3GPP TSG-T-WG2 - #5
Helsinki, Finland, Sept 6-9, 1999

TSGT2#5(99)771

Agenda Item:

To: **ALL 3GPP WG's and SWG's**

Source: **TSG T2 SWG6**

Title: **Liaison Statement - Cover letter for TR21.904,**
                       Terminal Capabilities Report, interim version

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This LS is to convey to all 3GPP WG's and SWG's a copy of the current version of the subject document.

TSG-T2-SWG6 has sent out a number of LS's in the past to all WG's soliciting information on Terminal Implementation Capabilities (Baseline and Service) in the areas of each of those WG's. TSG-T2-SWG6 would like to express its appreciation and its thanks to those WG's which responded, for the information contained in the received LS's and the effort undertaken to generate the information.

T2-SWG6 is utilizing the information provided, to complete its work on its document TR21.904, "Terminal Capability Requirements". This document will include the Implementation Requirements for Terminals to meet the defined Baseline Capability, and the Implementation Requirements to meet the defined Service Capabilities for the Release 99 services, as defined by TSG-S. The intention of T2-SWG6 is to make the above document officially available to all 3GPP WG's following approval at TSG-T level. In the meantime, T2-SWG6 is pleased to provide an interim version of the subject document to all WG's for information. Please note that the report is not complete. T2 expects to include further details of service implementation capabilities as they are made available by other working groups.

TSG T WG2 would like to emphasise the status of TR 21.904 as a report, not a specification. Further, TSG T WG2 is not seeking to decide which implementation capabilities are mandatory/optional, that is the responsibility of the working group within whose technical domain given implementation capabilities exist.

It is the intention that the report can be used in a number of ways by 3GPP working groups/members, for example:
- To help ensure that terminals claiming to support a given service have the required capabilities to correctly inter-operate with the network in order to provide said services;
- To help TSG T WG1 identify requirements upon which minimum conformance tests can be based;
- To help in the definition of mechanisms by which terminals can communicate their capabilities with the Access and Core Networks

TR 21.904 V0.0.4 (1999-09)

Technical Report

**3rd Generation Partnership Project (3GPP);
Technical Specification Group (TSG) Terminals;
Terminal Capability Requirements**

3GPP

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Contents

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Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project, Technical Specification Group Terminals.

The contents of this TR may be subject to continuing work within the 3GPP and may change following formal TSG approval. Should the TSG modify the contents of this TR, it will be re-released with an identifying change of release date and an increase in version number as follows:

Version m.t.e

where:

m   indicates [major version number]

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 into the specification.

Introduction

The 3GPP System consists of terminals and Network Infrastructure. The System is designed to support a wide variety of services and terminal types. Due to this diversity of applications there are many options within the 3GPP specifications. This document identifies the implementation requirements for the sub-set of options (referred to as **baseline capabilities**) that are required in 3GPP terminals to allow world-wide roaming of terminals within all 3GPP networks. This document also identifies the implementation requirements for specific Terminal Service Capabilities, in order to help ensure end to end interworking for terminals claiming to support compatible services.

1   Scope

This document defines a baseline set of capability requirements that enable all terminals to "register" with all applicable 3GPP networks (depending on the availability of a appropriate subscription). It describes all the functions that a terminal has to perform in order to "exist" within a 3GPP network. These functions are used to derive requirements for all aspects of terminal baseline capability. This document also identifies different Terminal Service Capabilities and the functions that a terminal must perform in order to access a service. The actual capabilities that a terminal must posses to meet these requirements are listed in the Annexes to this document and described in the referenced implementation specifications.

This document introduces the concept of "**service-less terminal**" which can exist in the network but provides no user service. Although this is not a marketable terminal type it describes from the standardisation viewpoint a baseline set of capabilities to which specific service-related terminal capabilities can then be added.

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.

[1]   3G TS 25.304: "3GPP; UE Procedures in idle mode".

[2]   3G TS 25.303: "3GPP; UE Functions and Inter-Layer Procedures in Connected Mode".

[3]   3G TS 22.101: "3GPP; Service Principles".

[4]   3G TS 22.100: "3GPP; UMTS Phase 1".

[5]   3G TS 22.105: "3GPP; Services and Service Capabilities".

[6]   3G TS 22.121: "3GPP; Virtual Home Environment".

[7]   3G TS 22.129: "3GPP; Handover between UMTS and GSM or other R

[8]   GSM 02.04: "Digital cellular telecommunications system (Phase2+); General on supplementary

[9]   GSM 02.81: "Digital cellular telecommunication system (Phase 2+); Line identification supplementary services - Stage 1".

[10]   GSM 02.82: "Digital cellular telecommunication system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 1".

[11]   GSM 02.83: "Digital cellular telecommunication system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 1".

[12]   GSM 02.84: "Digital cellular telecommunication system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 1".

[13]   GSM 02.85: "Digital cellular telecommunication system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 1".

[14]   GSM 02.86: "Digital cellular telecommunication system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 1".

[15]   GSM 02.88: "Digital cellular telecommunication system (Phase 2+); Call Barring (CB) supplementary services - Stage 1".

