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Technical Specification

3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; General on supplementary services (Release 16)



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Foreword

This Technical Specification (TS) 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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- 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 purpose of the present document is to define a recommended set of supplementary services to the Teleservices and Bearer services which will be supported by a PLMN in connection with other networks as a basis for the definition of the network capabilities required.

Supplementary services not covered in 3GPP TS 22.004 cannot be introduced unilaterally in any PLMN if they require modification of the signalling Specifications.

Technical realization of supplementary services is described in 3GPP TS 23.011 [19] and 24.010 [21].

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. 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 TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 22.001: " Principles of circuit telecommunication services supported by a Public Land Mobile Network (PLMN)".
- [3] 3GPP TS 22.002: "Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".
- [4] 3GPP TS 22.003: " Teleservices supported by a Public Land Mobile Network (PLMN)".
- [5] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the Mobile Station (MS)".
- [6] 3GPP TS 22.067: "Enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 1".
- [7] 3GPP TS 02.081: "Line identification supplementary services - Stage 1".
- [8] 3GPP TS 22.082: "Call Forwarding (CF) supplementary services - Stage 1".
- [9] 3GPP TS 22.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 1".
- [10] 3GPP TS 22.084: "MultiParty (MPTY) supplementary services - Stage 1".
- [11] 3GPP TS 22.085: "Closed User Group (CUG) supplementary services - Stage 1".
- [12] 3GPP TS 22.086: "Advice of Charge (AoC) supplementary services - Stage 1".
- [13] 3GPP TS 22.088: "Call Barring (CB) supplementary services - Stage 1".
- [14] 3GPP TS 22.072: "Call Deflection (CD) - Stage 1".
- [15] 3GPP TS 22.087: "User-to-user signalling (UUS) - Stage 1".
- [16] 3GPP TS 22.091: "Explicit Call Transfer (ECT) supplementary services - Stage 1".
- [17] 3GPP TS 22.093: "Call Completion to Busy Subscriber (CCBS) - Stage 1".
- [18] 3GPP TS 22.096: "Calling Name Presentation (CNAP) - Stage 1".
- [19] 3GPP TS 23.011: "Technical realization of supplementary services".

- [20] 3GPP TS 22.135: "Multicall (MC) - Stage 1".
- [21] 3GPP TS 24.010: "Mobile radio interface layer 3 Supplementary services specification General aspects".
- [22] 3GPP TS 24.080: "Mobile radio interface layer 3 supplementary services specification Formats and coding".
- [23] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [24] 3GPP TS 22.101: "Service Principles".
- [25] 3GPP TS 22.105: "Services and service capabilities".
- [26] 3GPP TS 42.068: "Voice Group Call Service (VGCS) - Stage 1".
- [27] 3GPP TS 42.069: "Voice Broadcast Service (VBS) - Stage 1".

1.2 Abbreviations

For the purposes of the present document the abbreviations and acronyms listed in 3GPP TR 21.905 [1] apply.

2 General

2.1 Supplementary service

A supplementary service modifies or supplements a basic Telecommunication service.

NOTE: Offered supplementary services may be used by subscribers/users at their discretion.

2.2 Concepts associated with supplementary services

For the purpose of the present document the following terms are defined:

Provision

An action to make a service available to a subscriber. The provision may be:

- general: where the service is made available to all subscribers (subject to compatibility restrictions enforced) without prior arrangements being made with the service provider;
- pre-arranged: where the service is made available to an individual subscriber only after the necessary arrangements have been made with the service provider.

Withdrawal

An action taken by the service provider to remove an available service from a subscriber's access. The withdrawal may be:

- general: where the service is removed from all subscribers provided with the service;
- specific: where the service is removed on an individual basis from subscribers provided with the service.

Registration

The programming by the service provider or subscriber of information to enable subsequent operation of a service. The programming action involves input of specific supplementary information. For certain services the registration procedure may cause activation whilst for others the service may already be in the action phase.

Erasure

The deletion by the service provider, the subscriber or the system of information stored against a particular service by a previous registration(s).

Activation

An action taken by either the service provider, the subscriber or the system to enable a process to run as and when required by the service concerned, resulting in the active phase. Some services can be either "operative" or "quiescent" (not operative) during the active phase according to whether or not the system would be able to invoke or use the service.

