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GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

Digital cellular telecommunications system (Phase 2+); enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 3 (GSM 04.67 version 5.0.0)

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 4 92 94 42 00 - Fax: +33 4 93 65 47 16

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Foreword

This draft European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI) and is now submitted for the Unified Approval Procedure phase of the ETSI approval procedure.

This ETS specifies the stage three description of the enhanced Multi-Level Precedence and Pre-emption Service (eMLPP) within the digital cellular telecommunications system.

This ETS is a GSM Technical Specification version 5 and is part of the 1996 release of the GSM Technical Specifications.

The contents of this ETS is subject to continuing work within TC-SMG and may change following formal TC-SMG approval. Should TC-SMG modify the contents of this ETS, it will be resubmitted for UAP by ETSI with an identifying change of release date and an increase in version number as follows:

Version 5.x.y

where:

y	the third digit is incremented when editorial only changes have been incorporated in the specification;
x	the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

Proposed transposition dates	
Date of latest announcement of this ETS (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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1 Scope

This European Telecommunication Standard (ETS) specifies the procedures used at the radio interface (Reference point Um as defined in GSM 04.02) for normal operation, invocation, registration and interrogation of the enhanced Multi-Level Precedence and Pre-emption Service (eMLPP) supplementary service. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3 radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and GSM 02.8x and 02.9x-series. GSM 02.67 is related specially to eMLPP.

Technical realization of supplementary services is described in GSM 03.11 and GSM 03.8x and 03.9x-series.

GSM 03.67 is related specially to eMLPP.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3 radio interface are defined in GSM 04.07 and GSM 04.08.

2 Normative references

This ETS incorporates by dated and undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1]   GSM 01.04 (ETR 350): "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2]   GSM 02.04 (ETS 300 918): "Digital cellular telecommunications system (Phase 2+); General on supplementary services".

[3]   GSM 02.67 (ETS 300 924): "Digital cellular telecommunications system (Phase 2+); enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 1".

[4]   GSM 02.81: "Digital cellular telecommunications system; Line identification supplementary services - Stage 1".

[5]   GSM 02.82: "Digital cellular telecommunications system; Call Forwarding (CF) supplementary services - Stage 1".

[6]   GSM 02.83: "Digital cellular telecommunications system; Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 1".

[7]   GSM 02.84: "Digital cellular telecommunications system; MultiParty (MPTY) supplementary services - Stage 1".

[8]   GSM 02.85: "Digital cellular telecommunications system; Closed User Group (CUG) supplementary services - Stage 1".

[9]   GSM 02.86: "Digital cellular telecommunications system; Advice of Charge (AoC) Supplementary Services - Stage 1".

[10]   GSM 02.88: "Digital cellular telecommunications system; Call Barring (CB) supplementary services - Stage 1".

[11]   GSM 02.90: "Digital cellular telecommunications system (Phase 2+); Stage 1 description of Unstructured Supplementary Service Data (USSD)".

[12]   GSM 02.91: "Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT)".

[13]   GSM 03.11 (ETS 300 928): "Digital cellular telecommunications system; Technical realization of supplementary services".

[14]   GSM 03.67 (ETS 300 932): "Digital cellular telecommunications system (Phase 2+); enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 2".

[15]   GSM 03.68 (ETS 300 933): "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS) - Stage 2".

[16]   GSM 03.69 (ETS 300 934): "Digital cellular telecommunications system (Phase 2+); Voice Broadcast Service (VBS) - Stage 2".

[17]   GSM 03.81: "Digital cellular telecommunications system; Line identification supplementary services - Stage 2".

[18]   GSM 03.82: "Digital cellular telecommunications system; Call Forwarding (CF) supplementary services - Stage 2".

[19]   GSM 03.83: "Digital cellular telecommunications system; Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".

[20]   GSM 03.84: "Digital cellular telecommunications system; MultiParty (MPTY) supplementary services - Stage 2".

[21]   GSM 03.85: "Digital cellular telecommunications system; Closed User Group (CUG) supplementary services - Stage 2".

[22]   GSM 03.86 (ETS 300 935): "Digital cellular telecommunications system; Advice of Charge (AoC) supplementary services - Stage 2".