[16]   GSM 02.91: "Digital cellular telecommunication system (Phase 2+); Explicit Call Transfer (ECT)"

[17]   3G TS 24.008: "3GPP; Layer 3 specification"

3   Definitions, symbols and abbreviations

3.1   Definitions

For the purposes of the present document, the following terms and definitions apply.

Baseline capabilities: capabilities that are required for a service-less terminal to operate within a network. The baseline capabilities for a terminal include the capabilities to search for, synchronise with and register (with authentication) to a network. The negotiation of the terminal and the network capabilities, as well as the maintenance and termination of the registration are also part of the required baseline capabilities.

Baseline implementation capabilities: set of Implementation capabilities, in each technical domain, required to enable a terminal to support the required Baseline capabilities.

Implementation capability: a capability that relates to a particular technical domain. Examples: a spreading factor of 128 (in the domain of the physical layer); the A5 algorithm; a 64 bit key length (in the domain of security); a power output of 21 dBm (in the domain of transmitter performance); support of AMR Codec (in the domain of the Codec); support of CHV1 (in the domain of the USIM);

Terminal Service Capabilities: capabilities that can be used either singly or in combination to deliver services to the user. The characteristic of Terminal Service Capabilities is that their logical function can be defined in a way that is independent of the implementation of the UMTS system (although all Terminal Service Capabilities are of course constrained by the implementation of UMTS). Examples: a data bearer of 144 kbps; a high quality speech teleservice; an IP teleservice; a capability to forward a speech call.

Service Implementation Capabilities: **set of Implementation capabilities, in each technical domain, required to enable a terminal to support a set of Terminal Service Capabilities.**

Service relationship: **the association between two or more entities engaged in the provision of services**

Service-less terminal: **a terminal that has only the Baseline capabilities.**

[Editor's note: other definitions to be added as required]

3.2   Abbreviations

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

<ACRONYM>   <Explanation>
BIC   Baseline Implementation Capability
SIC   Service Implementation Capability
TSC   Terminal Service Capability

4   Baseline Definition

The requirements for the baseline implementation capabilities can be defined by the functions required of a terminal to power on and attempt registration with a network. Note that successful completion of the registration procedure depends on the subscription and Terminal Service Capabilities of the terminal and user and is therefore outside the scope of the baseline requirements. The basic mandatory MS requirements are further explained in section 15 of 22.101 Service Principles [3]. The corresponding baseline implementation capabilities are referenced in Annex A. The registration attempt and maintenance is illustrated in the state diagram of figure 1.
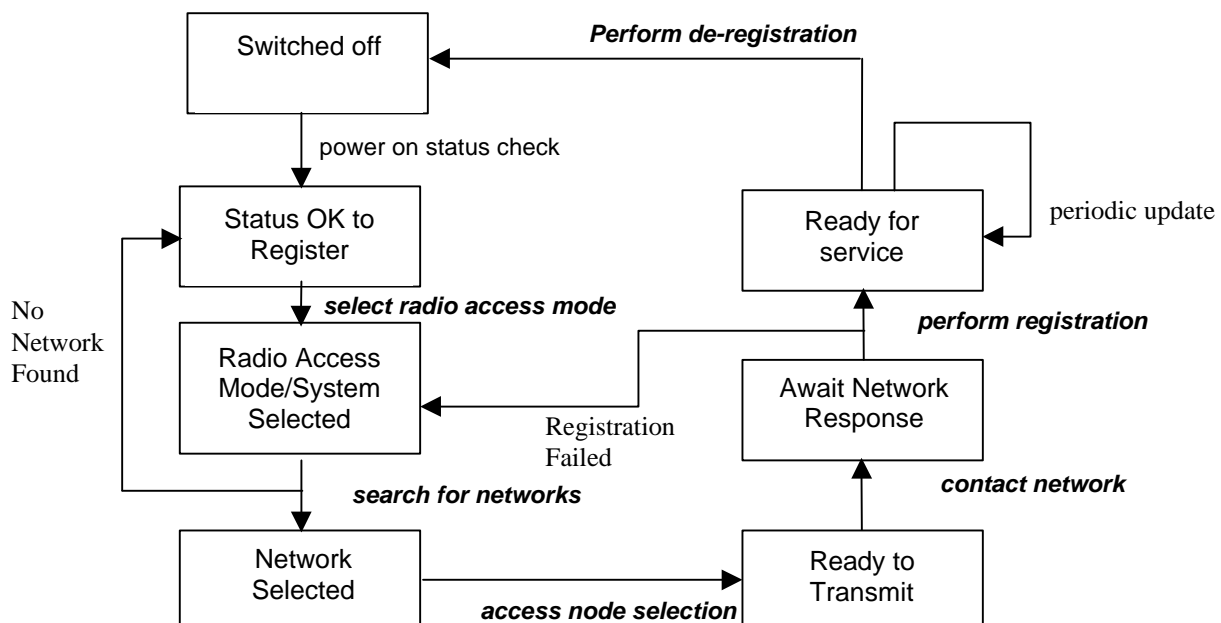
Figure 1 - states required for baseline capability

The actions and states given in figure 1are defined below.