Deactivation

An action taken by either the service provider, the subscriber or the system to terminate the process started at the activation.

Invocation

An action to invoke the service required, taken by the subscriber (e.g. pressing a specific button) or automatically by the network or terminal as a result of a particular condition (e.g. calling number identification for each incoming call).

Normal operation with successful outcome

Description of the normal operation of the service, the normal served subscriber's actions and the system response. Decision points, timing and call progress signals would be some of the aspects defined for the service if they can be perceived by the subscriber.

Interrogation

The request by the subscriber to the PLMN to provide information about a specific supplementary service. This information can be requested by a:

- status check;

The following values can be returned by the PLMN:

- not supported;
- active and operative;
- active and quiescent;
- not active.

Not all values are applicable to all supplementary services.

- data check;

This interrogation function compares the data input by the subscriber during an interrogation procedure with the information stored in the PLMN. The PLMN signals an appropriate indication (e.g. "check is positive" or "check is negative").

- data request;

This interrogation function enables the subscriber to obtain confirmation of her input data. The PLMN signals an appropriate indication (e.g. "the forwarded-to number is etc."). The response to a data request may comprise the status of the service (e.g. not active).

Exceptional operation or unsuccessful outcome

Abnormal situations not described in "normal operation with successful outcome". Procedures on time-out, unexpected signalling response and other such events would be defined.

Interaction with other supplementary services

When more than one supplementary service is active, new logical situations, decisions, priorities, etc., may arise. This subclause would identify and define the resolution of such situations as they affect subscriber perception of the service. Special procedures may therefore be required, e.g. to allow, where possible, the simultaneous use of different supplementary services by one mobile subscriber.

Interworking considerations

Identification of subscriber perceptions when a call exits from an ISDN/PLMN to another network or enters an ISDN/PLMN from another network (e.g. PSTN).

Unstructured SS Operations

These operations are characterized by:

- in the mobile to network direction the transparent transport of MMI strings entered by the user to the network;
- in the network to mobile direction the transparent transport of text strings that are displayed by the mobile for user information;
- transparent transfer of data between an application in the MS and a corresponding application in the network.

These operations provide capabilities that can either be used as part of operator specified services, or to facilitate the early introduction of specified services.

NOTE: This Specification does not distinguish between subscriber, user and customer, since all three do not fully cover the textual needs. Generally the term "subscriber" is used, even if this person is not having the subscription.

3 Categories and framework of supplementary services

3.1 Framework for the description of supplementary services

3GPP TS 22.001 [2] and 3GPP TS 22.101 [24] describe the principles of the Telecommunication services. They also defines the concepts of Telecommunication services and describes their characterization by appropriate attributes. Bearer services and Teleservices, which are offered by a PLMN in connection with other networks, are defined in 3GPP TS 22.002 [3], 3GPP TS 22.105 [25] and 3GPP TS 22.003 [4]. Besides these basic Telecommunication services, their enhancement or modification by supplementary services need also to be offered.

A supplementary service modifies or enhances a basic Telecommunication service and, hence, cannot be offered to a subscriber on a stand alone basis. It must be offered together with or in association with a basic Telecommunication service. The same supplementary service may be offered with a number of different Telecommunication services. For applicability of a Supplementary Service to a Telecommunication service refer to annex A.

Table 3.1/3GPP TS 22.004 (identical to table 1/3GPP TS 22.001 [2] and to table 1 of ITU-T Recommendation I.210 [23]) illustrates the description of Telecommunication services.

Table 3.1/3GPP TS 22.004: Categorisation of Telecommunication services

TELECOMMUNICATION SERVICE			
BEARER SERVICE		TELESERVICE	
Basic Bearer Service	Basic Bearer service + supplementary services	Basic Teleservice	Basic Teleservice + supplementary service

Provision and withdrawal of a supplementary service, with the exception of Closed User Group, shall apply to all basic services the subscriber subscribes to.

Registration, erasure, activation and deactivation of a supplementary service shall apply to one or more group of basic services. The groups of basic services are defined to avoid handling of many basic service codes.

An operation is effective on the basic services, within the basic service group, which have been provisioned and for which the supplementary service is applicable. The fact that a basic service is provisioned but is not supplied by the network shall not lead to reject the request. The request shall be accepted since there is one basic service within the group(s) which is provisioned and for which the supplementary service is applicable. For applicability of a Supplementary Service to a basic service or service group refer to annex A.