[23]   GSM 03.88: "Digital cellular telecommunications system; Call Barring (CB) supplementary services - Stage 2".

[24]   GSM 03.90: "Digital cellular telecommunications system; Unstructured supplementary services operation - Stage 2".

[25]   GSM 03.91: "Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT) supplementary service - Stage 2".

[26]   GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[27]   GSM 04.07 (ETS 300 939): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3; General aspects".

[28]   GSM 04.08 (ETS 300 940): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[29]   GSM 04.10 (ETS 300 941): "Digital cellular telecommunications system; Mobile radio interface layer 3; Supplementary services specification; General aspects".

[30]   GSM 04.80 (ETS 300 950): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification; Formats and coding".

3   Definitions and abbreviations

3.1   Definitions

Definitions used in this ETS are also defined in GSM 02.67 and 03.67.

3.2   Abbreviations

Abbreviations used in this ETS are also listed in GSM 01.04.

For the purposes of this ETS, the following abbreviations apply:

eMLPP   enhanced MLPP
MLPP: Multi-Level Precedence and Pre-emption
VBS: Voice Broadcast Service
VGCS: Voice Group Call Service

4 enhanced Multi-Level Precedence and Pre-emption (eMLPP)

4.1 Normal operation

NOTE: In the call related messages only the additional information for the eMLPP supplementary service is shown in the figures.

4.1.1 Mobile originated calls

The mobile station can indicate the priority of each call initiated. If no priority is indicated by the user or a non-compatible mobile station is used then the default priority level shall be applied which is stored in the VLR. The selection of priority shall be an MMI function.

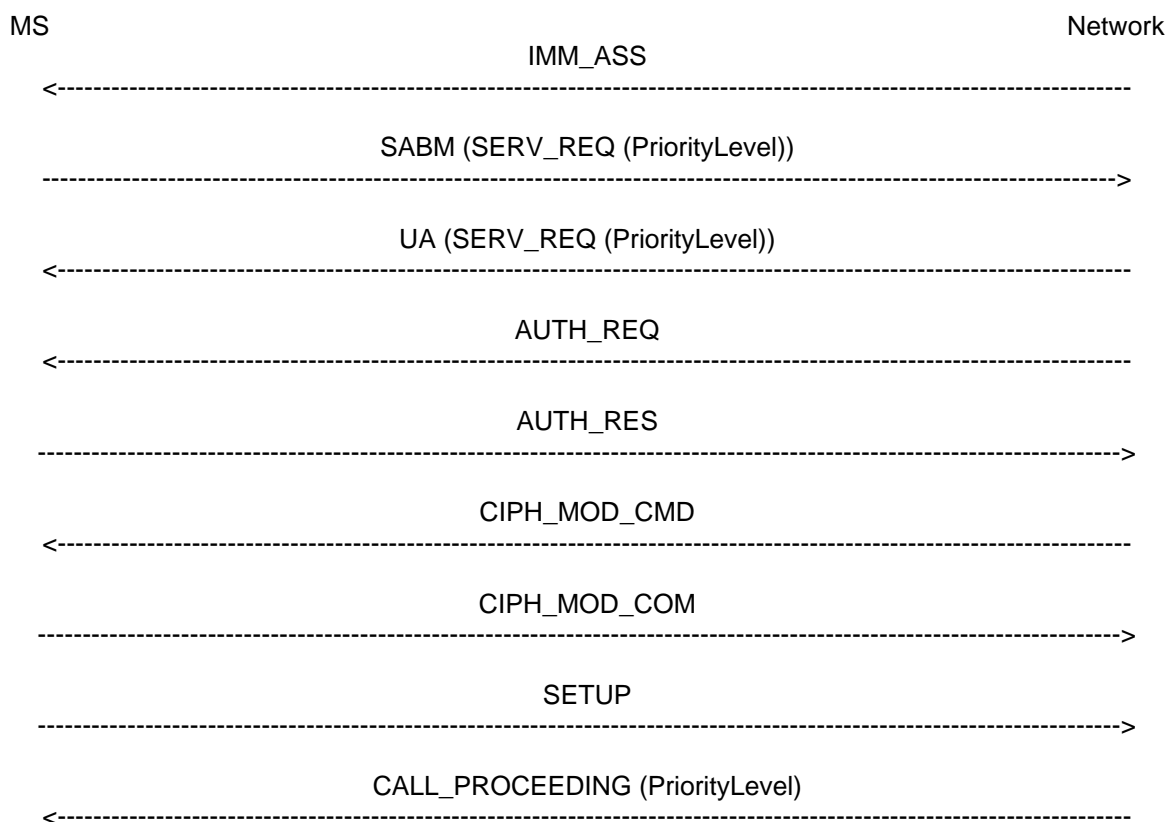For mobile originated calls, the corresponding message flows are shown in figure 1.

```
MS                                                                       Network
                               IMM_ASS
    <------------------------------------------------------------------------

                     SABM (SERV_REQ (PriorityLevel))
    ------------------------------------------------------------------------>

                      UA (SERV_REQ (PriorityLevel))
    <------------------------------------------------------------------------

                               AUTH_REQ
    <------------------------------------------------------------------------

                               AUTH_RES
    ------------------------------------------------------------------------>

                             CIPH_MOD_CMD
    <------------------------------------------------------------------------

                             CIPH_MOD_COM
    ------------------------------------------------------------------------>

                                SETUP
    ------------------------------------------------------------------------>

                     CALL_PROCEEDING (PriorityLevel)
    <------------------------------------------------------------------------
```

