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Technical Report

Digital cellular telecommunications system (Phase 2+);
Support of Videotex
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Foreword

This Technical Report (TR) has been produced by the Special Mobile Group (SMG).

The present document describes the support of videotext services within the digital cellular telecommunication system.

The contents of the present document is subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of the present document it will be re-released with an identifying change of release date and an increase in version number as follows:

Version 7.x.y

where:

7   indicates Release 1998 of GSM Phase 2+

x   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

y   the third digit is incremented when editorial only changes have been incorporated in the specification.

1 Scope

The present document describes the support of Videotex service within the GSM PLMN network, taking into account the service definition as per CCITT Recommendation F.300 and Bearer Services specified in GSM 02.02 for a GSM PLMN.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

[1]   ETS 300 072: "Terminal Equipment (TE): Videotext presentation layer protocol Videotext presentation layer syntax".

[2]   ETS 300 073: "Videotext presentation layer data syntax; Geometric Display".

[3]   ETS 300 075: "Terminal Equipment (TE): Videotext processable data".

[4]   ETS 300 079: "Integrated Services Digital Network (ISDN); Syntax based Videotex End-to-end protocols circuit mode DTE-DTE".

[5]   ETS 300 080: "Integrated Services Digital Network (ISDN); Lower layer protocols for telematic terminals".

[6]   ETS 300 218: "Integrated Services Digital Network (ISDN); Syntax based Videotex Lower layer protocols using packet mode (X.31 Case A abd Case B)".

[7]   ETS 300 221: "Terminal Equipment (TE): Syntax based Videotex Lower layer protocols using packet mode access over the Public Switched Telephone Network (PSTN)".

[8]   ETS 300 222: "Framework of Videotext Terminal Protocols".

[9]   ETS 300 223: "Terminal Equipment (TE): Syntax based Videotex End-to-end protocols".

[10]   GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[11]   GSM 02.02: "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[12]   GSM 03.10: "Digital cellular telecommunication system (Phase 2+); GSM Public Land Mobile Network (PLMN) connection types".

[13]   GSM 03.70: "Digital cellular telecommunication system (Phase 2+); Routeing of calls to/from Public Data Networks (PDN)".

[14]   GSM 07.01: "Digital cellular telecommunications system (Phase 2+); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[15]   GSM 07.02: "Digital cellular telecommunications system (Phase 2+); Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".

[16]   GSM 07.03: "Digital cellular telecommunications system (Phase 2+); Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[17]   GSM 08.20: "Digital cellular telecommunication system (Phase 2+); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[18]   CCITT Recommendation E.163: "Numbering plan for the international telephone service".

[19]   CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[20]   CCITT Recommendation F.300: "Videotext service".

[21]   CCITT Recommendation X.31: "Support by Packet Mode Terminal Equipment in ISDN".

[22]   CCITT Recommendation X.32: "Interface between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) for terminals operating in Packet Mode and accessing a PSPDN through a PSTN or an ISDN or a CSPDN".

[23]   CCITT Recommendation X.75: "Packet -switched signalling system between public networks providing data transmission services".

2.1   Abbreviations

In addition to those below, abbreviations used in the present document are listed in GSM 01.04.

AU	Access Unit
SBVT	Syntax Based Videotex Terminal
VAP	Videotex Access Point
VSC	Videotex Service Centre
VTX host	The computer dedicated to Videotex service

3   Service definition

The Videotex service is an interactive service that by means of proper access points and standardized procedures provide the access to data base information stored in host computers external to the PLMN, via public telecommunication networks.

The basic elements considered for a Videotex system are:

- the user terminal;

- the telecommunication network;

- the Videotex host computer or Videotex service access function (PAD/VAP/VSC).

The specific features that are relevant to the service are:

- a Videotex call is usually a mobile originated call, but mobile terminated call are supported as well;

- it is an interactive service;

- the requested information is generally in form of text and/or pictures;

- the information access is under the control of the user;

- there are different Videotex syntax standards , depending on high layer attributes of the service (Profile 1, Profile 2, Profile 3, Profile 4, "ASCII"), ETS 300 073 (Geometric Display), ETS 300 075 (Processable Data), ETS 300 177 (Photographic Syntax).