The basic service groups are defined in table 3.2/3GPP TS 22.004.

Table 3.2/3GPP TS 22.004: List of basic service groups

Basic service group		Basic service (1) (2)	
number	name	Number (2)	name
1	Speech	TS 11 TS 12	Telephony Emergency call
2	Short message service	TS 21 TS 22 TS 23	Short message MT/PP Short message MO/PP Short message CB
3 - 5	Not allocated		
6	Facsimile services ⁽³⁾	TS 61 TS 62	Alternate speech and facsimile group 3 Automatic facsimile group 3
7	All Data circuit asynchronous	BS 20	General asynchronous bearer service
8	All Data circuit synchronous	BS 30	General synchronous bearer service
12	Voice group services ⁽⁴⁾	TS 91 TS 92	Voice Group Call Service Voice Broadcast Service
NOTE 1: Basic services are defined in 3GPP TS 22.002 [3] and 3GPP TS 22.003 [4].			
NOTE 2: TS: Teleservice BS: Bearer service.			
NOTE 3: The transparent facsimile services apply to A/Gb mode of GERAN only. The non-transparent facsimile services apply to UTRAN only. NOTE 4: The Voice Group Services, TS 91 and TS 92 apply to A/Gb mode of GERAN only.			

3.2 Categories of supplementary services

Below follows a list of the possible categories of supplementary services related to provision, withdrawal, registration, erasure, activation, deactivation, invocation and interrogation.

Provision of a supplementary service can be made on a subscription basis, i.e. after pre-arrangement with the service provider, or the supplementary service can be made generally available to all mobile subscribers having access to PLMNs.

Withdrawal of a supplementary service can be as a result of a subscriber's request or for administrative reasons. Both withdrawal actions are performed by the service provider.

Registration of a supplementary service is only applicable to those supplementary services in which specific data is required to enable subsequent operation of the service. This registration can be the result of provision or it can be a subscriber controlled procedure. Registration of a supplementary service may mean simultaneous activation of that service.

Erasure of a supplementary service is only applicable to those supplementary services for which registration is necessary. It can be the result of withdrawal, it can be the result of a new registration overruling, and thus effectively erasing the previous registration, or it can be a subscriber controlled procedure. Erasure of a Supplementary Service may mean simultaneous deactivation of that service.

Activation of a supplementary service can be the result of provision. In some cases the supplementary service is only activated if the conditions in the subscription options are met. A supplementary service can also be activated by means of a procedure controlled either by the mobile subscriber or the service provider. Some supplementary services may also be activated as a result of registration.

Deactivation of a supplementary service can be the result of withdrawal or erasure of the service. In some cases the supplementary service is deactivated if the conditions in the subscription options are not met. A supplementary service can also be deactivated by means of a procedure controlled either by the mobile subscriber or the service provider. A supplementary service can be automatically deactivated at the end of a call if the supplementary service was specifically activated for that call. Finally, a supplementary service may be automatically deactivated by the network as a consequence of activation of another supplementary service if it conflicts with the other activated supplementary service.

Invocation of a supplementary service can take place by means of a subscriber controlled procedure or automatically by the network as a result of a particular condition.

Interrogation of a supplementary service is only applicable for a few supplementary services for which it is useful to get information from the network about the status or relevant data concerning the supplementary service.

4 Supported supplementary services

Table 4.1/3GPP TS 22.004 gives a list of possible supplementary services implemented in the PLMN, the definitions of which are given in the specifications [6]-[18].

NOTE: All supplementary services in this table are implemented in the PLMN. Subscribers can use these supplementary services for calls within the PLMN, but also in interworking situations with the PSTN (if supported) and the ISDN. In interworking situations with CSPDN and PSPDN these supplementary services can only be used during call set up (e.g. call forwarding services). When a call is established between an MS and a PDN, the MS acts as a data network terminal and can consequently only use the supplementary services that are supported by the relevant PDN. The PDN supplementary services are not described in this Specification; they can be found in the relevant PDN Specifications. However, the interworking situations with PDNs still require further study.