**Figure 1: Signalling information required for the prioritization
at mobile originating call establishment**

IMM_ASS: Standard message which is sent if no RR connection was already established.

SABM (SERV_REQ (PriorityLevel)): L3-MM CM SERVICE REQUEST where the priority level information element is provided in addition if a priority selection is performed by the user. In case of no priority selection or use of a non-compatible mobile station the mobile station shall send a service request message without priority level information element and the network shall apply a default priority to the request. The message may be piggybacked in a SABM if no RR connection was already established.

UA (SERV_REQ (PriorityLevel): Standard message to acknowledge the layer 2 link which is sent if no RR connection was already established. The priority level is the same as received by the network.

AUTH_REQ: Standard message which is sent if the network applies authentication as shown in figure 1. If not, the network will sent a standard CM_SERVICE_ACCEPT message.

AUTH_RES: Standard message which is sent if the network applies authentication.

CIPH_MOD_CMD: Standard message which is sent if the network applies ciphering as shown in figure 1.

CIPH_MOD_COM: Standard message which is sent if the network applies ciphering.

SETUP: Standard message.

CALL_PROCEEDING: The network shall include the assigned priority level in a CALL_PROCEEDING message if no priority level was indicated in the CM_SERVICE_REQUEST message or the assigned priority level is different to the one requested.

4.1.2 Mobile terminated calls

For a mobile terminated call the priority level is indicated by the calling subscriber if MLPP is used. The mobile station shall be paged in the normal manner, but with the paging messages also containing the priority level of the call. In addition, the priority level shall be included in the set-up message.

> NOTE: Mobile stations in idle mode which are going to respond to a paging message do not need to analyse the priority level in the paging request message but can take the priority level provided in the set-up message. Mobile stations in group receive mode [or with active GPRS modes or other future services ongoing] need to analyse the priority level in the paging request message in order to decide to respond to the paging request.
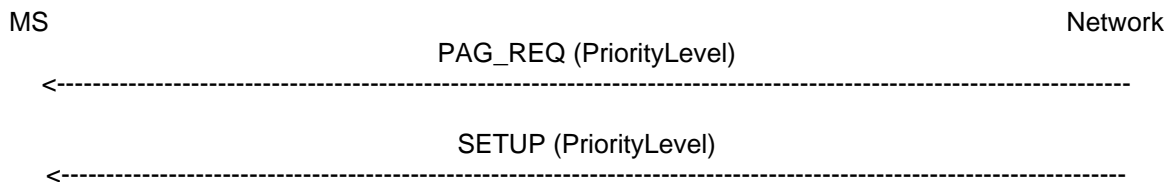
```
MS                                                                                            Network
                              PAG_REQ (PriorityLevel)
    <----------------------------------------------------------------------------------------------------

                               SETUP (PriorityLevel)
    <----------------------------------------------------------------------------------------------------
```

Figure 2: Signalling information required for the prioritization at mobile terminating call establishment without called-party pre-emption

PAG_REQ: Paging message including the related priority level to be applied.

