Source:　　　　**TSG CN WG 1**

Title:　　　　**CRs to R99 Work Item** GSM-UMTS interworking,

Agenda item:　　**7.16**

Document for:　　**APPROVAL**

<u>**Introduction**</u>**:**

This document contains 1 CR on **R99** Work Item **"** GSM-UMTS interworking,**"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #10 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
23.009	015	2	N1-001412	R99	GSM to UMTS Handover: Location Reporting in	F	3.4.0

CR-Form-v3

CHANGE REQUEST

| ⌘ | **24.002** | CR | **001** | ⌘ | rev | **R2
~~1~~** | ⌘ | Current version: | **3.0.0** | ⌘ |

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

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

Title: ⌘	CR 24.002 on Adaptations for UMTS	
Source: ⌘	Ericsson	
Work item code: ⌘	TEI	***Date:*** ⌘ 2000-11-23
Category: ⌘ **F**		***Release:*** ⌘ R99

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

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

Reason for change: ⌘	TS 24.002 has been transferred from SMG to 3GPP. Therefore, adaptations for UMTS are required. In addition, some texts which were not conformity the latest standard (e.g. X.21 and V.11 had been removed.) or not accordant to this document (e.g.subclause 3.2) have been removed.
Summary of change: ⌘	-Revised and added the references. -Add the PLMN (Iu mode) Access Reference Configuration and clear up of GSM. -Remove subclause 3.2 Base Station + MSC (BS/MSC)
Consequences if not approved: ⌘	Inapplicable to UMTS.

Clauses affected: ⌘	
Other specs affected: ⌘	**X** Other core specifications ⌘ TS 27 series ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	Regarding the S interface (and consequently TE1 and MT1), we would like to ask T2 for advice. MT1 is an idea from the early days of GSM, when the GSM PLMN was thought of as the mobile extension of ISDN. In 3G it was removed since this idea was never realised, It is only reason leaving it in for 2G for legacy reasons. However, if T2 decides to remove MT1 in GSM as well, it will be removed from this document.

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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

> Version x.y.z

> where:

>> x   the first digit:

>>> 1   presented to TSG for information;

>>> 2   presented to TSG for approval;

>>> 3   or greater indicates TSG approved document under change control.

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

>> z   the third digit is incremented when editorial only changes have been incorporated in the document.

1   Scope

The present document describes the reference configuration for access to a ~~GSM~~ PLMN.

A user accesses a ~~GSM~~ PLMN via a number of interfaces, including the MS-BS (in A/Gb mode) and UE-UTRAN (in Iu mode) interface. The purpose of this Technical Specification is to indicate the possible access arrangements that may be used in conjunction with the MS-BS (in A/Gb mode) and UE-UTRAN (in Iu mode) interface.

1.1   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]   ~~GSM~~3GPP TS 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2]   ~~GSM 02.02~~3GPP TS 22.002: "~~Digital cellular telecommunications system (Phase 2+):~~Circuit Bearer Services (BS) supported by a ~~GSM~~ Public Land Mobile Network (PLMN)".

[3]   ~~GSM~~3GPP TS 04.01: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface General aspects and principles".

[4]   ~~GSM~~3GPP TS 04.03: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Channel structures and access capabilities".

[5] ~~GSM~~3GPP TS 04.04: "Digital cellular telecommunications system (Phase 2+); layer 1 General requirements".

[6] ~~GSM~~3GPP TS 04.05: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer General aspects".

[7] ~~GSM~~3GPP TS 04.06: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[8] ~~GSM 04.07~~3GPP TS 24.007: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface signalling layer 3 General aspects".

[9] ~~GSM 04.08~~3GPP TS 24.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface Core Network protocol layer 3 specification".

[10] ~~GSM 04.10~~3GPP TS 24.010: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface layer 3 Supplementary services specification General aspects".

[11] ~~GSM 04.11~~3GPP TS 24.011: "~~Digital cellular telecommunications system (Phase 2+);~~ Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[12] ~~GSM 04.12~~3GPP TS 24.012: "~~Digital cellular telecommunications system (Phase 2+);~~ Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

[13] ~~GSM~~3GPP TS 04.13: "Digital cellular telecommunications system (Phase 2+); Performance requirements on mobile radio interface".

[14] ~~GSM~~3GPP TS 04.21: "Digital cellular telecommunications system (Phase 2+); Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".