It has been identified as a requirement that the man-machine interface in PLMNs regarding supplementary services should be compatible as much as possible with the man-machine interface in the fixed networks as defined in CEPT groups, e.g. the same use of keypad information or function keys.

Table 4.1/ 3GPP TS 22.004 lists the categories for all supported supplementary services. Below the abbreviations used are listed.

Registration:

- p = as a result of provision
- a = service provider controlled procedure
- s = subscriber controlled procedure
- = not applicable

Erasure:

- w = as a result of withdrawal
- s = subscriber controlled procedure
- r = due to new registration
- = not applicable

Activation:

- p = as a result of provision
- r = as a result of registration
- s = subscriber controlled procedure
- a = service provider controlled procedure
- c = when the conditions in the subscription options are met
- = not applicable

Deactivation:

- w = as a result of withdrawal
- s = subscriber controlled procedure
- a = service provider controlled procedure
- e = as a result of erasure
- n = when the conditions in the subscr. options are not met
- c = at the end of a per call basis activation
- = not applicable

Invocation:

- n = automatic invocation by the network as a result of a particular condition
- u = user invocation, by means of a control procedure
- = not applicable

Interrogation:

- s = status check
- dr = data request
- = not applicable

Table 4.1/ 3GPP TS 22.004: Supported Supplementary Services

Supplementary Service							
Spec/section	Reg	Eras	Act	Deact	Inv	Int	
22.067 eMLPP	a/s	w/r	-	-	n	dr	
22.072, Call Deflection SS							
CD	-	-	p	w	u	-	
22.081, Number Identif. SS							
CLIP	-	-	p	w	n	s	
CLIR	-	-	p	w	n	dr	
CoLP	-	-	p	w	n	s	
CoLR	-	-	p	w	n	s	
22.082, Call Offering SS							
CFU	a/s	w/r/s	r/s	e/s	n	dr	
CFB	a/s	w/r/s	r/s	e/s	n	dr	
CFNRy	a/s	w/r/s	r/s	e/s	n	dr	
CFNRc	a/s	w/r/s	r/s	e/s	n	dr	
22.083, Call Completion SS							
CW	-	-	a/s	a/s	n	s	
HOLD	-	-	p	w	u	-	
22.084, Multi Party SS							
MPTY	-	-	-	-	u	-	
22.085, Comm. of Interest SS							
CUG	-	-	p	w	u/n	-	
22.087, User-to-User SS							
UUS	-	-	s	c	u/n	-	
22.086, Charging SS							
AoCI	-	-	p	w	n	-	
AoCC	-	-	p	w	n	-	
22.088, Call Restriction SS							
BAOC	a/s	w/r	a/s	s/a	n	dr	
BOIC	a/s	w/r	a/s	s/a	n	dr	
BOIC-exHC	a/s	w/r	a/s	s/a	n	dr	
BAIC	a/s	w/r	a/s	s/a	n	dr	
BAIC-Roam	a/s	w/r	a/s	s/a	n	dr	
ACR	-	-	a/s	s/a	n	s	
22.067 eMLPP	a/s	w/r/s	-	-	u/n	s/dr	
22.091, Call Transfer SS							
ECT	-	-	p	w	u	-	
22.093, Completion of Calls to Busy Subscribers							
CCBS SS	-	-	p	w	n		
CCBS Requests			s	s/a/w		dr	
22.096 Name Identification SS							
CNAP	-	-	p	w	n	s	
22.135 Multicall							
MC	a/s	w	p	w	U/n	dr	

Abbreviations used for the Supplementary Services:

CD	Call Deflection
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CoLP	Connected Line Identification Presentation
CoLR	Connected Line Identification Restriction
CFU	Call Forwarding Unconditional
CFB	Call Forwarding on Mobile Subscriber Busy
CFNRy	Call Forwarding on No Reply
CFNRc	Call Forwarding on Mobile Subscriber Not Reachable
CNAP	Calling Name Presentation - (CNAP)
CW	Call Waiting
HOLD	Call Hold
MPTY	Multi Party Service
MC	Multicall
CUG	Closed User Group
AoCI	Advice of Charge (Information)
AoCC	Advice of Charge (Charging)
UUS	User-to-user signalling
BAOC	Barring of All Outgoing Calls
BOIC	Barring of Outgoing International Calls
BOIC-exHC	Barring of Outgoing International Calls except those directed to the Home PLMN Country
BAIC	Barring of All Incoming Calls
BIC-Roam	Barring of Incoming Calls when Roaming Outside the Home PLMN Country
ECT	Explicit Call Transfer
eMLPP	enhanced Multi-Level Precedence and Pre-emption
SPNP	Support of Private Numbering Plan - (SPNP)
CCBS	Completion of calls to busy subscribers.- (CCBS)

4.1 Support of Line identity services

A PLMN which supports the CLIP service shall also support the CLIR service. A PLMN which supports CoLP service shall also support the CoLR service.