SETUP: Modified SETUP message with an indication of the priority level.

4.1.3   Called party pre-emption for mobile terminated calls

In the case where the called subscriber has a subscription for eMLPP and for CW, the mobile station shall be informed of the priority of the new call together with the CW indication. On reception of the set-up message the compatible mobile station decides on called party pre-emption. If called party pre-emption applies, the mobile station shall automatically accept the waiting call and send a hold message to the network. If a hold acknowledge is received, the waiting call is accepted. If a hold reject is received for any reason, e.g. there is no subscription for hold, the other call shall be released and the waiting call accepted. If the ongoing call is not a TS11 call, the mobile station should not send a hold message to the network but release the call and accept the waiting call.

If no pre-emption applies or the called party is using a non compatible mobile station, CW will be used as normal.

```
MS                                                                                            Network
                               SETUP (PriorityLevel)
    <----------------------------------------------------------------------------------------------------
```
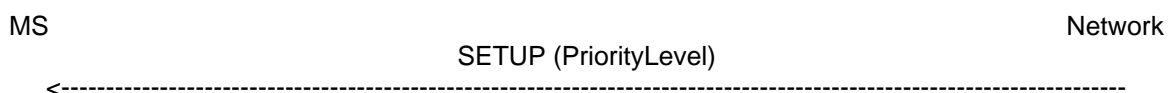
Figure 3: Signalling information required for the called-party pre-emption in case of use of a compatible mobile station

SETUP: Modified SETUP message with an indication of the priority level.

4.1.4 Group call or broadcast call, calling mobile station

Within each set of voice group call or voice broadcast call attributes stored in the GCR as defined in GSM 03.68 and GSM 03.69, respectively, a priority level is included if eMLPP is applied. The priority level will be provided by the GCR to the MSC together with the call attributes.