4.1 Switched off

The state "switched off" describes the terminal when no 3GPP system functions are operational.

4.2 Power-on status check

The action "power-on status check" describes starting the 3GPP functions within the terminal and checking that the terminal meets the 3GPP system requirements needed to start the registration procedure (e.g. an appropriate subscription). If no subscription is available, the terminal may still select an access node and enter an limited service state in which only emergency calls can be attempted.

[Editor's note: any requirements here for response to power on stimulus?]

4.3 Status OK to register

The state "status OK to register" describes the terminal when all checks have been performed and the terminal is ready to start 3GPP reception.

4.4 Select radio access mode

The action "select radio access mode" describes the terminal's selection of an available radio access mode e.g. UTRA FDD/TDD mode or GSM/GPRS. The decision may be made manually or automatically.

4.5 Radio access mode selected

The state "radio access mode" describes the terminal when it has selected a radio access mode to use it its search for networks.

4.6 Search for networks

The action "search for networks" describes the terminal's attempt to detect and decode the information for all 3GPP networks in its immediate environment. The terminal will initially search for the network to which it was last connected, and then its home network, before undertaking any further search. The result of any subsequent search should produce a list of available networks from which one can be selected on which to attempt registration. If no suitable networks can be found, the terminal can revert to its "OK to register" state and select another radio access mode if it has one available.

4.7 Network selected

The state "network selected" describes the terminal when a 3GPP network has been selected for a registration attempt. The particular network to be selected may be chosen either manually or automatically.

4.8 Camping on a cell

The action "camping on a cell" describes the terminal's selection of one cell in which to attempt registration. This action is further described in 25.304 [1], and enables the terminal to receive system information. More detailed descriptions of the procedures for selecting PLMN (including radio access mode selection), and cell selection/re-selection, are also given in 25.304[1].

4.9 Ready to Transmit

The state "ready to transmit" describes the condition in which the terminal has regulatory permission to start transmitting at the 3GPP frequencies.

4.10 Contact network

The action "contact network" describes the terminal's act of transmitting a first signal to the network to indicate its desire to register.

4.11 Await network response

The state "await network response" describes the condition in which the terminal is waiting for the network to respond to its first contact signal.

4.12 Perform registration

The action "perform registration" describes the MM and GMM procedures for authentication, capability negotiation and location/routing area updating. A list of required MM and GMM procedures are given in Annex A section 5. Those procedures are further defined in 24.008 [17]. Note that in order to "perform registration" the terminal briefly enters a connected state as defined in 25.303 [2].

4.13 Ready for service

The state "Ready for service" describes the condition in which the terminal has successfully completed the registration procedures. If registration is unsuccessful the mobile can revert to the "radio access mode selected" state and try searching for another available network. At this point the terminal is ready to initiate or receive data for a specific service. Note that in order to maintain the "ready for service" state, the terminal will have to periodically update the location/routing area information, as described in 24.008 [17].

4.14 Perform De-registration

The action "perform de-registration" describes the procedures for de-registering the terminal prior to power-off. After de-registration the terminal returns to the power-off state.

5   Terminal Implementation Types

Although the baseline capability requirements define what is needed for service-less terminals there are a few basic service-less terminal types can be used to meet these requirements. These are as follows:

- single-mode FDD

- single-mode TDD

- dual-mode FDD/TDD

- dual-system FDD/GSM

- dual-system TDD/GSM

- dual-mode/dual-system FDD/TDD/GSM

Editor's Note: Reference should be made to the report on multi-mode issues, where appropriate.

6   Terminal Service Definition

The requirements for the Service Implementation Capabilities can be defined by the functions required of a terminal to request and access a service from the network, as well as enter into and maintain a connected state for the purposes of receiving that, or other service(s). Note that it is not always necessary to enter into a connected state in order to receive a service. In order to simplify the service definition, only two terminal states for service access are shown in figure 2. More details of the Terminal Service Capabilities are given in section 7. UE Functions and Inter-Layer Procedures in Connected Mode are clearly defined in defined in 25.303 [2].
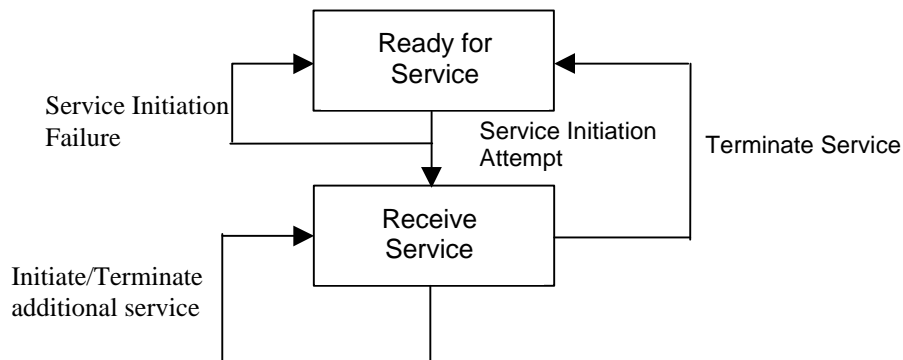

Figure 2 - states required for service capability

The actions and states given in figure 2 are defined below.