A PLMN which does not support the CLIR service shall ensure that the line identity of a subscriber shall not be displayed to the called party unless the called party has CLIR override capability. A PLMN which does not support the CoLR service shall ensure that the line identity of a subscriber shall not be displayed to the calling party unless the calling party has CoLR override capability.

4.2 Support of Name identity services

(CNAP): A PLMN which supports the CNAP service shall also support the CLIR service.

A PLMN which does not support the CLIR service shall ensure that the name identity of a subscriber shall not be displayed to the called party.

5 Use of a password option in relation to supplementary services

5.1 Definition

Some Supplementary Services (e.g. Call Barring) can be offered to a subscriber with the subscription option of using a password to control the service. When this option is selected every action (related to that Supplementary Service), such as registration, erasure, activation or deactivation is performed by the mobile subscriber with the concurrent entry of the password.

5.2 Description

When the subscription option "Control of a Supplementary Service by the subscriber using a password" is provided, password handling is supported by the network.

The password will consist of four digits in the range 0000 to 9999.

5.3 Management - normal procedures and successful outcome

5.3.1 Provision of password option

Each Supplementary Service for which the control by the subscriber usage of a password is relevant may be offered with the subscription option "Control of the Supplementary Service". The values of this option will be:

- by the subscriber using a password;
- by the service provider.

NOTE: A service provider needs not to offer this option to its subscribers. However, the support of the password facility is mandatory in the networks for visiting subscribers.

5.3.2 Withdrawal of the password option

The password option may be withdrawn for administrative reasons or due to subscription modification.

5.3.3 Registration of password

If a mobile subscriber selects at provision time the option of using a password for any given Supplementary Service, the password have to be registered at the same time.

Furthermore, the subscriber can change the password by an appropriate control procedure at any time. The control procedure is described in 3GPP TS 22.030 [5].

5.3.4 Erasure of password

A password can be erased in two ways:

- 1) Registration of a new password erases the previous one; or
- 2) Withdrawal of the password option.

5.3.5 Password checking

If the mobile subscriber in an attempt to control a Supplementary Service requiring a password enters a correct password, the corresponding request is then considered by the network.

5.4 Management - exceptional procedures or unsuccessful outcome

If the mobile subscriber in an attempt to control a Supplementary Service requiring a password, or in an attempt to register a new password, enters an incorrect password, the corresponding request will be rejected by the network and the subscriber will be notified.

If the mobile subscriber enters incorrect password more than three consecutive times, all control procedures related to the use of the password are made impossible until the service provider instructs the network to again accept password-related requests from this subscriber.

6 Not used

7 Processing of supplementary service operations

7.1 Processing of operations containing basic service information

The network shall process a registration/erasure/activation/deactivation request indicating basic service information independent of the previous registration/activation status. As a result the network will process these requests for the indicated basic service information only, whereas other registration/activation status information remains unchanged.

Basic service information received by the network within the above supplementary service operations is in the specifications [6]-[18]. According to this definition the network may receive a combined basic service indication, e.g. for all basic services. As a result the combined basic service indication may be dissolved (note 1). This has to be taken into account when an interrogation procedure is performed.

In case the operation contains a combined basic service indication (e.g. for all bearer services) the interactions specified in the specifications [6]-[18] have to be checked subsequently for each member of the combined service indication. As a result a supplementary service request may be partly rejected due to the interaction requirements (note 2). This has to be taken into account in the acknowledgement to the supplementary service request from the Mobile Station (MS), i.e. the network shall send a notification to the MS that the SS operation request was only partially successful.

NOTE 1: Explanatory example

1. Operation:

Registration of CFU for "all basic services" to number 1.

2. Operation:

Registration of CFU for "Speech" to number 2.