Common end-to-end protocols for syntax-based Videotex are specified in ETS 300 223 and ETS 300 079.

3.1 Videotex service in the GSM context

Figure1 shows the basic concept underlying all the GSM Bearer Services, as defined in GSM 02.02.

The most general case is the GSM PLMN interworking with a Transit Network (PSTN and/or ISDN, none), interconnected to a Terminating Network (PSPDN, PSTN and/or ISDN).
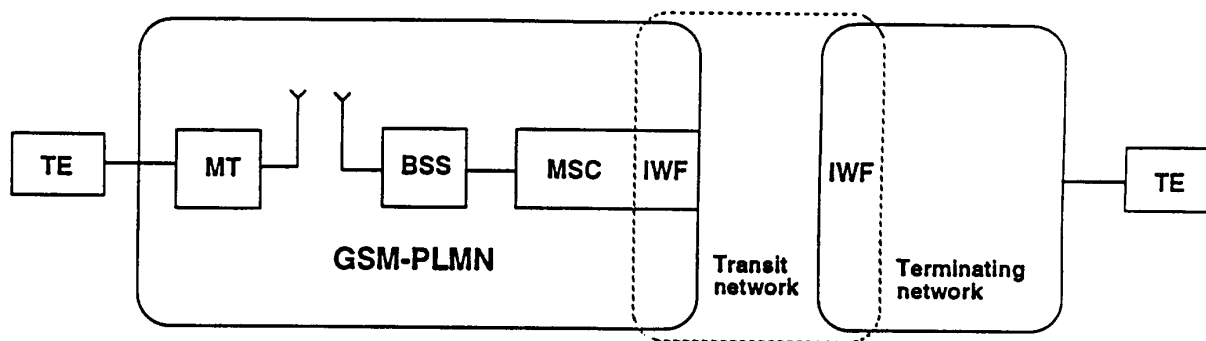

Figure 1/03.43: GSM Bearer Service scheme

As the information transfer mode attribute on the PLMN is always "Circuit", and the information transfer capability is always "UDI", the end-to-end Bearer Service attributes depend mainly on the combination of Transit/Terminating networks utilized in the overall connection.

This means that both "circuit mode" and "packet mode" bearer services are appropriate for Videotex on a GSM PLMN; in particular (see table 4/GSM 02.02):

- BS 21 to BS 26, covering data circuit duplex asynchronous rates up to 9 600 bit/s;

- BS 41 to BS 44 covering PAD access asynchronous rates up to 9 600 bit/s;

- BS 31 to BS 34, covering data circuit duplex synchronous rates up to 9 600 bit/s;

- BS 51 to BS 53, covering packet mode synchronous rates up to 9 600 bit/s;

Concerning packet mode services, the GSM PLMN network supports both:

- basic packet/PAD mode, allowing the GSM users to access dial-in asynchronous (PAD) or synchronous (AU/PH) ports of a PSPDN (to which individual subscriber is subscribed to), using respectively BS 2x or BS 3x GSM Bearer Services;

- dedicated packet/PAD mode, allowing the GSM users a "seemingly immediate" access to the PSPDN word, without any explicit intermediate passage on the transit network to access the PSPDN port; BS 4x and BS 5x are used in this case.

4 Network architecture

As identified in CCITT Recommendation F.300, various configurations are permitted for the structure of a Videotex system. A terminal can be connected to a Videotex host server:

- directly by a telecommunication network;

- via a Packet Assembly/Disassembly (PAD);

- via a Videotex Access Point (VAP);

- via a Videotex Service Centre (VSC) which may also act as a Videotex host.

All these configurations can be supported by a GSM PLMN, as detailed in the following network schemes.