[15] ~~GSM 04.22~~3GPP TS 24.022: "~~Digital cellular telecommunications system (Phase 2+);~~ Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS - BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[16] ~~GSM 04.80~~3GPP TS 24.080: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface layer 3 supplementary services specification Formats and coding".

[17] ~~GSM 04.81~~3GPP TS 24.081: "~~Digital cellular telecommunications system (Phase 2+);~~ Line identification supplementary services - Stage 3".

[18] ~~GSM 04.82~~3GPP TS 24.082: "~~Digital cellular telecommunications system (Phase 2+);~~ Call Forwarding (CF) supplementary services - Stage 3".

[19] ~~GSM 04.83~~3GPP TS 24.083: "~~Digital cellular telecommunications system (Phase 2+);~~ Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[20] ~~GSM 04.84~~3GPP TS 24.084: "~~Digital cellular telecommunications system (Phase 2+);~~ MultiParty (MPTY) supplementary services - Stage 3".

[21] ~~GSM 04.85~~3GPP TS 24.085: "~~Digital cellular telecommunications system (Phase 2+);~~ Closed User Group (CUG) supplementary services - Stage 3".

[22] ~~GSM 04.86~~3GPP TS 24.086: "~~Digital cellular telecommunications system (Phase 2+);~~ Advice of Charge (AoC) supplementary services - Stage 3".

[23] ~~GSM 04.88~~3GPP TS 24.088: "~~Digital cellular telecommunications system (Phase 2+);~~ Call Barring (CB) supplementary services - Stage 3".

[24] ~~GSM 04.90~~3GPP TS 24.090: "~~Digital cellular telecommunications system (Phase 2+);~~ Unstructured supplementary services operation - Stage 3".

[25] ~~GSM~~3GPP TS 05.01: "Digital cellular telecommunications system (Phase 2+); Physical layer on the radio path General description".

[26]   ~~GSM~~3GPP TS 05.02: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

[27]   ~~GSM~~3GPP TS 05.03: "Digital cellular telecommunications system (Phase 2+); Channel coding".

[28]   ~~GSM~~3GPP TS 05.04: "Digital cellular telecommunications system (Phase 2+); Modulation".

[29]   ~~GSM~~3GPP TS 05.05: "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception".

[30]   ~~GSM~~3GPP TS 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[31]   ~~GSM~~3GPP TS 05.10: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronisation".

[32]   ~~GSM~~3GPP TS 05.90: "Digital cellular telecommunications system (Phase 2+); GSM Electro Magnetic Compatibility (EMC) considerations".

[33]   ~~GSM 07.01~~3GPP TS 27.001: "~~Digital cellular telecommunications system (Phase 2+);~~ General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[34]   ~~GSM 07.02~~3GPP TS 27.002: "~~Digital cellular telecommunications system (Phase 2+);~~ Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".

[35]   ~~GSM 07.03~~3GPP TS 27.003: "~~Digital cellular telecommunications system (Phase 2+);~~ Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[36]   ~~CCITT~~ITU-T Series V Recommendations: "Data communication over the Telephone network".

[37]   ~~CCITT~~ITU-T Series X Recommendations: "Data communication networks".

[38]   ~~CCITT~~ITU-T Recommendation I.420: "Basic user-network interface".

[39]   3GPP TS 21.905: "3G Vocabulary".

[40]   3GPP TS 23.910: "Circuit Switched Data Bearer Services".

[41]   3GPP TS 25.322: "Radio Link Control (RLC) Protocol Specification".

[42]   ITU-T Recommendation V.24 (1996):"List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)".

[43]   ITU-T Recommendation V.28 (1993): "Electrical characteristics for unbalanced double-current interchange circuits".

[44]   Infrared Data Association IrDA: "IrPHY Physical layer signalling standard".

[45]   Personal Computer Memory Card Association: "PCMCIA 2.1 or PC-Card 3.0 electrical specification or later revisions".

1.2   Abbreviations

Abbreviations used in the present document are listed in ~~GSM~~3GPP TS 01.04 and 3GPP TS 21.905.

2   General definitions

The following definitions 2.1-2.3 are based on those used for ISDN.

2.1 Reference Configurations

Reference Configurations are conceptual configurations useful in identifying access arrangements to a network. Two concepts are used in defining reference configurations:

reference points and functional groups.

2.2 Functional Groups

Functional Groups are sets of functions which may be needed in network access arrangements. In a particular access arrangement, specific functions in a functional group may or may not be present. ~~Note that s~~Specific functions in a functional group may be performed in one or more pieces of equipment.