Result:

Registration status for

"Speech": CFU active to number 2.

All other basic service groups: CFU active to number 1.

NOTE 2: Explanatory example

1. Operation:

Registration of CFB for "Speech" to number 1.

2. Operation:

Activation of BAOC for "Facsimile services".

3. Operation:

Registration of CFU for "all basic services" to number 2.

Result:

Registration status for

"Speech": CFU active to number 2, CFB "quiescent" to number 1.

"Facsimile services": BAOC Active, CFU rejected.

All other basic service groups: CFU active to number 2.

7.2 Processing of operations involving multiple Supplementary Services

Normally, SS operations relate to one single Supplementary Service at a time. The network reaction on such operations are described in the specifications [6]-[18] subclauses x.3 (Normal Procedures), x.4 (Exceptional Procedures) and x.6 (Interaction). Also subclause 7.1 contains information related to this area.

In addition, some groups of Supplementary Services may be controlled collectively, such as Call Forwarding and Barring services. The information contained in such "global" operation (e.g. Forwarded-to-number, Password, Basic Service group(s)) then applies generally to all SS concerned by the operation.

The reaction of the network when receiving such control requests is generally the same as when receiving a number of subsequent single operations to the corresponding Supplementary Services. However, in some cases the action to be taken by the network may be regarded as "exceptional", and therefore the following clarifies the only allowed operations on groups of Supplementary Services:

- If the group "all Call Forwarding services" is subject for a Registration or an Activation request, CFU shall become Active and Operative whilst the conditional CFs (CFC) will become Active and quiescent for the Basic Service groups concerned by the operation. I.e the network behaviour is the same as if the CFCs were Registered/Activated first, followed by Registration/Activation of CFU.

The No Reply Timer may be a part of this general operation.

If the Basic Service information provided in the request is not relevant to one or more of the SS involved, the principles in subclause 7.1 of apply, i.e. the network ignores these parts of the request.

- If the group "all Conditional Call Forwarding services" is subject for a Registration or an Activation request, all CFCs shall become Active and Operative for the Basic Service groups concerned by the operation.

The No Reply Timer may be a part of this general operation.

If the Basic Service information provided in the request is not relevant to one or more of the SS involved, the principles in subclause 7.1 of apply, i.e. the network ignores these parts of the request.

- If the group "all Call Forwarding services" or the group "all Conditional Call Forwarding services" is subject for a Deactivation or an Erasure request, the network shall act as normal, i.e. as if a number of subsequent Deactivations/Erasures were requested. If the Basic Service information provided in the request is not relevant to one or more of the SS involved, the principles in subclause 7.1 of this specification apply, i.e. the network ignores these parts of the request.
- If any of the groups "all Barring services", "all Outgoing Barring Services" or "all Incoming Barring Services" is subject to a Deactivation request, the network shall act as normal, i.e. as if a number of subsequent Deactivations were requested.

If the Basic Service information provided in the request is not relevant to one or more of the SS involved, the principles in subclause 7.1 of this specification apply, i.e. the network ignores these parts of the request.

- If the user requests Password Registration for any other single or group of Barring Services than "all Barring Services" the request will be denied (as only **one** (common) password for the Barring services per subscriber is allowed).
- Interrogation of groups of Supplementary Services is not supported.

7.3 Compatibility Information and Supplementary Services

Within the Single Numbering Scheme it is possible that an incoming call (e.g. PSTN call) do not have an allocated Bearer Capability Information Element. The network cannot at this stage determine the Basic Service requirement and shall, for Supplementary Service purposes, handle the call based on a "default basic service" for the call. If the subscriber has a subscription to telephony then the network shall use telephony as the "default basic service". If the subscriber does not have a subscription to telephony the HLR shall choose a Basic Service from the set provisioned to the subscriber as the "default basic service".

When an incoming call is subject to Call Forwarding, no modifications or additions to the original BC-IE information, present or not, received by the PLMN shall be sent with the forwarded call.