6.1 Ready for service

The "Ready for service" state is described in section 4.13 above.

6.2 Service initiation attempt

The action "Service initiation attempt" describes the act of attempting to a access a service. The action is initiated in the terminal, either in response to a page from the network, or as a result of higher layer activity in the terminal. If it is not possible to access the required service (e.g. due to failure of the radio link, absence of an appropriate subscription) then the terminal will return to the "Ready for service" state.

6.3 Receive service

The state "Receive Service" describes the terminal when a service relationship has been established with the network and the terminal is in the process of accessing the requested service. It is also possible that the terminal will request/terminate additional services whilst in the "Receive service" state. The many service possibilities/combinations that exist for this state are discussed in section 7 below. The corresponding Service Implementation Capabilities are reference in Annex B. This state encompasses any handovers that might take place within the network and with other 3G networks & 2G networks, depending on the terminal's modes of operation.

6.4 Terminate service

The action "Terminate service" describes the act of the ending all current service relationships and re-entering the "ready for service" state. The action can be initiated by either the Terminal, or the Network. Note that if more than one service is being accessed simultaneously, a service can be terminated without ending the service relationship.

7 Terminal Service Capabilities

Terminal Service Capabilities are required in addition to Baseline Capabilities in order that the terminal can support a given service. In the 3GPP documentation unless otherwise stated, none of the identified Terminal Service Capabilities are mandatory for the terminal and the support of one service in a terminal does not imply a requirement to support any other service (unless otherwise stated).

7.1 Standardised Terminal Service Capabilities

The 3GPP release '99 requirements for the Terminal Service Capabilities listed below are elaborated in TS 22.00 UMTS Phase 1 [4] unless otherwise indicated. UMTS R99 will standardise the technical means by which a terminal may implement the following Terminal Service Capabilities. The Terminal Service Capabilities can be divided into five main categories as follows:

Tele-services (defined in [5])

- Speech

- Emergency Call (mandatory for all terminal supporting the default speech service)

- Short Message Service - Point to Point (SMS-PP)

- Short Message Service - Cell Broadcast (SMS-CB)

- Fax

Bearer Services

- Defined by their attributes as described in [5]

    - Information transfer attributes (e.g. Connection mode, Information transfer rate, etc.)

    - Information quality attributes (e.g. Bit Error Ratio, Maximum transfer delay, Delay variation, etc.)

Supplementary services

- Defined in GSM R'99[1]. Examples:

    - Call Forwarding as defined in [10]

    - Advice of Charge as defined in [14]

    - Explicit Call transfer as defined in [15]

Service capabilities (defined in [6])

- Mobile station Execution Environment (MExE)

- Location Services (LCS)

- SIM Application Toolkit (SAT)

GSM system features (defined in [5])

- Network Identity and Time Zone (NITZ)

- Support of Localised Service Area (SoLSA)

- Unstructured Supplementary Service Data (USSD)

7.1.1 Support of standardardised Terminal Service Capabilities

Editor's note: This sub-section will discuss the support of the standardised TSCs with references to corresponding tables in the Annexes, where appropriate.

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[1] Note that Supplementary Services are used to complement and personalise the usage of basic telecommunication services (bearer services and teleservices). The capabilities standardised in UMTS shall enable provision of all the supplementary services specified in GSM 02.04 [8] and the 02.8x/02.9xseries [9] –[15].

7.1.1.1 Teleservices

7.1.1.1.1 Default Speech Service

7.1.1.1.2 Short Message Service

7.1.1.1.3 Cell Broadcast Service

7.1.1.1.4 Fax Service

7.1.1.2 Bearer services

7.1.1.2.1 Circuit Switched Services

7.1.1.2.2 Packet Switched Services

7.1.1.3 Supplementary Service

7.1.1.4 Service Capabilities

7.1.1.5 GSM System Features

7.2 Non-Standardised Terminal Service Capabilities

The nature of the UMTS standard is such that it facilitates the implementation of Terminal Service Capabilities such as Video telephony, Audio and Video Streaming, that are not themselves specified within the UMTS standard. Such "non-standardised" Terminal Service Capabilities are instead realised using the defined Bearer Services in section 7.1. The intention is that the UMTS standard shall not limit the implementation of such non-standardised TSCs. However, it is important to ensure that non-standardised services can be delivered to terminals with an appropriate Quality of Service. Example mappings of services to Terminal Service Capabilities are therefore required, in order to try to identify the TSC requirements to support the more commonly envisgaed services. Further details of QoS requirements for envisaged services can be found in [5].

7.2.1 Mapping of envisaged services to Terminal Service Capabilities

7.2.1.1

Annex A Baseline Implementation Capabilities

A1 Baseline implementation capabilities for conformance test purposes

Terminal baseline implementation capabilities:

- The special conformance testing functions and the logical test interface as specified in TS 34.109. This issue is currently under investigation.

- Up-link reference measurement channel 12.2 kbps (FDD), TS 25.101 clause A.2.1.

- Down-link reference measurement channel 12.2 kbps (FDD), TS 25.101 clause A.2.2.