2.3 Reference Points

Reference Points are the conceptual points dividing functional groups. In a specific access arrangement, a reference point may correspond to a physical interface between pieces of equipment, or there may not be any physical interface corresponding to the reference point.

~~The following definition is used in the present document:~~

2.4 ~~GSM~~ Interface Points

~~GSM~~ Interface Points are reference points within a ~~GSM~~ PLMN at which a ~~GSM~~3GPP specified interface is always identified.

2.5 Terminal Definitions

The term 'mobile station' (MS) in the present document is synonymous with the term 'user equipment' (UE) in 3G terminology as defined in 3GPP TR 21.905.

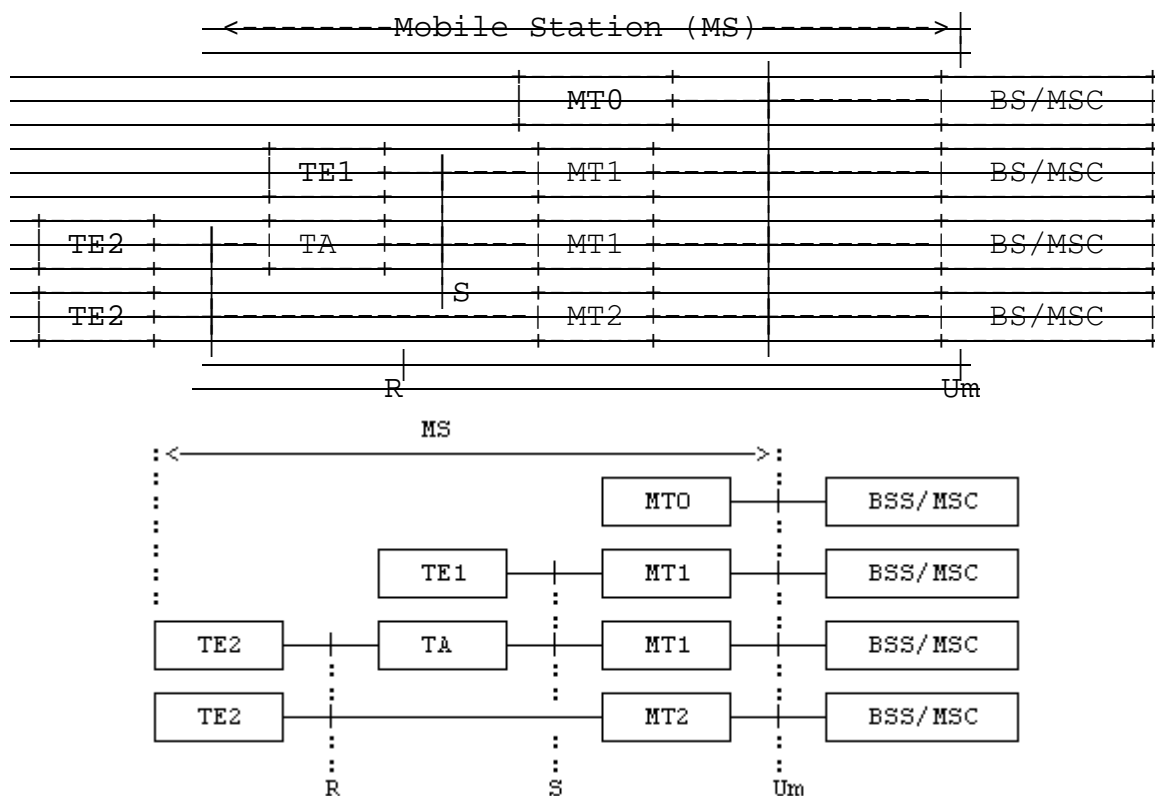The term 'TE2' in the present document is synonymous with the term 'TE' in 3G terminology as defined in 3GPP TR 21.905.

The term 'MT2' in the present document is synonymous with the term 'MT' in 3G terminology as defined in 3GPP TR 21.905.

