of a MT with S interface:
The LLC/HLC-IEs which are contained in the ISDN SETUP message received from the terminal are passed unchanged to the MSC.
- Mobile-terminated call set up to a MS consisting of a MT with R interface:
The LLC/HLC related part of the compatibility check is carried out according to the knowledge of the MT concerning its implemented functions (i.e. answering the call). The offered field values determine the selection of the terminal function for the intended connection.
- Mobile-terminated call set up to a MS consisting of a MT with S interface:
The LLC/HLC received from the MSC is passed to the terminal by the MT. The LLC/HLC related part of the compatibility check is up to the terminal connected to the S interface of the MT, as is the selection of the terminal function (i.e. answering the call).

Where applicable, the same settings and rules concerning LLC and/or HLC apply as for ISDN use (ref. ETS 300 102-1 and ETR 018). However, considering that GSM PLMN data transmission is based on CCITT V.110 rate adaptation, the MS shall provide the LLC-IE for mobile-originated calls when using unrestricted digital information transfer capability. This is to assure the conveyance of the e.g. "V.110" indication towards the called entity, as the comparable indication in the ISDN BC-IE may be lost. The LLC-IE shall also be provided for the case of an information transfer capability "3.1 kHz audio ex PLMN", if the call is destined for ISDN.

There shall be no contradiction of the information between the BC-IE and LLC-IE at the originating side. However, as some parts of the bearer capability may be modified during the transport of the call, there should be minimum duplication of this information between the BC-IE and the LLC-IE.

If as a result of duplication, a contradiction occurs between the BC-IE and the LLC-IE at the terminating side, the receiving entity shall ignore the conflicting information in the LLC-IE.

2.1.2 Interpretation of the Tables

The individual contents of the LLC/HLC-IE are represented in the following tables. The indication of the applicable service group defines the link between the GSM BC-IE and its associated LLC/HLC-IEs.

Only one LLC/HLC-IE is included in the appropriate messages, regardless of a possible dual GSM bearer capability indication. In this case, the LLC/HLC is always related to the bearer capability representing the data phase of a connection.

Legend: { xxxx ; yyyy }....choice of values
-----not relevant for this service (set to
 appropriate value)
[zzzz].....optional

2.2 LLC Bearer Service 21 ... 262.2.1 Unrestricted digital informaton transfer capability

Low layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Information transfer capability	CCITT unrestricted digital
4	Transfer mode Information transfer rate	circuit mode 64 kbit/s
5	User information layer 1 protocol	V.110/X.30
5a	Synchronous / asynchronous Negotiation User rate	asynchronous in-band not possible { 0.3 ; 1.2 ; 2.4 ; 4.8 ; 9.6 ; 1.2/0.075 } kbit/s
5b	Intermediate rate NIC on Tx NIC on Rx Flow control on Tx Flow control on Rx	{ 8 ; 16 } kbit/s ----- ----- { not required *}; required } { not accepted *}; accepted }
5c	Number of stop bits Number of data bits Parity	{ 1 ; 2 } bits { 7 ; 8 } bits { odd ; even ; none ; forced to 0 ; forced to 1 }
5d	Duplex mode Modem type	{ duplex } { { V.21 ; V.22 ; V.22bis ; V.23 ; V.26ter ; V.32 } }

*) only these values are applicable to Mobile Originated Calls

2.2.2 3.1 kHz audio ex-PLMN information transfer capability

Low layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Information transfer capability	CCITT 3.1kHz audio
4	Transfer mode Information transfer rate	circuit mode 64 kbit/s
5	User information layer 1 protocol	G.711 A-law
5a	Synchronous / asynchronous Negotiation User rate	(may be set depending on user's requirement)
5b	Intermediate rate NIC on Tx NIC on Rx Flow control on Tx Flow control on Rx	not relevant but cannot be omitted in order to have octet 5d
5c	Number of stop bits Number of data bits Parity	(may be set depending on the user's requirement)
5d	Duplex mode Modem type	[duplex] [(V.21 ; V.22 ; V.22bis ; V.23 ; V.26ter ; V.32)]

Note: If octet 5d is not specified, the whole LLC is not required.

