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Foreword

This Technical Report 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:

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- x the first digit:
 - 1 presented to TSG for information;
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- 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.

Introduction

The future environment will be characterised by features such as multimedia services and the convergence of UMTS and the Internet. In this environment the total User Equipment used to access UMTS 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 UMTS module containing UMTS 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. For the scenarios in this report the UMTS standard shall enable interoperability between user equipment components from different vendors. This report is not intended to identify all possible or permitted functionality splits. However it is intended to identify a minimum set of scenarios which shall be supported in the standard.

Certain splits of functionality may be prohibited for security or other reasons. This report does not identify all prohibited scenarios. However requirements stated here may implicitly prohibit some scenarios.

Specific implementations of MEs and TEs may use any functionality split that is compatible with the UMTS standards. However MEs and TEs that conform to the scenarios in this document will provide the user with the benefit of allowing UE components from different vendors to be combined in a flexible and compatible way.

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. 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)

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 ME and all the TEs that are connected to that ME.

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

[Editors note: Other terms eg ME, 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

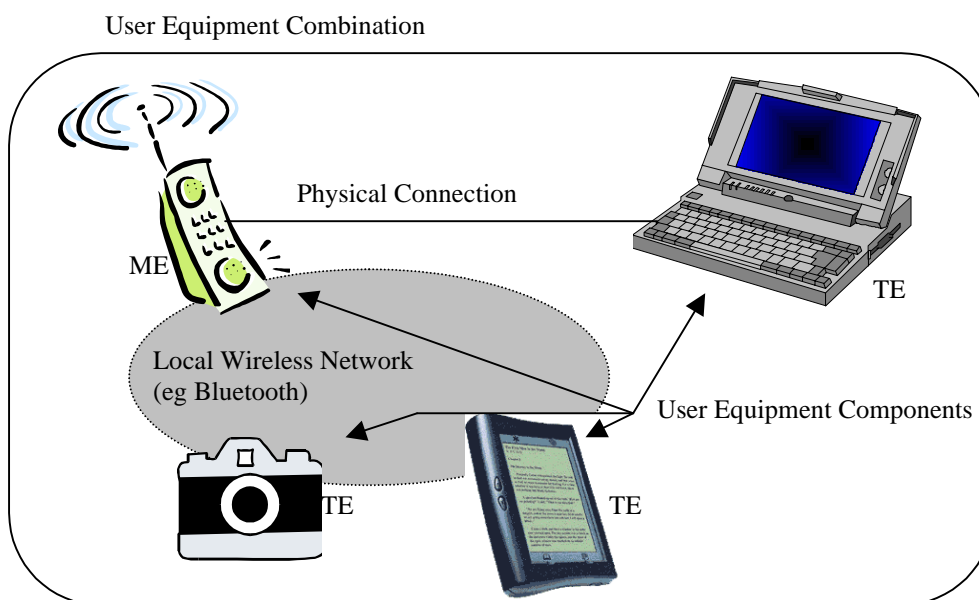
For the purposes of the present document, the following abbreviations apply:

PC	Personal Computer
PDA	Personal Digital Assistant
UE	User Equipment
[Editors note: Complete list is to be provided]	

4 General Aspects

4.1 Overview of User Equipment

UMTS 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.



The user equipment combination shall contain an ME and may also contain one or more TEs.

4.2 Background to Requirements

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

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

Allowing some UMTS-related applications (in particular IMS clients) to be implemented on TEs separate from the UMTS ME offers advantages such as:

- The application can evolve without changing hardware or firmware. This will improve service velocity.
- The application can integrate with the user's other business, entertainment and communications tools.
- - The application can take advantage of the physical characteristics of computer (eg large display, memory, processing power)

4.3 Subscription

The scenarios required in this report are limited to cases where there is a single active UMTS subscription in a single user equipment combination. Scenarios where this is not true are for further study. This decision has been reached in the light of the background identified above. The case of a single active UMTS subscription covers a very large number of important user scenarios and corresponds to the cases which have been highlighted as most commercially important.

The requirement for "one active UMTS subscription" means that:

- 1) The user equipment combination shall contain only one active USIM.
- 2) The user equipment combination shall contain only one active ME.
- 3) It is assumed that the user is able to control which MEs and TEs are part of their user equipment combination. [How this is done may be outside the scope of UMTS]
- 4) All MEs and TEs in a particular user equipment combination shall be treated by the UMTS system as being under the responsibility of the subscription identified by the active USIM. All charges made by UMTS shall be directed to the subscriber identified by the USIM.

Note: It is possible that charges that are not related to the UMTS subscription may be treated differently for different TEs in the same user equipment combination. For example a user on a TE may access an Internet service which charges them based on a credit-card or a subscription that is not associated with UMTS.

Note: If a UMTS subscriber permits a TE to be connected to their user equipment combination they shall be willing to accept any charges as a result of this. This is similar to the situation where you lend your phone to another person to allow them to make a call.

5. Packet Data Based Scenarios

This clause describes scenarios that shall be supported by the UMTS standard. The scenarios are described in overview and then detailed requirements for each scenario are captured. All scenarios in this clause relate to services based on packet-data technology – ie those services defined in [2] and [3].

These scenarios deal with the case of a UE that accesses a remote packet-network (which may also be a UMTS IMS) and is capable of communicating with that remote packet network once the connection is established. It does not include cases where the interaction is purely local to the ME (eg a digital camera locally sends data to an ME in a way that is independent of UMTS).