Up-/Down-link reference measurement channels for static channel Rx sensitivity measurements in TDD mode is [TBD], TS 25.102

A2 RF Baseline Implementation Capabilities

Table 1: RF baseline implementation capabilities for FDD mode.

Capability FDD	Doc.	Para	UE	General Comments
Chiprate 3.84 Mcps	25.101 A	5.1	M	
Frequency bands – 1920-1980, 2110-2170 MHz – Other spectrum	25.1.01 A	5.2	M O	 As Declared
TX-RX Freq. Sep: - 190 MHz – Variable	25.101 A	5.3	M O	referred [1] As Declared
Carrier raster:	25.101 A	5.4	M	
UE maximum output power	25.1.01 A	6.2.1	M	At least one power class

Table 2: RF baseline implementation capabilities for TDD mode.

Capability TDD	Doc	Para	UE	General Comments
Chiprate 3.84 Mcps	25.102 A	5.1	M	
Frequency bands – 1900-1920 MHz – 2010-2025 MHz – Other spectrum	25.102 A	5.2	M M O	referred [1] Declared 1900-1920 MHz Declared 2010-2025 MHz As Declared
Carrier raster:	25.102 A	5.4	M	
UE maximum output power	25.101 A	6.2.1	M	At least one power class

A3 Physical Layer baseline implementation capabilities

Table 3. FDD mode Physical Layer Baseline implementation capabilities

Baseline Implementation Capability[2]	Specification	Section(s)[3]	Comments
Physical Layer UE procedures and measurements:			
Support for network and access node selection	25.214	4.1, 4.2, 4.3	
Cell selection and reselection	25.215	6.1.5, 7.1.1.1	
Support for network contact and registration	25.214	4.4, 4.5, 6	
Power control	25.214 25.215	5.1.1 6.1.1, 6.1.3,	
Channel Coding	25.212	4.1, 4.2	The exact requirements for channel coding to support baseline capability, are still to be decided
Spreading and Scrambling Code Generation	25.213	4.3	Limit of FDD spreading factor required to support baseline capability, is still to be decided.
Code de-spreading and de-scrambling	25.213	5.2	
Modulation	25.213	4.4,	
Support for downlink Transmit Diversity	25.211	5.3.1	Only Open Loop mode Tx diversity required to support baseline capability
Transport channels necessary for the above:			
Broadcast channel (BCH)	25.211	4.2.1, 6	

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[2] All the baseline implementation capabilities for the FDD mode physical layer should be considered as mandatory for the terminal.

[3] The list of references to the 25.2 series should not be considered exhaustive. References will need to be refined and updated as the standard is further elaborated.

Paging channel (PCH)	25.211	4.2.3, 6	PCH is required to transport notification of a change in system information carried on BCCH.
Random access channel (RACH)	25.211	4.2.4, 6	
Forward access channel (FACH)	25.211	4.2.2, 6	
Physical channels necessary for above:			
Primary Common Control Physical Channel (Primary CCPCH)	25.211	5.3.3.1, 6	
Secondary Common Control Physical Channel (Secondary CCPCH)	25.211	5.3.3.1, 6	
Physical Random Access Channel (PRACH)	25.211	5.2.2, 6	
Synchronisation Channel (SCH)	25.211	5.3.3.3, 6	
Acquisition Indication Channel (AICH)	25.211 25.221	5.3.3.6, 6	

Table 4. TDD mode Physical Layer Baseline Implementation Capabilities

Baseline Implementation Capability[4]	Specification	Section(s)[5]	Comments
Physical Layer UE procedures and measurements:			
Support for network and access node selection	25.224	6.5, 6.6	
Cell selection and reselection	25.225	6.1.1, 6.1.3, 6.1.5, 6.1.9, 7.1.1.1	
Support for network contact and registration	25.224	6.4	
Power control	25.224	6.3.3.1	

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[4] All the baseline implementation capabilities for the TDD mode physical layer should be considered as mandatory for the terminal.

[5] The list of references to the 25.2 series should not be considered exhaustive. References will need to be refined and updated as the standard is further elaborated.

Channel Coding	25.222	6.1, 6.2	The exact requirements for channel coding to support baseline capability, are still to be decided
Spreading and Scrambling Code Generation	25.223	6, 7	
Code de-spreading and de-scrambling	25.223	6, 7	
Modulation	25.223	5	
Support for downlink Transmit Diversity	25.221	6.8	
Transport channels necessary for the above:			
Synchronisation channel (SCH)	25.221	4.1.2	SCH exists for TDD mode only
Broadcast channel (BCH)	25.221	4.1.2, 6	
Paging channel (PCH)	25.221	4.1.2, 6	PCH is required to transport notification of a change in system information carried on BCCH.
Random access channel (RACH)	25.221	4.1.2, 6	
Forward access channel (FACH)	25.221	4.1.2, 6	
Physical channels necessary for above:			
Common Control Physical Channel (CCPCH)	25.221	5.3.1, 6	
Physical Random Access Channel (PRACH)	25.221	5.3.2, 6	
Physical Synchronisation Channel (PSCH)	25.221	5.4, 6	

A4 Layer 2/3 baseline implementation capabilities (access stratum)

