Technical Specification Group Services and System Aspects **TSGS#15(02)0064**

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TSG-SA WG 1 (Services) meeting #15 **S1-020664**
Saalfelden, Austria, 11-15th February 2002 **Agenda Item: 10.9**

Presentation of Technical Report to TSG SA

Presentation to:	**TSG SA Meeting #15**
Document for presentation:	**TR 22.944, Version 2.0.0;** **Report on Service Requirements for UE Functionality Split**
Presented for:	**Approval**

Abstract of document: This is the technical report on Service Requirements for UE Functionality Split.

Changes since last presentation to TSG-SA Meeting #14:

(i) Editorial corrections.
(ii) Added new section 6.4
(iii) Added security related text in 6.2
(iv) Added call control related text in 6..3.2
(v) Added editor's note added in 6.1, 6.3.1, 6.4

Outstanding Issues:

- Location of call control (and other non-access stratum functions)
- ISIM related changes.

Contentious Issue

3GPP TR 22.944 V2.0.0 (2002-02)

Technical Report

3rd Generation Partners

Technical Specification Group Services and System Aspects; Report on Service Requirements for UE Functionality Split; (Release 5)

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Foreword Introduction

The future environment will be characterised by features such as multimedia services and the convergence of 3GPP systems and the Internet. In this environment the total User Equipment used to access 3GPP services may be implemented over a number of physical devices. For example the User Equipment may include a PC or PDA with appropriate client software as well as a separate module containing radio protocols and other elements. These cases are referred to under the term “UE Functionality Split” or just “UE Split”.

This report identifies scenarios and requirements for UE Functionality Split.

1 Scope

This report identifies scenarios and requirements for UEs with functionality split over multiple devices. Scenarios that are required to be supported in the standard are defined in detail. The requirements in this report should enable interoperability between user equipment components from different vendors. This report is not intended to identify all possible or permitted functionality splits. Certain splits of functionality may be prohibited for security or other reasons. This report does not identify all prohibited scenarios.

2 References

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

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- 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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 21.905: 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications.

[2] 3GPP TS 22.060: 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; General Packet Radio Service (GPRS); Service Description, Stage 1

[3] 3GPP TS 22.228: 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Service Requirements for the IP Multimedia; Core Network Subsystem (Stage 1)

[4] 23.101 General UMTS Architecture

[5] 24.002 GSM-UMTS Public Land Mobile Network (PLMN) access reference configuration

3 Definitions, symbols and abbreviations

3.1 Definitions

User Equipment Combination: All the user equipment that is connected and used together in a particular scenario. For example a user equipment combination may consist of an MT and all the TEs that are connected to that MT.

User Equipment Component: Any one of a number of separate components of user equipment. User equipment components include MTs and TEs.

[Editors note: Other terms e.g. MT, TE should be defined in 21.905. However the current definitions may not be sufficiently clear for a detailed discussion of UE-split. The current definitions date back to ISDN models from the 1980s.]

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

MT	Mobile Terminal
PC	Personal Computer
PDA	Personal Digital Assistant
TE	Terminal Equipment
UE	User Equipment

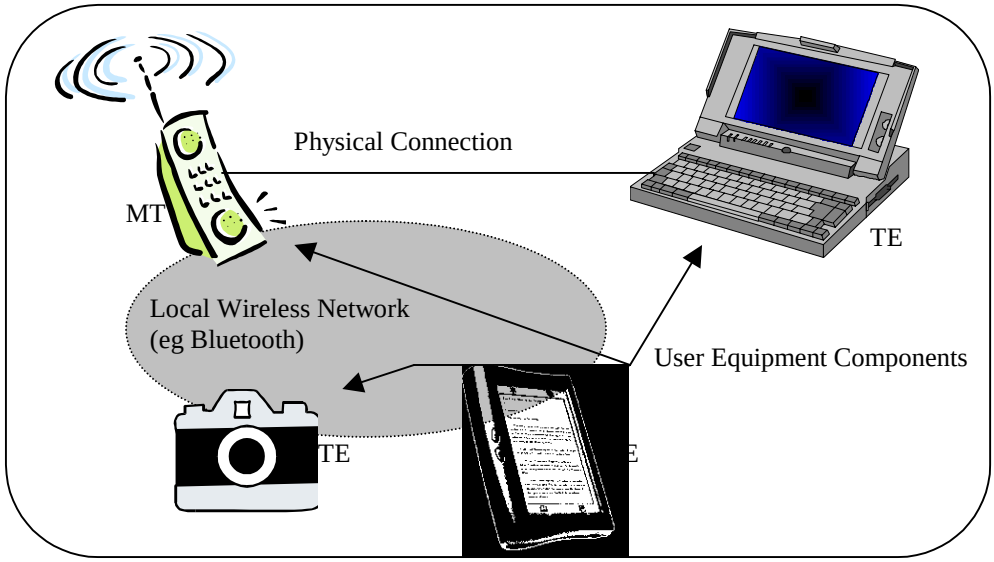
[Editors note: Complete list is to be provided]

4 General Aspects

4.1 Overview of User Equipment

3GPP user equipment may take many forms. One case is that all the user equipment is integrated in to a single physical device. This report deals with cases where several different components make up the whole user equipment combination. An example is illustrated below. This illustration is only meant to introduce concepts and not imply any limitations or physical form for user equipment.