3 ~~GSM~~ Reference Configuration

The reference configuration for ~~GSM~~ PLMN (in A/Gb mode) access interfaces is shown in figure 1.

```
    <---------------Mobile Station (MS)---------->|
    |-------------------------------+-------+------------+-------|
    |                               |  MT0  |            | BS/MSC |
    |-------------------------------+-------+------------+-------|
    |               +-------+-------+-------+            | BS/MSC |
    |       TE1     |       | MT1   |                    |
    |-------+-------+-------+-------+-------+------------+-------|
    | TE2   |       TA      |       | MT1   |            | BS/MSC |
    |-------+---------------+-------+-------+------------+-------|
    | TE2   |               S       | MT2   |            | BS/MSC |
    |-------+-----------------------+-------+------------+-------|
            |               R               |            Um
```

```
                          MS
        :<------------------------------------>:
        :                        +-------+     :  +---------+
        :                        |  MT0  |--------| BSS/MSC |
        :                        +-------+     :  +---------+
        :          +-------+     +-------+     :  +---------+
        :          |  TE1  |--|--|  MT1  |--------| BSS/MSC |
        :          +-------+     +-------+     :  +---------+
    +-------+      +-------+     +-------+     :  +---------+
    |  TE2  |--|--|   TA   |--|--|  MT1  |--------| BSS/MSC |
    +-------+      +-------+     +-------+     :  +---------+
    +-------+                    +-------+     :  +---------+
    |  TE2  |--------------------|  MT2  |--------| BSS/MSC |
    +-------+                    +-------+     :  +---------+
        :                           :          :
        R                           S          Um
```

╼╾ : 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 (in A/Gb mode)

There are three types of MT:

- MT0 includes functions belonging to the functional group MT, with support of no terminal interfaces.

- MT1 includes functions belonging to the functional group MT, and with an interface that complies with the GSM recommmended subset of the ISDN user-network interface specifications.

- MT2 includes functions belonging to the functional group MT, and with an interface that complies with the 3GPP TS 27.00z series Terminal Adaptation Function specifications. Accordingly, the interchange circuit mapping at the MT2 to TE interface shall comply with the ITU-T V.24 [42] recmmendation; while the physical implementation shall conform either to the ITU-T V.28 [43], or to the IrDA IrPHY Physical signalling standard specification [44], or to the PCMCIA 2.1[45], or to the PC-Card 3.0[45], electrical specification or to later revisions.

The MT plus any TE/(TE + TA) constitutes the Mobile Station, MS.

The terminal equipment functional groups TE1, TE2 and TA are conceptually the same functional groups as those in the ISDN.

~~The terminal equipment functional groups TE1, TE2 and TA are conceptually the same functional groups as those in the ISDN. The two new functional groups are:~~

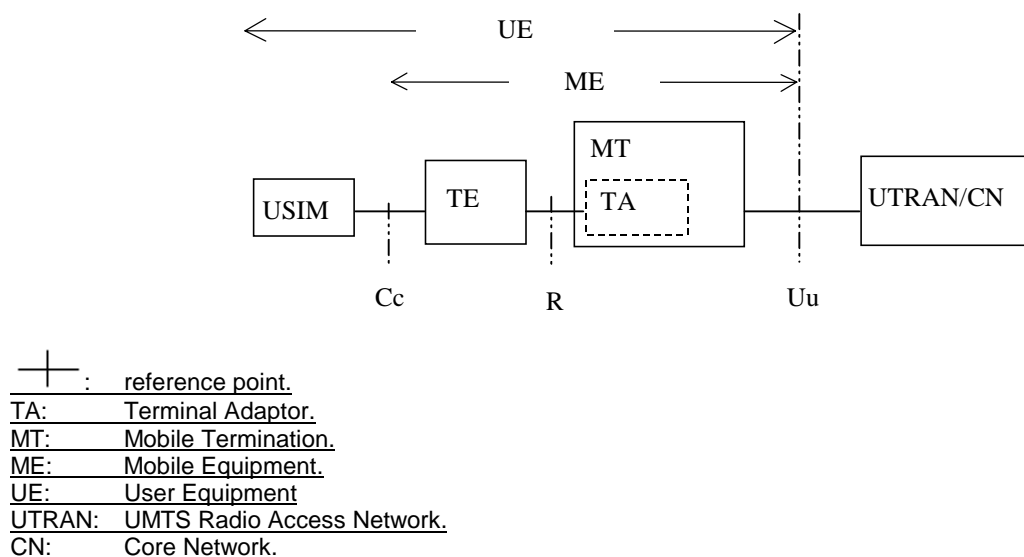The reference configuration for PLMN (Iu mode) access interfaces is shown in figure 2.