Table 5. Baseline implementation capabilities for Layer 2/3 (access stratum)

Baseline Implementation Capability[6]	Specification	Section(s)[7]	Comments
UE procedures:			
The procedures below require support of the RLC protocol described in 25.322, with the exception of RLC header compression. RLC toolbox features (section 9.7) required as part of the baseline capabilities have yet to be identified.			
Support for PLMN selection Support for location registration	25.304	5.2, 9.4, 9.5, 9.6, 9.7	
Cell selection and reselection	25.304	5.3	
System information reception	25.304 25.331	6.1 10.1.6.1	System information message is required. RLC Mode TM. Uses logical channel PCCH and transport channel PCH.
Paging	25.331	10.1.3.2	Paging type 1 message is required. RLC Mode TM. Uses logical channel PCCH and transport channel PCH.
Idle mode measurements	25.304	7	
RRC connection establishment	25.303 25.331	7.1.1 10.1.4.6, 10.1.4.7, 10.1.4.8, 10.1.4.9	RRC connection request message is required. RLC mode TM. Uses logical channel CCCH and transport channel RACH. RRC connection set up message is reuqired. RLC mode UM. Uses logical channel CCCH and transport channel RACH. RRC connection setup complete message is required. RLC mode AM. Uses logical channel DCCH and transport channel RACH. RRC connection reject message is reuqired. RLC mode UM. Uses logical channel CCCH and transport channel RACH.

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[6] All the baseline implementation capabilities for L2/3 should be considered as mandatory for the terminal.

[7] The list of references to the 25.3 series should not be considered exhaustive. References will need to be refined and updated as the standard is further elaborated.

Support for higher layer messages on signaling connection	25.303	7.1.3	
<u>RRC Status</u>	<u>25.331</u>	<u>10.1.4.10</u>	<u>RRC status message required. RLC mode UM. Uses logical channel DCCH and transport channel FACH.</u> <u>RRC status ack message required. RLC mode UM. Uses logical channel DCCH and transport channel RACH.</u>
RRC connection release	25.303	7.1.4	
	25.331	10.1.4.4, 10.1.4.5	RRC connection release message required. RLC mode AM/UM. Uses logical channel DCCH and transport channel FACH. RRC connection release complete message required. RLC mode AM/UM. Uses logical channel DCCH and transport channel RACH.
Direct transfer	25.331	10.1.7.3	Direct transfer message required. RLC mode AM. Uses logical channel DCCH and transport channels RACH/FACH.
Cell update	25.303	7.3.2	
	25.331	10.1.1.3, 10.1.1.4, 10.1.1.12	Cell update message is required. RLC mode TM. Uses logical channel CCCH and transport channel RACH. Cell update confirm message is required. RLC mode UM. Uses logical channel DCCH and transport channel FACH. RNTI reallocaiton complete message is required. RLC mode AM. Uses logical channel DCCH and transport channel RACH.
Logical channels necessary for the above procedures:			
Synchronisation control channel (SCCH)	25.301	5.3	SCCH exists for TDD mode only
Broadcast control channel (BCCH)	25.301	5.3	

Paging control channel (PCCH)	25.301	5.3	PCCH is needed for notification of the change in system information on BCCH. It may also be needed by the CN MM protocol for reasons other than UE terminated services.
Common control channel (CCCH)	25.301 25.321	5.3 9.2.1.2	 MAC-PDU for mapping CCCH to RACH/FACH
Dedicated control channel (DCCH)	25.301 25.321	5.3 9.2.1.1	 MAC-PDU for mapping DCCH to RACH/FACH
Transport channels necessary for the above procedures			
Synchronisation channel (SCH)	25.301	5.2	SCH exists for TDD mode only
Broadcast channel (BCH)	25.301	5.2	
Paging channel (PCH)	25.301	5.2	
Random access channel (RACH)	25.301 25.321	5.2 11.2	 RACH transmission procedure
Forward access channel (FACH)	25.301	5.2	

A5 Layer 3 baseline implementation capabilities (non-access stratum)

Editor's note: The contents of table 5 below have not been officially sanctioned by TSG N WG1, and so should not be considered as a definitive guide to layer 3 (non-access stratum) baseline implementation capabilities. However, the table has been included at this time, as it is referred to within the sections explaining the baseline functionality and as such should help to facilitate the understanding of the reader.

Table 6: Terminal Baseline Implementation Capabilities for NAS

M: mandatory, O: Optional, C: Conditional

Baseline Implementation Capabilities			Ref. Doc	Section(s)	Kind of Terminals			Comments
					CS-only	PS-only	CS+PS	
UMT S CS mobil ity manag ement (incl. optio nal)	MM common procedures	TMSI reallocation procedure	24.008	4.3.1	M	-	M	

