SLOVENSKI STANDARD
SIST ETS 300 931 E2:2003

01-december-2003

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Digital cellular telecommunications system (Phase 2+) (GSM); Technical realization of facsimile group 3 transparent (GSM 03.45 version 5.1.1)

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Ta slovenski standard je istoveten z: **ETS 300 931 Edition 2**

ICS:

33.070.50	Globalni sistem za mobilno telekomunikacijo (GSM)	Global System for Mobile Communication (GSM)

SIST ETS 300 931 E2:2003 **en**

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EUROPEAN TELECOMMUNICATION STANDARD

EUROPEAN

TELECOMMUNICATION

STANDARD

ETS 300 931

August 1997

Second Edition

Source: ETSI SMG

Reference: RE/SMG-040345QR

ICS: 33.020

Key words: Digital cellular telecommunications system, Global System for Mobile communications (GSM)

Digital cellular telecommunications system (Phase 2+);
Technical realization of facsimile group 3 transparent
(GSM 03.45 version 5.1.1)

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) of the European Telecommunications Standards Institute (ETSI).

This ETS defines the technical realization of facsimile group 3 using transparent network support within the digital cellular telecommunications system.

The specification from which this ETS has been derived was originally based on CEPT documentation, hence the presentation of this ETS may not be entirely in accordance with the ETSI/PNE Rules.

Transposition dates	
Date of adoption:	8 August 1997
Date of latest announcement of this ETS (doa):	30 November 1997
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 May 1998
Date of withdrawal of any conflicting National Standard (dow):	31 May 1998

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0 Scope

This European Telecommunication Standard (ETS) deals with the procedures allowing the technical realization of the Group 3 facsimile Service within the GSM PLMN using transparent Network support, according to the definition of Teleservice 61 and 62 specified in the GSM 02.03 [2].

0.1 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1]   GSM 01.04 (ETR 350): "Digital cellular telecommunications system (Phase 2+): Abbreviations and acronyms".

[2]   GSM 02.03 (ETS 300 905): "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[3]   GSM 02.34: "Digital cellular telecommunications system (Phase 2+): High Speed Circuit Switched Data (HSCSD) - Stage 1".

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

[5]   GSM 03.34 (TS 101 038): "Digital cellular telecommunications system (Phase 2+); High Speed Circuit Switched Data (HSCSD) - Stage 2".

[6]   GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[7]   GSM 04.08 (ETS 300 940): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[8]   GSM 04.21 (ETS 300 945): "Digital cellular telecommunications system; Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".

[9]   GSM 07.01 (ETS 300 913): "Digital cellular telecommunications system (Phase 2+); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[10]   GSM 07.03 (ETS 300 915): "Digital cellular telecommunications system (Phase 2+); Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[11]   GSM 09.07 (ETS 300 976): "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[12]   CCITT Recommendation T.35: "Procedure for the allocation of CCITT members' codes".

[13]   CCITT Recommendation F.160 Fascicle II.5: "General operational provision for the international public facsimile".

[14]   CCITT Recommendation T.4 Fascicle VII.3: "Standardization of group 3 facsimile apparatus for document transmission".

[15]   CCITT Recommendation T.30 Fascicle VII.3: "Procedures for document facsimile transmission in the general switched telephone network".

[16]   CCITT Recommendation V.21 Fascicle VIII.l: "300 bits per second duplex modem standardized for use in the general switched telephone network".

[17]   CCITT Recommendation V.24 Fascicle VIII.l: "List of definitions for interchange circuits between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE)".

[18]   CCITT Recommendation V.25bis Fascicle VIII.l: "Automatic calling and/or answering equipment on the General Switched Telephone Network (GSTN) using the 100-series interchange circuits".

[19]   CCITT Recommendation V.27ter Fascicle VIII.l: "4 800/2 400 bits per second modem standardized for use in the general switched telephone network".

[20]   CCITT Recommendation V.29 Fascicle VIII.l: "9 600 bits per second modem standardized for use on point-to-point 4-wire leased telephone-type circuits".

[21]   CCITT Recommendation V.33 Fascicle VIII.l: "14 400 bits per second modem standardized for use on point-to-point 4-wire leased telephone-type circuits".

[22]   CCITT Recommendation X.300 Fascicle VIII.6: "General principles for interworking between public networks, and between public networks and other networks for the provision of data transmission services".

[23]   CCITT Recommendation V.17: "A 2-wire modem for facsimile applications with rates up to 14 400 bit/s".

0.2   Definitions and abbreviations

In addition to those below, abbreviations used in this ETS are listed in GSM 01.04 [1].

BCS   Binary Coded Signalling phase of Facsimile transmission as per CCITT T.30
CT105   Interchange Circuit 105 as per CCITT V.24
CT106   Interchange Circuit 106 as per CCITT V.24
CT107   Interchange Circuit 107 as per CCITT V.24
CT108.2   Interchange Circuit 108/2 as per CCITT V.24
CT109   Interchange Circuit 109 as per CCITT V.24
CT114   Interchange Circuit 114 as per CCITT V.24
CT115   Interchange Circuit 115 as per CCITT V.24
FA/MT   The Fax Adaptor specifically located at MT side
FA/IWF   The Fax Adaptor specifically located at IWF side
MSG   Message phase of Facsimile transmission as per CCITT T.30

All protocol entities from CCITT Facsimile Recommendations (T.4 and T.30) apply; in this ETS they are referenced to in the same way as in the above CCITT Recommendations (see also annex I to this ETS).