User Equipment Combination



The user equipment combination contains at least one MT and may also contain one or more TEs.

4.2 Background to Requirements

The support of UE-functionality split in 3GPP should aim to exploit technology trends and to promote the convergence of 3GPP technologies with Internet and computing technologies. The objective of this report is to identify a scenario which is seen as being particularly important for the success of the 3GPP system. The scenario should:

- correspond to likely physical scenario for available equipment
- offer attractive commercial opportunities
- be simple enough to allow requirements capture and technical specifications to be completed
- align with other standards (e.g. Bluetooth, PC-Card) and common industry practice (e.g. major operating systems) where appropriate

Allowing some 3GPP related applications to be implemented on TEs separate from the MT offers advantages such as:

- Ability for applications to evolve without changing hardware or firmware. This will improve service velocity.
- Ability of 3GPP applications to integrate with a user's other business, entertainment and communications tools.
- Allowing 3GPP applications to take advantage of the physical characteristics of computer (e.g. large display, memory, processing power)
- Ability to use hardware built into the TE (eg speaker, microphone) for input and output.
- Integration of emerging wireless LAN technologies (e.g. Bluetooth, 802.11b) with 3GPP networks

This will facilitate the development of applications in the TE that use 3GPP services independently of the specific 3GPP defined radio module being used. For example the application developer should not need to write different applications for 3GPP defined radio modules made by different vendors.

The scenario considered is shown in Figure 1. In this case, multiple independent applications that are possibly being used by independent users employ one subscription and its information is stored in one SIM/USIM/ as shown in Fig. 1. The user(s) identity is possibly different from the subscribers' identity.

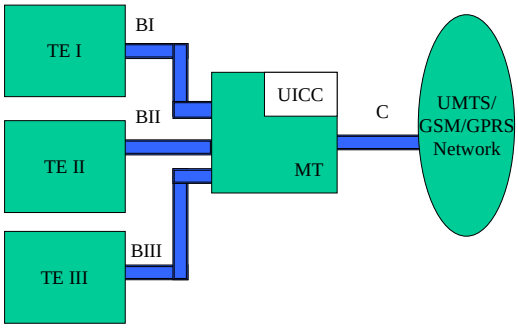


Figure 1: Multiple applications and/or users with one subscriber identity.

Note: The single TE associated with a single MT scenario is a special case of this scenario.

Examples of where scenario 1 is useful include:

- A PC or PDA contains a 3GPP defined radio module to allow it to access 3GPP services. The module may be a (semi)permanent part of the PC or PDA (similar to an embedded modem) or a removable module such as a PC card.

4.3 Assumptions

The following assumptions are made:

a The transport link between the TE and MT functions of the UE is not necessarily secure.

b A SIM/USIM application resident on a UICC is required to access the 3GPP system . Only a single USIM on a UICC can be active at any time (multiple USIMs can be located on a UICC).

c Charging is linked to one particular USIM.

d The secret key and the authentication algorithm cannot be transferred out from the USIM.

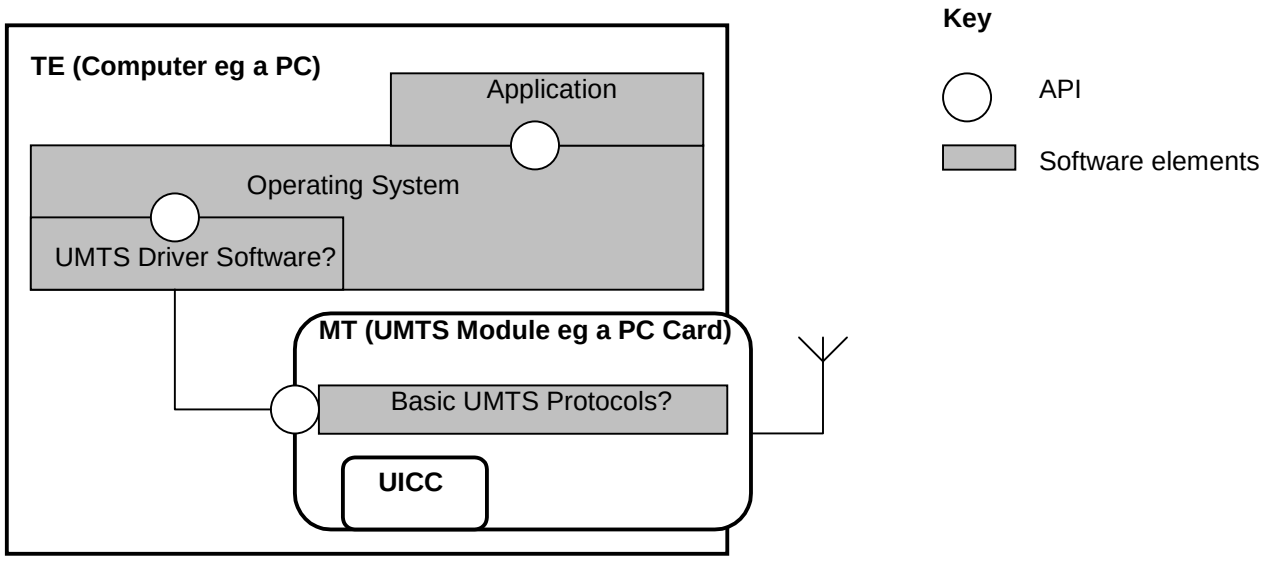
e The SIM/USIM must be present during the entire duration of the call. Periodic UICC presence detection is mandatory during a call.