		Authentication procedure	Ditto	4.3.2	M	-	M	
		Identification procedure	Ditto	4.3.3	M	-	M	
		IMSI detach procedure	Ditto	4.3.4	M	-	M	
		Abort procedure	Ditto	4.3.5	M	-	M	
		MM information procedure	Ditto	4.3.6	O	-	O	
	MM specific procedure	Location updating procedure	Ditto	4.4.1	M	-	M	
		Periodic updating procedure	Ditto	4.4.2	M	-	M	
		IMSI attach procedure	Ditto	4.4.3	M	-	M	
		Generic Location Updating procedure	Ditto	4.4.4	M	-	M	
	MM connection management procedure	MM connection establishment	Ditto	4.5.1.1	M	-	M	
		MM connection establishment for emergency call	Ditto	4.5.1.5	C	-	C	Mandatory If speech calls supported.
		MM re-establishment	Ditto	4.5.1.6	C	-	C	Mandatory If CC supported.
		Paging response procedure	Ditto	Not yet defined	M	-	M	
		Network initiated MM connection establishment	Ditto	4.5.1.3	O	-	O	
		MM connection release	Ditto	4.5.3	M	-	M	
UMT S PS mobil ity	GMM common procedure management (generic control)	P-TMSI reallocation procedure	ditto	4.7.6	-	M	M	
		Authentication and ciphering procedure	ditto	4.7.7	-	M	M	
		Identification procedure	ditto	4.7.8	-	M	M	
		Paging procedure	ditto	4.7.9	-	M	M	
		GMM status procedure	ditto	4.7.10	-	M	M	
		GMM support for anonymous access	Ditto	4.7.11	-	O	O	
		GMM Information procedure	Ditto	4.7.12	-	O	O	
	GMM specific procedure	GPRS attach procedure	Ditto	4.7.3.1	-	M	M	

		Combined GPRS attach procedure		4.7.3.2	-	-	C	Mandatory If class-A or B.
		MS initiated GPRS detach procedure	Ditto	4.7.4.1	-	M	M	
		Network initiated GPRS detach procedure	Ditto	4.7.4.2	-	M	M	
		Normal and periodic routing area updating Procedure	Ditto	4.7.5.1	-	M	M	
		Combined routing area updating Procedure	Ditto	4.7.5.2	-	-	C	Mandatory If class-A or B.

A6 Security baseline implementation capabilities

Table 7. Terminal Baseline Implementation Capabilities in the security domain

Security feature			Mandatory/optional capabilities	Section in TS 33.102 draft V3.2.0[8]
User Identity Confidentiality			-----	5.1.1
	Identification by temporary identities and confidential transport of other USIM information.		<mandatory>	6.1
	Identification by a permanent identity *Note: This functionality is implemented in the USIM and is transparent to the UE.*	Use of IMUI and other USIM information in cleartext	<mandatory>	6.2
		Transport of an encrypted IMUI and other USIM information.	<mandatory> *Note: The use of the enhanced mechanism is HE-specific.*	6.2
Entity Authentication			-----	5.1.2
	Authentication and key agreement	The authentication and key agreement protocol	<mandatory>	6.3
		Authentication and key agreement algorithms. *Note: Algorithms are implemented on the USIM.*	<option> *Note: The algorithms are HE-specific.*	
Confidentiality			-----	5.1.3
	Data confidentiality		<mandatory>	6.6
	Cipher indicator		<mandatory>	5.5
Hooks for network wide encryption			<mandatory>	8.2
Data integrity			**-----**	5.1.4
	Data integrity of signalling elements		<mandatory>	6.4

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8 That is V3.1.0 with agreed CRs

Mobile Equipment Identification *Note: Security features for UE identification have currently not been defined.*	\<mandatory\> *Note: Includes capability of having IMEI and capability of reporting it to the network.*	5.1.5
User-to-USIM Authentication	\<mandatory\>	5.3.1
USIM-Terminal Link	\<option\>	5.3.2
Secure messaging between the USIM and the network	\<option\> *Note: Security features are HE and application specific*	5.4.1

A6 USIM baseline implementation capabilities

FFS

Annex B Service Implementation Capabilities

B1. Service implementation capabilities for conformance test purposes

Note: Support of the following reference measurement channels is optional depending on the Terminal Service Capabilities for a given terminal.

Terminal service implementation capabilities:

- Down-link reference measurement channel 64 kbps (FDD), TS 25.101 clause A.2.3.

- Down-link reference measurement channel 144 kbps (FDD), TS 25.101 clause A.2.4.

- Down-link reference measurement channel 384 kbps (FDD), TS 25.101 clause A.2.5.

- Packet switched data measurement channel (FDD), TS 25.101 clause A.3.

Down-link (>12.2 kbps) reference measurement channels and Packet-switched measurement channels for TDD is [TBD] , TS 25.102

B2. Physical Layer Service Implementation Capabilities

Table 8. FDD mode Physical Layer Service implementation capabilities for support of the default speech service and of CS data services up to 64 kbps