8 Format of description

The supplementary services are described according to the following format:

0. GENERAL

x.1 DEFINITION

x.2 DESCRIPTION

x.2.1 Description

x.2.2 Applicability to telecommunication services

x.2.3 Terminology

x.3 NORMAL PROCEDURES WITH SUCCESSFUL OUTCOME

x.3.1 Provision

x.3.2 Withdrawal

x.3.3 Registration

x.3.4 Erasure

x.3.5 Activation

x.3.6 Deactivation

x.3.7 Invocation

x.3.8 Normal operation with successful outcome

x.3.9 Quality of service

x.3.10 Testing

x.3.11 Interrogation

x.3.12 Charging requirements

x.4 EXCEPTIONAL PROCEDURES OR UNSUCCESSFUL OUTCOME

- x.4.1 Exceptional operation or unsuccessful outcome
- x.4.2 Registration
- x.4.3 Erasure
- x.4.4 Activation
- x.4.5 Deactivation
- x.4.6 Invocation
- x.4.7 Testing
- x.4.8 Interrogation
- x.4.9 Charging requirements
- x.4.10 Roaming in non-supporting networks
- x.5 ALTERNATE PROCEDURES
- x.6.y.z INTERACTIONS WITH OTHER SUPPLEMENTARY SERVICES
- x.7 INTERWORKING CONSIDERATIONS
- x.8 DYNAMIC DESCRIPTION OF SERVICE
- x.9 OUTSTANDING ISSUES

The letter "x" denominates the supplementary service described in clause "x" of the specifications [6]-[18]. The letter "y" denominates the specification (e.g. 3GPP TS 22.0y or 42.0y) in which the supplementary service denominated by the letter "z" is described and which interacts with the supplementary service that is described in clause "x".

Every supplementary service is described according to this format. If a subheading is not included in the text, it means:

- not applicable (e.g. in cases where "registration", "erasure", "activation", etc., do not apply);
- none identified (e.g. no exceptional procedure for "invocation");
- no interaction (in cases where no interaction appears between two supplementary services in clause 6).

Annex A (normative): Applicability of Supplementary Services to Telecommunication Services

Table A.1 gives the applicability of Supplementary Services to telecommunication services.

Table A.1/3GPP TS 22.004: Applicability of SSs to telecommunication services

SS	Telephony	Emergency Call	SMS PTP		SMS-CB	Fax	cct Data	GPRS	Voice Group Services	
	TS11	TS12	TS21	TS22	TS 23	TS 6x	BS2x, BS3x	BS 70	TS 91	TS 92
eMLPP	Yes	Yes ⁹				Yes	Yes		Yes	Yes
CD	Yes					Yes	Yes			
CLIP	Yes					Yes	Yes			
CLIR	Yes					Yes	Yes			
COLP	Yes					Yes	Yes			
COLR	Yes					Yes	Yes			
CFU	Yes					Yes	Yes			
CFB	Yes					Yes	Yes			
CFNRy	Yes					Yes	Yes			
CFNRc	Yes					Yes	Yes			
CW ¹	Yes					Yes	Yes			
HOLD ²	Yes									
MPTY	Yes									
CUG	Yes					Yes	Yes			
AoCI	Yes					Yes	Yes			
AoCC	Yes					Yes	Yes			
UUS	Yes					Yes	Yes			
BAOC	Yes		Yes ³	Yes		Yes	Yes		Yes ¹¹	Yes ¹¹
BOIC	Yes		Yes ³	Yes		Yes	Yes			
BOIC-exHC	Yes		Yes ³	Yes		Yes	Yes			
BIC	Yes		Yes	Yes ³		Yes	Yes			
BIC-Roam	Yes		Yes	Yes ³		Yes	Yes			
ACR	Yes					Yes	Yes			
ECT	Yes									
CCBS	Yes					Yes	Yes		¹⁰	¹⁰
SPNP	Yes		Yes ⁵	Yes ⁵		Yes	Yes			
CNAP	Yes		⁸	⁸					Yes ³	Yes ³
MSP	Yes		Yes	Yes		Yes	Yes			
MC	Yes	Yes				Yes	Yes			