ETSI

: reference point.
TA: Terminal Adaptor.
MT: Mobile Termination.
ME: Mobile Equipment.
UE: User Equipment
UTRAN: UMTS Radio Access Network.
CN: Core Network.

Figure 2: PLMN Access Reference Configuration (Iu mode)

There is no reference point identified for the TA Function F. The TA Function F is considered as a part of the Mobile Termination and with an interface that complies with the 3GPP TS 27.00z series Terminal Adaptation Function specifications.

3.1   Mobile Termination (MT)

The MT performs the following functions, which performs the following functions:

- radio transmission termination;

- radio transmission channel management;

- terminal capabilities, including presentation of a man-machine interface to a user;

- speech encoding/decoding;

- error protection for all information sent across the radio path. This includes FEC (forward error correction) and, for signalling and user data (except for transparent data services), ARQ (automatic request forretransmission);

- flow control of signalling and mapping of user signalling to/from PLMN access signalling;

- flow control of user data (except for transparent data services) and mapping of flow control for asynchronous transparent data services;

- rate adaptation of user data between the radio channel rate and user rates;

- rate adaptation of user data (see 3GPP TS 04.21[14]) and data formatting for the transmission SAP (3GPP TS 25.322);

- multiple terminal support;

- mobility management.

There are three types of MT:

- MT0 includes functions belonging to the functional group MT, with support of no terminal interfaces.

- MT1 includes functions belonging to the functional group MT, and with an interface that complies with the GSM

recommmended subset of the ISDN user-network interface specifications.

- MT2 includes functions belonging to the functional group MT, and with an interface that complies with the GSM 07.0x series Terminal Adaptation Function specifications. Accordingly, the interchange circuit mapping at the MT2 to TE interface shall comply with the CCITT V.24 or X.21 recmmendations; while the physical implementation shall conform either to the CCITT V.28, or V.11, or to the IrDA IrPHY, or to the PCMCIA 2.1, or to the PC-Card 3.0 electrical specification, or to later revisions.

The MT plus any TE/(TE + TA) constitutes the Mobile Station, MS.

3.2 Base Station + MSC (BS/MSC)

which include the following functions:

- radio transmission termination;

- speech transcoding;

- radio transmission channel management;

- error protection for all information sent across the radio path. This includes FEC (forward error correction) and for signalling and user data (except for transparent data services), ARQ (automatic request for retransmission);

- link layer functions for signalling across the radio path;

- MS-BS circuit establishment and release functions;

- handover functions;

- rate adaptation of user data.

4 Physical Realisation

In a GSMPLMN, the reference point Um/Uu is an GSMinterface point, i.e. it is always implemented as a physical interface (according to GSM3GPP Technical Specifications in the 04, 05, 024 and 025 series). The reference points S and R may be optionally implemented as physical interfaces. The implementation of interfaces at these reference points is according to Technical Specifications 3GPP TS GSM 027.001, 027.002 and 027.003.

Figure 32 gives examples of configurations illustrating combinations of physical interfaces at reference points R and S. The examples shown are not exhaustive, but only serve to illustrate possible implementations of the respective functional blocks.

Example (a) of figure 32 illustrates a fully integrated MS including data terminal functions within the mobile station equipment.

Example (b) of figure 32 illustrates the connection of a TE1 in accordance with Technical Specifications GSM3GPP TS 027.002 and/ 027.003 (and ITU-TCCITT Recommendation I.420). In this example the speech service is offered via the TE1.

Example (c) of figure 32 illustrates the connection of a TE2 by a ITU-TCCITT X or V series interface according to Technical Specifications GSM3GPP TS 027.002 and 027.003.

Example (d) of figure 32 illustrates the connection of a MT2 PCMCIA card to a TE2 by a PCMCIA 2.1 interface according to the Technical Specifications 3GPP TS GSM 027.002 and 027.003.

Example (e) of figure 32 illustrates the connection of a TE2 by means of an ISDN TA to the MT equipment.