5.1 Scenario 1: Single ME and single UE

This scenario includes the case where the user equipment combination consists of a single ME and a single UE. The ME purely provides UMTS access. It does not contain its own applications. Examples of where this scenario is useful include:

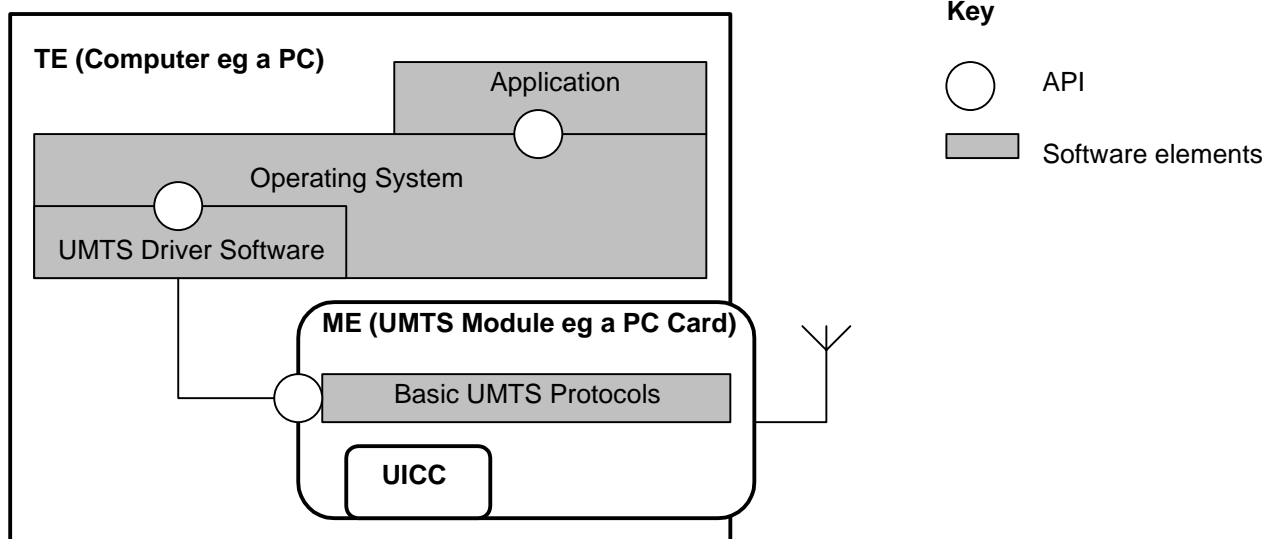
- A PC or PDA contains a UMTS module to allow it to access UMTS services. The UMTS module may be a (semi)permanent part of the PC or PDA (similar to an embedded modem) or a removable module such as a PC card.

In defining this case we shall focus on a UMTS PC-Card or similar physical module plugged in to a computer such as a PDA or PC. Clearly there is strong growth in the use of portable computers of all types. Being able to use these machines in conjunction with UMTS is an important business opportunity.

The functionality split required in this case corresponds to generic way computers treat other types of network interface cards, and it corresponds to available and planned products. In this configuration the basic UMTS protocols are implemented in the UMTS module. The computer contains the following elements:

- driver software to control the UMTS 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.

This scenario is illustrated below.



Single ME and Single TE Scenario

5.1.1 Detailed Requirements for scenario 1

[Editors note: As the requirements become more detailed it may be necessary to sub-divide this section. One possible sub-division is “Requirements on ME”, “Requirements on TE”, “Requirements on applications” etc.]

The ME shall contain all “basic” UMTS protocols to provide system integrity and security. [The definition of “basic UMTS protocols” is FFS]

The application environment in the TE shall utilise as much as possible the generic operating system capabilities of the TE. However this shall be extended to support any required UMTS-specific elements (eg communication between the application and the UICC).

The IP-multimedia subsystem client may be implemented in the TE. In this case all requirements identified generally for the IMS shall be met [3]. Other types of UMTS client software also needs to be supported.

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

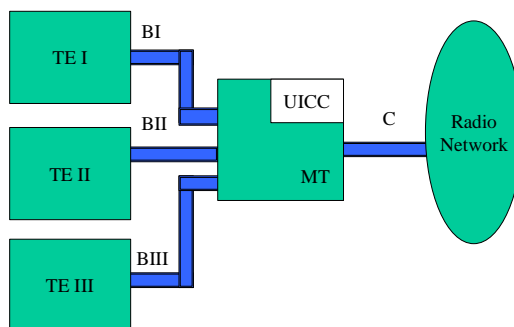
[Topics for further study:

- Which APIs are to be standardised and to what extent? From an SA1 perspective this might translate in to which use-cases need to be supported.
- Should the “UMTS module” and the “driver software” be treated as a single unit and assumed to be provided from the same source? Should it be possible to use a generic driver for different modules?
- The definition of a TE and MT in this context needs to be developed.
- Impact of using a wireless rather than physical connection between the TE and MT.]

5.2 Scenario 2: Single ME and Multiple TE

This scenario is similar to the above case, but it is extended to allow multiple TEs to be connected to the same ME. This may be because the ME supports multiple physical connections, or because the ME has a local wireless interface that allows more than one TE to be active simultaneously. This is illustrated below.

This scenario also includes the case where the ME contains its own applications. These can be modelled as a “virtual TE” which is physically integrated with the ME.



Single ME and Multiple TE Scenario

The functional split between the ME and the TE shall be the same as in scenario 1.

5.2.1 Detailed Requirements for scenario 2

All requirements for scenario 1 are also applicable to scenario 2. In addition the following requirements apply:

It shall be possible to connect and disconnect TEs (up to a maximum number of TEs supported by the ME).

[Topics for further study:

- Addressing
- Security – can all TEs gain access to all services?
- Contention – how are scarce resources shared between different TEs?]

6. Conclusions

The scenarios identified in clause 5 shall be supported in UMTS.

Annex <X>: Change history

It is usual to include an annex (usually the final annex of the document) for reports under TSG change control which details the change history of the report using a table as follows:

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New