[Editor's Note: The issue of ISIM and its impact on UE Functionality split is for further study. This may require revising this specification.]

[Editor's Note: The following seems more appropriate for a stage 2 description. It is recommended that this be incorporated into an appropriate document at a later stage.

The functionality split required in this case corresponds to generic way computers treat other types of network interface cards. In this configuration the basic 3GPP protocols are implemented in the 3GPP defined radio module (see figure below). The computer contains the following elements:

- *driver software to control the 3GPP radio module and interface it to the computer operating system*
- software applications using network protocols (such as IP) which are routed to other computers via the card.



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6 Requirements

Requirements are identified for only the single active subscription for each TE-MT combination case. Requirements for the other more general cases may be added in later releases.

6.1 General

1 The functionality split proposed applies to Circuit Switched (CS) domain.

2 The functionality split proposed applies to the Packet Switched (PS) domain.

3 The user should be able to control which MTs and TEs are part of their user equipment combination.

4 A standardized API for access to capabilities provided by an MT (TE) towards a TE (MT) across Operating Systems must be provided.

5 It must be possible to develop applications in the TE that use 3GPP services independently of the specific 3GPP defined radio module being used. For example the application developer should not need to write different applications for 3GPP defined radio modules made by different companies.

6 Control over those radio aspects as currently available with AT commands should be provided to the TE by the MT. Access to additional functions is not required.

7. Call control signalling (e.g. IMS SIP signalling) must not be run transparently through the MT by the TE in this Release. [Editor's Note: This requirement is currently under review.].

6.2 Security

1. IMEI must be collocated with Mobility Management functions.
2. The USIM/SIM application must be a part of the MT.
3. The architecture for UE Functionality Split must provide a solution with equivalent or better security than the integrated (non-split) UE architecture. Particular attention should be paid to the origination point of call control signalling to ensure that the TE does not insert false information without detection in the MT or the network.
4. Access to any parts of the network must not be given to unauthorised entities.

6.3 Functionality split

6.3.1 MT Functions

1 Radio attachment to the 3GPP network.

2 Authenticating subscription(s) (including IMS subscription).

3 Communicating with the UICC & SIM/USIM on behalf of the TE.

4 Creation/activation/deactivation of additional PDP contexts on demand from a TE.

5 Transceiving PS data across the appropriate Radio Access Bearers with the RAN

6 Security

7 Call control (including call control for IMS) [Editor's Note: This requirement is currently under review.]

8 Mobility Management function. Given this requirement, all relevant security-related identities (IMEI, IMSI, TMSI, etc.) must be located on the MT or UICC.

6.3.2 TE Functions

1 Control of hardware in the TE (speaker, microphones, video cameras, displays, etc.)

2 Access to services and capabilities provided by the MT. [Editor's Note: The services and capabilities provided by the MT which can be accessed by the TE are FFS].

3 Call control [Editor's Note: This requirement is currently under review.]

6.4 TE-MT Reference Point

1. The interface between a TE and an MT uses the 27.007 and 27.005 AT command set. [Editor's Note: Additional functionality may be added in the future.]

Annex C: Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
10/08/01					Initial draft		0.0.0
5/09/01					Revised at the joint T2-S1 meeting		0.0.1
13/09/01					Addition of Appendix B, agreed at the joint T2-S1 meeting		0.0.2
31/10/01					Editorial corrections		0.0.3
07/11/01					Discussion at TSG S1 # 14 UE-split adhoc		0.5.0
09/11/01					Raised to version 1.0.0 for presentation to SA #14		1.0.0
14/02/02					Revised and editorial corrections		1.1.1