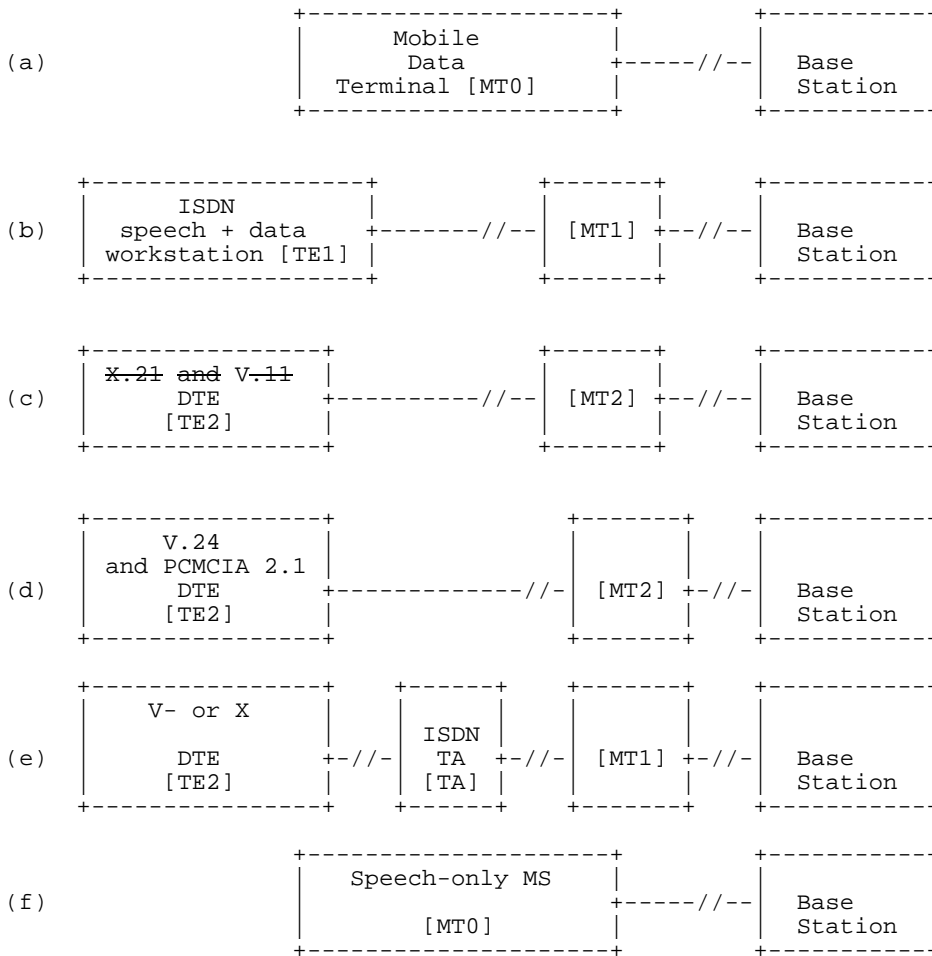Example (f) of figure 32 illustrates the connection of a speech only MS.

```
          +---------------------+         +-----------+
          |      Mobile         |         |           |
(a)       |      Data           +-----//--|  Base     |
          |   Terminal [MT0]    |         |  Station   |
          +---------------------+         +-----------+


      +------------------+        +------+      +-----------+
      |      ISDN        |        |      |      |           |
(b)   | speech + data    +-------//--| [MT1] +--//--|  Base     |
      | workstation [TE1]|        |      |      |  Station   |
      +------------------+        +------+      +-----------+


      +----------------+          +------+      +-----------+
      | X.21 and V.11  |          |      |      |           |
(c)   |      DTE       +---------//--| [MT2] +--//--|  Base     |
      |     [TE2]      |          |      |      |  Station   |
      +----------------+          +------+      +-----------+


      +----------------+          +------+      +-----------+
      |      V.24      |          |      |      |           |
      | and PCMCIA 2.1 |          |      |      |           |
(d)   |      DTE       +------------//-| [MT2] +-//-|  Base     |
      |     [TE2]      |          |      |      |  Station   |
      +----------------+          +------+      +-----------+


      +----------------+  +------+  +------+      +-----------+
      |   V- or X      |  |      |  |      |      |           |
      |                |  | ISDN |  |      |      |           |
(e)   |     DTE        +-//-| TA  +-//-| [MT1] +-//-|  Base     |
      |    [TE2]       |  | [TA] |  |      |      |  Station   |
      +----------------+  +------+  +------+      +-----------+


          +---------------------+         +-----------+
          |   Speech-only MS    |         |           |
(f)       |                     +-----//--|  Base     |
          |       [MT0]         |         |  Station   |
          +---------------------+         +-----------+
```

Figure 23: Examples of physical implementations

Annex <A> (informative):
Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
30.3.2000	CN#7	-	-	-	Transferred to 3GPP for R99 (from GSM 04.02 v7.0.0).		3.0.0