1 Service definition

The fixed network Group 3 Facsimile service, as basically defined in CCITT Recommendation F.160, is an international telematic service for ISO A4 document transmission between two facsimile stations.

The service specification is comprised of two parts: the control protocol described in CCITT Recommendation T.30, and the document transmission coding described in CCITT Recommendation T.4.

The GSM facsimile Teleservice is intended to allow facsimile connections between group 3 apparatus using:

- a GSM PLMN as a stand alone facility, for mobile to mobile communication;
- a GSM PLMN to gain access to fixed networks PSTN and ISDN, for mobile to/from land communication.

For this Teleservice, the document coding is as CCITT Recommendation T.4 with no modifications. The protocol used is CCITT Recommendation T.30 modified within the PLMN as detailed in this ETS.

The interworking between different networks is based on CCITT Recommendation X.300.

The particular features of this Teleservice are:

- it uses point-point communication;

- the information transfer capability is dual "Speech"/"Group 3 Facsimile" for Teleservice 61 and "Group 3 Facsimile" only for Teleservice 62;

- both mobile originated and terminated calls are supported;

- the information transfer mode is circuit, duplex, synchronous and symmetric;

- different end-to-end transfer rates are used within the same call to take advantage of the better radio path error rate;

- use of a standard synchronous terminal adaptation function (as per GSM 07.03) within the MS.

2 Network architecture

The network architecture applicable to this Teleservice is shown in figure 1/03.45, below.
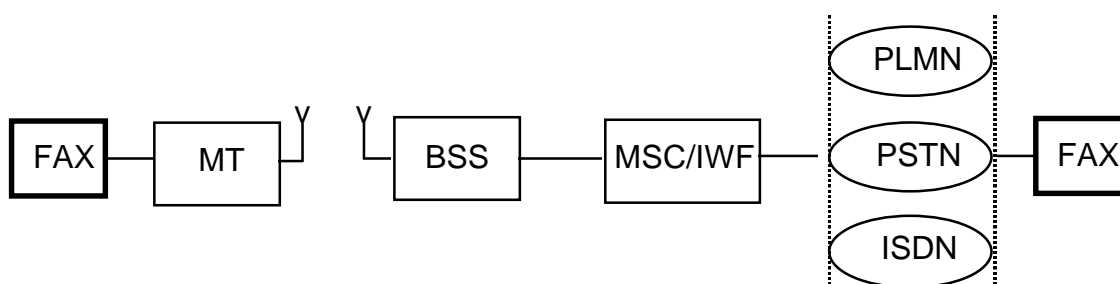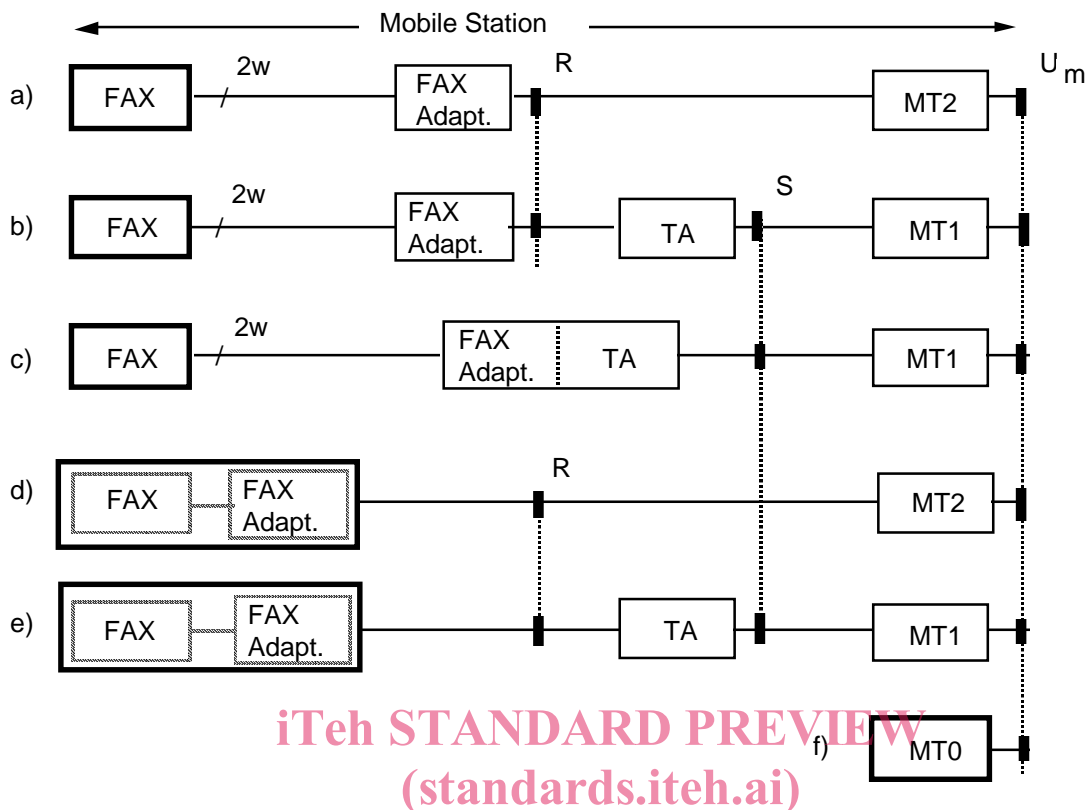