2.3 LLC Bearer Service 31 ... 342.3.1 Unrestricted digital information transfer capability

low layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Information transfer capability	CCITT digital unrestricted
4	Transfer mode Information transfer rate	circuit mode 64 kbit/s
5	User information layer 1 protocol	{ V.110/X.30 ; X.31 flag stuffing }
5a	Synchronous / asynchronous Negotiation User rate	synchronous in-band not possible { 1.2 ; 2.4 ; 4.8 ; 9.6 } kbit/s
5b	Intermediate rate NIC on Tx NIC on Rx Flow control on Tx Flow control on Rx	{ 8 ; 16 } kbit/s { not required ; required } { not accepted ; accepted } ----- -----
5c	Number of stop bits Number of data bits Parity	not relevant but cannot be omitted in order to have octet 5d
5d	Duplex mode Modem type	{ duplex } { { V.21 ; V.22bis ; V.26ter ; V.32 } }
6	User information layer 2 protocol	{ X.25 }
7	User information layer 3 protocol	{ X.25 }

Note: If octet 5d is not specified, octet 5c may be omitted.

2.3.2 3.1kHz audio ex-PLMN information transfer capability

Low layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Information transfer capability	CCITT 3.1kHz audio
4	Transfer mode Information transfer rate	circuit mode 64 kbit/s
5	User information layer 1 protocol	G.711 A-law
5a	Synchronous / asynchronous Negotiation User rate	(may be set depending on the user's requirement)
5b	Intermediate rate NIC on Tx NIC on Rx Flow control on Tx Flow control on Rx	not relevant but cannot be omitted in order to have octet 5d
5c	Number of stop bits Number of data bits Parity	(may be set depending on the user's requirement)
5d	Duplex mode Modem type	[duplex] [(V.22 ; V.22bis ; V.26ter ; V.32)]
6	User information layer 2 protocol	[X.25]
7	User information layer 3 protocol	[X.25]

Note: If octet 5d is not specified, octets 5a..5d may be omitted.

2.4 LLC Bearer Services 41 ... 46

may be optionally available with the settings according to 2.2.1

2.5 LLC Bearer Services 51 ... 53

2.5.1 Unrestricted digital information transfer capability

low layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Information transfer capability	CCITT unrestricted digital
4	Transfer mode Information transfer rate	circuit mode 64 kbit/s
5	User information layer 1 protocol	X.31 flag stuffing
5a	Synchronous / asynchronous Negotiation User rate	synchronous in-band not possible (2.4 ; 4.8 ; 9.6) kbit/s
6	User information layer 2 protocol	X.25
7	User information layer 3 protocol	X.25

2.6 LLC Bearer Service 61

2.6.1 Unrestricted digital information transfer capability

2.6.1.1 Asynchronous

ref. section 2.2.1

2.6.1.2 Synchronous

ref. section 2.3.1

2.6.2 3.1 kHz audio ex-PLMN information transfer capability

2.6.2.1 Asynchronous

ref. section 2.2.2

2.6.2.2 Synchronous

ref. section 2.3.2

2.7 LLC Bearer Service 71

to be defined

2.8 LLC Bearer Service 81

2.8.1 Unrestricted digital information transfer capability

2.8.1.1 Asynchronous

ref. section 2.2.1

2.8.1.2 Synchronous

ref. section 2.3.1

2.8.2 3.1 kHz audio ex-PLMN information transfer capability

2.8.2.1 Asynchronous

ref. section 2.2.2

2.8.2.2 Synchronous

ref. section 2.3.2

2.9 HLC Teleservices 11 ... 12

High layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Interpretation Presentation method of protocol profile	CCITT first high layer characteristic identification to be used in the call high layer protocol profile
4	High layer characteristics identific.	Telephony .

2.10 HLC Teleservices 21 ... 23

not applicable

2.11 HLC Teleservice 31

Low layer compatibility information element as needed by the supporting equipment

High layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Interpretation Presentation method of protocol profile	CCITT first high layer characteristic identification to be used in the call high layer protocol profile
4	High layer characteristics identific.	MHS

2.12 HLC Teleservice 41 ... 43

High layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Interpretation Presentation method of protocol profile	CCITT first high layer characteristic identification to be used in the call high layer protocol profile
4	High layer characteristics identific.	Videotex

2.13 HLC Teleservice 51

High layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Interpretation Presentation method of protocol profile	CCITT first high layer characteristic identification to be used in the call high layer protocol profile
4	High layer characteristics identific.	Teletex service, basic and mixed mode of operation . basic and processable mode of operation . basic mode of operation

2.14 HLC Teleservice 61

High layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Interpretation Presentation method of protocol profile	CCITT first high layer characteristic identification to be used in the call high layer protocol profile
4	High layer characteristics identific.	Facsimile G2/G3

2.15 HLC Teleservice 62

High layer compatibility information element:

OCTET	INFORMATION ELEMENT FIELD	FIELD VALUE
3	Coding standard Interpretation Presentation method of protocol profile	CCITT first high layer characteristic identification to be used in the call high layer protocol profile
4	High layer characteristics identific.	Facsimile G2/G3