4.1   Videotex host directly connected to PSTN/ISDN

When it is assumed that the Videotex centre is directly connected to the PSTN/ISDN, the network scheme is as shown in figureig.2 /03.43.
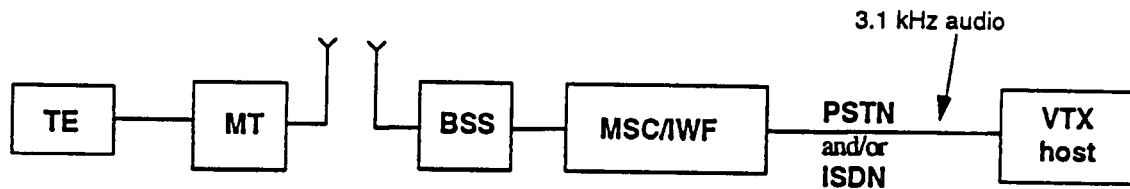

Figure 2/03.43: VTX host directly connected to PSTN/ISDN

With reference to the general scheme in figure1/03.43, the terminating network (in this case working as transit network as well) uses a 3,1 kHz audio information transfer capability; at both ends of the terminating network (MSC/IWF and VTX host) a voiceband modem is allocated, whose actual bit-rate is selected in the BC-IE at Call Establishment, within the GSM standard rates (maximun 9 600 bit/s).

BS 2x series apply in this case.

4.2   Videotex host accessed via PAD

Figure 3/03.43 summarizes this configuration, outlining all possible network alternatives.
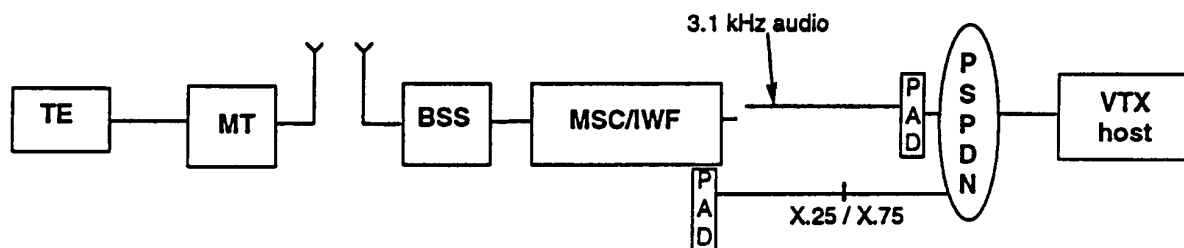

Figure 3/03.43: VTX host accessed via PAD

The main service alternative concerns basic/dedicated PAD access.

In case of basic PAD access, the transit network (PSTN and/or ISDN) is utilized to access the PAD, remotely located with respected to MSC/IWF; the Videotex customer has to make a E.164 Call to the desired PAD, then a second step is necessary to access the Videotex host.

BS 2x are utilized in this case; the information transfer capability on the transit network is 3.1 kHz audio (PSTN or ISDN).

In case of dedicated PAD access, two options are still possible (see GSM 09.05):

-    the PAD is remotely located with respect to the IWF, and automatically connected to IWF, via a dedicated circuit or a data circuit on a public network (PSTN or ISDN), so that the Videotex user has "direct" access to the PAD;

-    the PAD is located in the MSC/IWF and connected to the PSPDN via X.25 or X.75.

The dedicated PAD access provides the shortest possible connection from the PLMN to a PAD for both home subscribers staying in the home PLMN and foreign subscribers roaming in a visited PLMN.

BS 4x are utilized for dedicated PAD access.

4.3   Videotex host accessed via VAP

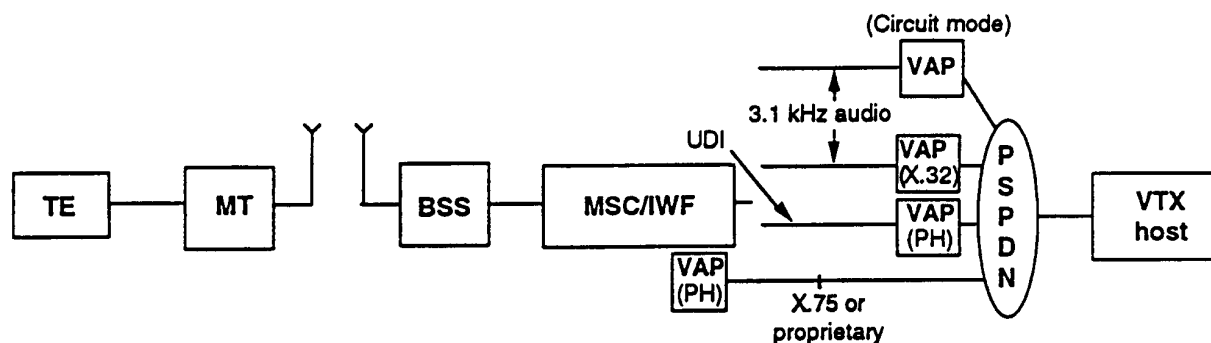Figure 4/03.43 summarizes this configuration, outlining all possible network alternatives.