- NOTE 1: The applicability of Call Waiting refers to the telecommunication service of the active call and not of the waiting call. The incoming, waiting, call may be of any kind.
- NOTE 2: If the served mobile subscriber has a call on hold, she may set up another call using the same or a different telecommunication service.
- NOTE 3: The SS is applicable, but generally will not be invoked.
- NOTE 4: For the purposes of applicability of supplementary services, the Alternate speech/unrestricted data (BS61) and speech followed by data (BS81) belong to the BS-group of the equivalent data service.
- NOTE 5: Both the SMS service centre and the mobile destination can be reached by PNP numbers.
- NOTE 6: Void
- NOTE 7: Void.
- NOTE 8: Applicability of SMS PTP to CNAP is for further study.
- NOTE 9: The network shall apply a specific or the default priority level to emergency calls. There is no possibility to change this priority by the subscriber. Pre-emption of an on-going emergency call is not possible.
- NOTE 10: The CCBS supplementary service is only applicable for dispatchers. If a new terminating p-t-p call is set up to a dispatcher who is busy because of an active VGCS/VBS call, it should be possible to allow the calling subscriber to apply the CCBS service. If the dispatcher initiates a VGCS/VBS call and the called group/broadcast ID has been active, then the dispatcher should be connected to the ongoing VGCS/VBS call. For VGCS/VBS call to busy dispatcher, the CCBS is not applicable. For a detailed description see 3GPP TS 42.068 [26] and 3GPP TS 42.069 [27].
- NOTE 11: BAOC is applicable with the exception of high priority voice group calls/voice broadcast calls.

Annex B (informative): Change history

Change history											
TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New	Work Item
Jun 1999			02.04					Transferred to 3GPP SA1	8.0.0	3.0.0	
SA#04			22.004						3.0.0		
SP-05	SP-99479	S1-99609	22.004	0001		R99	D	Editorial changes for alignment	3.0.0	3.0.1	
SP-06	SP-99518	S1-991042	22.004	0002		R99	F	Clarification of the applicability of CCBS service to TS91/92	3.0.1	3.1.0	
SP-07	SP-000068	S1-000154	22.004	0003		R99	F	Introduction of Multicall as Supplementary Service	3.1.0	3.2.0	
March 2000			22.004					Editorial: correction to title to replace "release 2000" with "Release 1999"	3.2.0	3.2.1	
March 2001	SP-010065	S1-010258	22.004			Rel-4		Transferred to 3GPP Release 4	3.2.1	4.0.0	
SP-15	SP-020045	S1-020457	22.004	0005	-	Rel-4	F	Editorial CR to correct terms and references	4.0.0	4.1.0	CORRECT
SP-16	SP-020236	S1-020985	22.004	0008		Rel-4	A	Correction to Table 3.2 (rel-4)	4.1.0	4.2.0	CORRECT
SP-16	SP-020267	S1-021043	22.004			Rel-5		Updated from Rel-4 to Rel5	4.2.0	5.0.0	
SP-24	SP-040283	S1-040499	22.004	0011	-	Rel-5	A	Modification of table A1 required to remove wrong SS applicabilities to VG Services	5.0.0	5.1.0	TEI 5
SP-26	SP-040744	S1-040997	22.004			Rel-6		Updated from Rel-5 to Rel-6	5.1.0	6.0.0	
SP-34	-	-	22.004	-	-	Rel-7	-	Provision of Rel-7 version as a result of approval of 22.004-0012 for Rel-8	6.0.0	7.0.0	-
SP-34	SP-060771	S1-061410	22.004	0012	-	Rel-8	F	Modification of table A1 required to correct the applicability of the BAOC to VGCS/VBS Services	6.0.0	8.0.0	TEI8
SP-46	-	-	-	-	-	-	-	Updated to Rel-9 by MCC	8.0.0	9.0.0	
2011-03	-	-	-	-	-	-	-	Update to Rel-10 version (MCC)	9.0.0	10.0.0	
SP-52	SP-110376	S1-111123	22.004	0013	-	Rel-11	B	Addition of Anonymous Call Rejection to 22.004 as a SS	10.0.0	11.0.0	ACR_CS
2014-10	-	-	-	-	-	-	-	Update to Rel-12 version (MCC)	11.0.0	12.0.0	
2015-12								Update to Rel-13 version (MCC)	12.0.0	13.0.0	
2017-03	-	-	-	-	-	-	-	Updated to Rel-14 by MCC	13.0.0	14.0.0	
2018-06	-	-	-	-	-	-	-	Updated to Rel-15 by MCC	14.0.0	15.0.0	
2020-07	-	-	-	-	-	-	-	Updated to Rel-16 by MCC	15.0.0	16.0.0	