Service Implementation Capability	Specification	Section(s)[9]	Comments
Physical Layer UE procedures and measurements:			
Handover	25.215 25.212	6.1.1, 6.1.4, 6.1.5, 6.1.9, 7.1.1.2, 7.1.2, 7.1.3 4.4	Support of soft handover is mandatory for all terminals supporting CS services. Support of Inter-Frequency handover is mandatory for all terminals. Support of intra-frequency hard handover is FFS. Terminals shall support measurements commensurate with their mode/system capabilities, to facilitate inter-frequency, inter-mode & inter-system handover.
Power control	25.214 25.215	5.1.2, 5.2.3 6.1.1, 6.1.3, 6.1.6, 6.1.7	Support of closed loop power control is mandatory for all terminals.
Multiplexing and Channel Coding	25.212	4.2.3.2, 4.2.4 – 4.2.15, 4.3	Turbo coding to be used for BER requirement of less than 10^{-3}.
Modulation	25.213	4.4.3	
Spreading and Scrambling Code Generation	25.213	4.3	Required Spreading Factor is dependent on channel coding rate, and on whether services are to be supported simultaneously. Terminals shall support all spreading factors between the maximum (256) and minimum (SFs of 16 & 64 are required for support of individual 64 kbps and 16 kbps services respectively). There is no specified manner for mapping given data rates to physical channels. That function is performed in Layer 2/3.
Code de-spreading and de-scrambling	25.213	5.2	
Support for downlink Transmit Diversity	25.211 25.214	5.3.2 8	Support of feedback mode transmit diversity is mandatory in Terminals supporting dedicated channels.
Support for Site Selection Diversity Transmission	25.214	5.3.2.4	Support of SSDT is mandatory for all terminals supporting soft handover.

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[9] The list of references to the 25.2 series should not be considered exhaustive. References will need to be refined and updated as the standard is further elaborated.

Transport channels required:			
Dedicated channel (DCH)	25.211	4.1.1, 6	
Physical channels required:			
Dedicated Physical Data Channel (DPDCH)	25.211	5.2.1, 5.3.2, 6	
Dedicated Physical Control Channel (DPCCH)	25.211	5.2.1, 5.3.2, 6	

Table 7. TDD mode Physical Layer Service implementation capabilities for support of the default speech service and of CS data services up to 64 kbps

Service Implementation Capability	Specification	Section(s)[10]	Comments
Physical Layer UE procedures and measurements:			
Handover	25.225	6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.9, 7.1.1.2, 7.1.2	Support of Intra and Inter Frequency hard handover is mandatory for all terminals. Terminals shall support measurements commensurate with their mode/system capabilities, to facilitate inter-frequency, inter-mode & inter-system handover.
Dynamic Channel Allocation	25.225	7.1.3	Terminals shall support measurement of SIR in different timeslots.
Power control	25.224 25.225	4.3 6.1.4, 6.1.7	Support of closed loop control for DL power. Support of open loop control for UL power.
Multiplexing and Channel Coding	25.222	6.2.3.2, 6.2.4 – 6.2.11, 6.3	Turbo coding to be used for BER requirement of less than 10^{-3}.
Spreading and Scrambling Code Generation	25.223	6	Terminals shall support spreading factors 8 and 16 for uplink transmission of speech and data services up to 16 kbps. SF4 of shall be supported by Terminals supporting 64 kbps data. Simultaneous transmission of up to two codes shall be supported.
Code de-spreading and de-scrambling	25.223	6	Terminals shall support simultaneous reception of up to 2 codes using spreading factor 16 for speech. Up to 5 codes with SF 16 shall be supported simultaneously by terminals supporting 64 kbps.
Support for Downlink Transmit diversity	25.221 25.224	5.2.4 4.8	Support channel estimation on different midambles
Timing Advance	25.224	4.4	Support of TA adjustment according to higher layer signalling
Discontinuous transmission	25.224	4.7	
Transport channels necessary for the above:			
DCH	25.221	4.1.1, 6	
USCH	25.221	6.2.8	The requirement for USCH in the case of CS connections is for further study.
Physical channels necessary for above:			

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[10] The list of references to the 25.2 series should not be considered exhaustive. References will need to be refined and updated as the standard is further elaborated.

Dedicated Physical CHannel (DPCH)	25.221	5.2, 6	
PUSCH	25.221	5.5	The requirement for USCH in the case of CS connections is for further study.

History

Document history		
V 0.0.1	1999-03	First draft (introduction, scope, TOCs) proposed by rapporteur
V 0.0.2	1999-04	Update based on discussions at T2 SWG6#2 (proposed by rapporteur)
V 0.0.3	1999-06	Proposed update from Rapporteur based on discussions on the need for an overall structure for document, agreements of T2 SWG6 #3, discussions in S1 #3 and R2#5.
V 0.0.4	1999-09	Revised baseline definition in section 4, as a result of informaiton received from TSG CN WG1, and comments received during TSG T WG2 #5. Added section 7.1.1 on support of standardised Terminal service capabilities. Added section 7.2.1 on mapping of envisaged services to Terminal Service Capabilities. Added section A1 on baseline implementation capabilities for conformance testing purposes. Revised section A4 on L2/3 (access stratum) baseline implementation capabilities to include additional information received from RSG RAN WG2. Added section A5 on baseline implementation capabilities for Layer 3 (non-access stratum), as received from TSG CN WG1. Added section A6 on baseline implementation capabilities for the security domain, as received from TSG SA WG3. Added section B1 on service implementation capabilities for conformance testing purposes. Added section B2 on physical layer service implementation capabilities to support default speech and circuit switched data (up to 64 kbps) services. Editorial changes made where appropriate.

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