Figure 4/03.43: VTX host accessed via VAP

Circuit Mode access to the VAP via ISDN transit network (and BS 3x) is according to ETS 300 079 and ETS 300 080.

Concerning Packet Mode access to VAP, again the main choice concerns basic/dedicated packet mode.

In case of basic packet mode configuration, the transit network is utilized to access a conventional X.32 dial port in the PSPDN or a PH function (X.31 Case A), remotely located with respected to MSC/IWF and functionally operating as VAP with respect to Videotex service.

The Videotex customer has to make a E.164/E.163 Call to the desired dial port/PH, then a second step is necessary to access the Videotex host.

BS 3x are utilized in this case; the information transfer capability on the transit network is 3,1 kHz audio (PSTN or ISDN) or UDI (ISDN).

In case of dedicated packet mode, the PH is logically part of the PLMN. The interface between the PH and the PSPDN is X.75 or proprietary; two options are still possible for its physical location:

-    the PH is remotely located with respect to the IWF;

-    the PH (VAP function) is located in the PLMN.

BS 5x are utilized in this case.

The dedicated packet mode provides the shortest possible connection from the PLMN to a PSPDN for both home subscribers staying in the home PLMN and foreign subscribers roaming in a visited PLMN.

4.4   Videotex host accessed via VSC

Though the Videotex Access Function is explicitly separate with respect to the Videotex host, no impact results on the overall Network architecture.

Actually the VSC can be considered a front-end function of the same Videotex host (either physically separate or integrated), so that all the above configuration in principle apply.

In particular the network schemes in Figures 3, 4/03.43 are appropriate, and all the above considerations on basic/dedicated PAD access/packet mode are still relevant.

5   Reference configuration of the Mobile Station (MS)

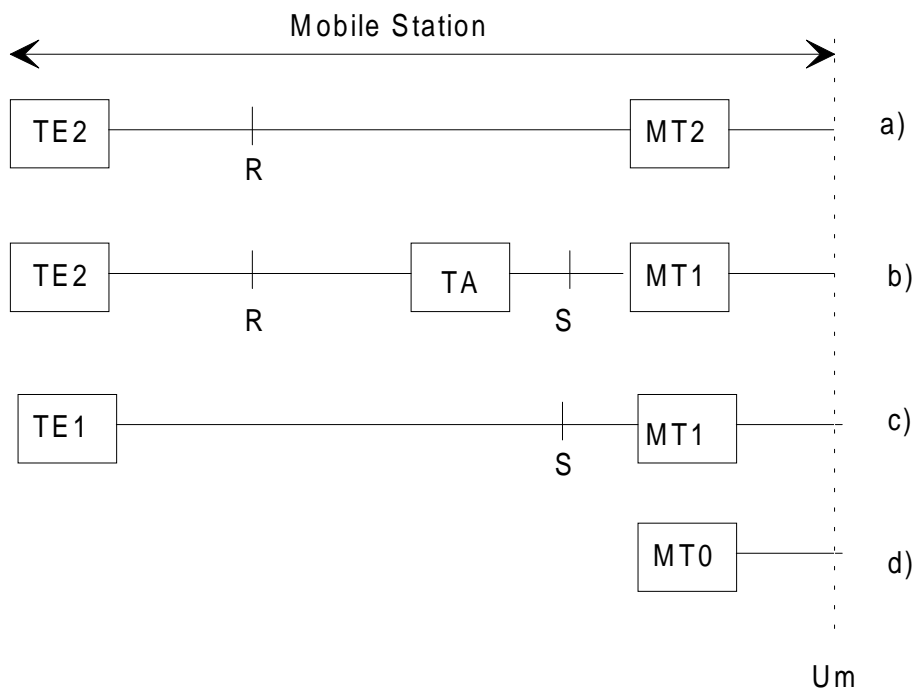The following types of reference configuration of the MS are possible:

Figure 5/03.43: Reference Configuration of the MS

The definitions of the functional blocks shown in figure 5 are reported in GSM 04.02.