Figure 1/03.45: Network architecture

This shows the case of mobile to fixed network interworking. For mobile to mobile calls, there would effectively be a loop back within the PLMN, using two IWFs.

3 Reference configuration at the mobile station

The mobile reference configurations described in this clause are defined as per GSM 04.02.

Figure 2/03.45: Reference configurations

The Teleservice definition in GSM 02.03 regards the group 3 facsimile terminal as a 2-wire analogue terminated equipment. In order to connect this to the MT2 a separate "Fax Adaptor" device is necessary.

This configuration, shown in figure 2a/03.45, has to be considered as the standard configuration, so that all the existing Group 3 facsimile apparatus can be connected to the PLMN.

An alternative realization would be to combine a standard group 3 facsimile machine and the Fax Adaptor into a specially developed "GSM facsimile machine", directly providing a digital output. Although such a device must appear to the MT2 as identical to the Fax Adaptor (i.e. with an identical interface and protocol), it would allow for a significantly smaller and simpler facsimile machine. This configuration is shown in figure 2d/03.45 and is regarded as a desirable alternative.

In addition of course, it is always possible to realize an MT0, as per figure 2f/03.45, where both the facsimile and mobile termination functions are considered to be part of one integrated unit.

The remaining configurations concern the use of an S interface and are considered as optional configurations. Their use is for further study.

The particular terminal adaptation functions used are those detailed in GSM 07.03 and the interface to the MT2 used is synchronous V.24 with an option for support of V.25bis procedures for autocalling and autoanswering.

3.1 Fax Adaptor functionality

The Fax Adaptor block, figure 3/03.45, is intended to specifically complement the Group 3 facsimile apparatus in order to be able to communicate over a GSM PLMN.
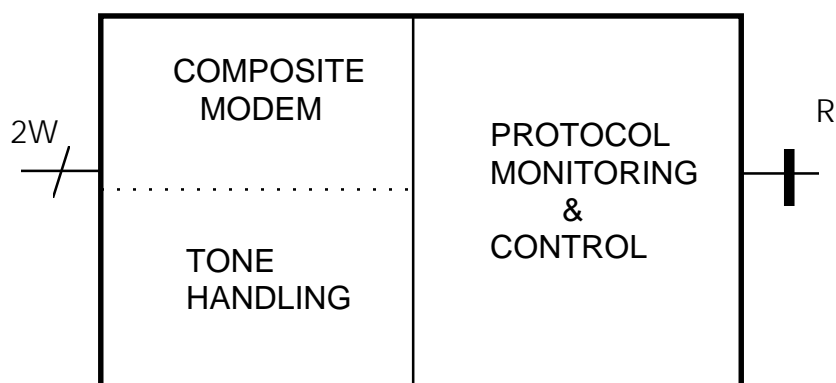
Figure 3/03.45: Fax Adaptor scheme

Whether it has to be a function internal to the GSM PLMN, or an external accessory associated with the Group 3 apparatus, is beyond the scope of this ETS, and in any case, does not affect at all the working of the procedure as here described.

It can be functionally partitioned in two clauses:

- an analogue clause, dealing with:

    - the modulation and demodulation processes according to CCITT Recommendation V.21, V.27ter, V.29 and V.17 as explained in T.4 and T.30;

    - handling of the signalling on the 2-wire path to the facsimile machine, including autocalling and autoanswer functions where necessary (see clause 6).

- a digital clause, dealing with:

    - monitoring and where necessary, manipulation of the T.30 protocol as detailed in the rest of this ETS;

    - overall control of the adaptor;

    - connection over the synchronous V.24 interface to the MT as described in GSM 07.03;

    - where necessary, autocalling and autoanswering functions according to V.25bis.

In the following this specification will reference the Fax Adaptor functionality, considering the most general case where it operates as a full-featured (see figure 3/03.45) separate block (see figure 2a/03.45), as this reference configuration is implicitly or explicitly exhaustive of all service related technical aspects.

3.2   GSM Facsimile Machine functionality

The special GSM facsimile machine shown in the MS configuration of figure 2d/03.45 has a similar functionality to the digital part of the Fax Adaptor, but without any of the analogue portions.

It appears over the V.24 interface as identical to the Fax Adaptor, i.e. the MT2 needs to have no knowledge of the particular configuration used.

When necessary this reference configuration, will be explicitly referenced to in the following; otherwise all technical aspects relevant to the configuration implicitly apply.