Concerning specific Videotex functions of the terminal, full support of end-to-end protocols for Syntax-based Videotex is granted in a GSM PLMN, within the limitation of 9 600 bit/s as maximum speed, due to inherent bounds of GSM system.

In this respect, TE2 shall be:

-    either a conventional Videotex terminal operating in asynchronous circuit mode on a V.series standard interface;

-    or a fully compliant SBVT equipment operating in synchronous packet mode as per ETS 300 221 standard (lower layers) and ETS 300 223.

TE1 shall be a typical ISDN-SBVT equipment, operating according to either ISDN Circuit mode (ETS 300 079 and ETS 300 080 standards) or ISDN packet mode (ETS 300 218 and 300 223 standards).

MT0 integrates in a single equipment both Videotex and mobile termination functions.

6 Bearer Service configuration and settings

Support of Videotex service on the the GSM PLMN is via GSM standard Bearer Services, as specified in various GSM Technical Specificationa. In the following specific reference on the main technical aspects are reviewed.

6.1 Connection Types

Transparent or non-transparent network support can be requested to the GSM PLMN for Videotex service.

The information transfer protocol models are those in figure 6/GSM 03.10, models 1a, 2a, 3a, 4a for ISDN-related MS configurations, and models 1b, 2b, 3b, 4b for PSTN-related MS configurations.

Concerning "Circuit mode" Videotex, the choice between transparent (error prone, fixed delay connection) and non-transparent (error resilient, variable delay connection) network support affects just the QOS general attribute.

For "packet mode" Videotex the transparent support, due to inherent constraints will only work in case of access to a X.32 dial port (see section 8.7/GSM 09.06); therefore "Dedicated packet mode" Videotex is only possible with non-transparent support.

6.2 Terminal Adaption functions

The TAFs used for Videotex are the asynchronous and synchronous standards defined in GSM 07-series; rate adaption functions are those specified in GSM 04.21 and GSM 08.20.

6.3 Signalling aspects

All GSM standard rates (up to 9 600 bit/s) can be used for Videotex on a GSM PLMN; appropriate settings in BC-IE and LLC (where applicable) fix the rate on the GSM connection, and identify the voiceband modem to be used (when applicable) by the IWF.

When a 1 200/75 bit/s Bearer Capability is requested, the 75 bit/s rate is intended for MS to Network direction only; no provision for "reversing" the channel rates is provided on the GSM Network.

GSM 07.01 is the reference for all technical aspects concerning BC/LLC/HLC on a GSM PLMN.

6.4 Network interworking

Ad-hoc Specifications are devoted in the GSM normative to explicitly cover the aspects of PLMN interworking; being Videotex service a generic application running on top of GSM standard Bearer services, all technical aspects in those GSM specifications apply.

The reference are:

- GSM 09.07, which details interworking requirements towards PSTN/ISDN;

- GSM 09.05 and GSM 09.06, which detail interworking requirements towards PSPDN;

- GSM 03.70, defining general Call routing scenarios to/from PDNs.

Concerning packet mode it should be stressed that X.31 Case B is currently not feasible within PLMN (see section 7.4/GSM 09.06).

Moreover for dedicated packet mode, whilst Mobile Originated Calls are fully supported, Mobile Terminated Calls are not supported (see section 9.1/GSM 09.06).

Annex A (informative):
Change Request History

Change history					
SMG No.	**TDoc. No.**	**CR. No.**	**Section affected**	**New version**	**Subject/Comments**
SMG#07				4.1.2	ETSI Publication
SMG#20				5.0.0	Release 1996 version
SMG#27				6.0.0	Release 1997 version
SMG#29				7.0.0	Release 1998 version

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V7.0.0	August 1999	Publication