For VGCS or VBS establishment, the calling mobile station may indicate a priority level in the service request as in section 4.1.1. This priority level can be applied for the dedicated link of the calling mobile station as long as no different priority level in provided by the GCR. If this happens, the priority level provided by the GCR shall also be applied to the dedicated link of the calling mobile station.
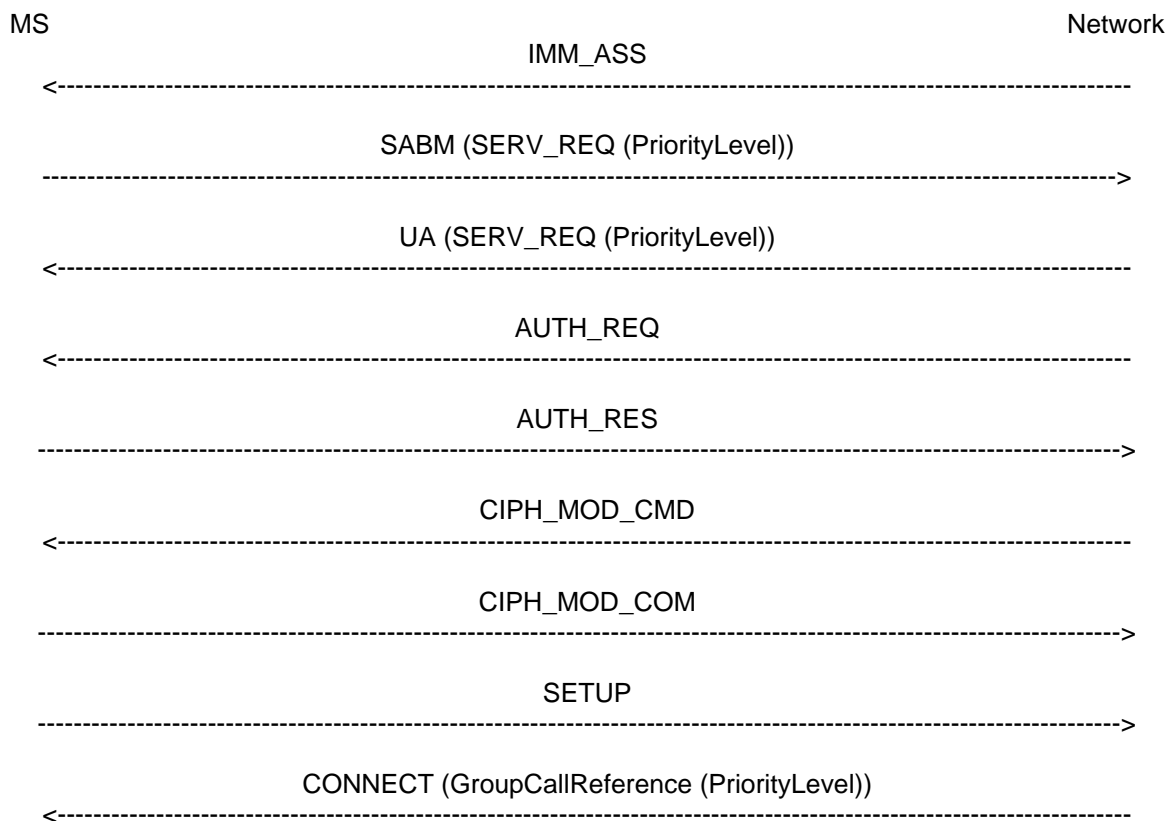
```
MS                                                                          Network
                                    IMM_ASS
    <----------------------------------------------------------------------------

                        SABM (SERV_REQ (PriorityLevel))
    ---------------------------------------------------------------------------->

                         UA (SERV_REQ (PriorityLevel))
    <----------------------------------------------------------------------------

                                    AUTH_REQ
    <----------------------------------------------------------------------------

                                    AUTH_RES
    ---------------------------------------------------------------------------->

                                  CIPH_MOD_CMD
    <----------------------------------------------------------------------------

                                  CIPH_MOD_COM
    ---------------------------------------------------------------------------->

                                     SETUP
    ---------------------------------------------------------------------------->

                    CONNECT (GroupCallReference (PriorityLevel))
    <----------------------------------------------------------------------------
```

Figure 4: Signalling information between the network and the calling mobile station required for the prioritization in case of a VGCS or VBS call

IMM_ASS: Standard message which is sent if no RR connection was already established.

SABM (SERV_REQ (PriorityLevel)): L3-MM CM SERVICE REQUEST where the priority level information element is provided in addition if a priority selection is performed by the user. In case of no priority selection or use of a non-compatible mobile station the mobile station shall send a service request message without priority level information element and the network shall apply a default priority to the request. The message may be piggybacked in a SABM if no RR connection was already established.

UA (SERV_REQ (PriorityLevel)): Standard message to acknowledge the layer 2 link which is sent if no RR connection was already established. The priority level is the same as received by the network.

AUTH_REQ: Standard message which is sent if the network applies authentication as shown in figure 4. If not, the network will sent a standard CM_SERVICE_ACCEPT message.

AUTH_RES: Standard message which is sent if the network applies authentication.

CIPH_MOD_CMD: Standard message which is sent if the network applies ciphering as shown in figure 4.

CIPH_MOD_COM: Standard message which is sent if the network applies ciphering.

SETUP: Standard message.

CONNECT: Information to the mobile station that the VGCS or VBS call is established with the related group or broadcast call reference as the connected number. The group or broadcast call reference includes the priority level applied for the group or broadcast call in the network. This priority level can be different to the one indicated in the CM_SERVICE_REQUEST.

4.1.5 Group or broadcast call, called mobile stations

Within each set of voice group call or voice broadcast call attributes stored in the GCR as defined in GSM 03.68 and GSM 03.69, respectively, a priority level is included if eMLPP is applied. The priority level will be provided by the GCR to the MSC together with the call attributes.

The priority level shall be indicated together with the related notification messages and treated in the mobile station as defined in GSM 03.68 and GSM 03.69, respectively.
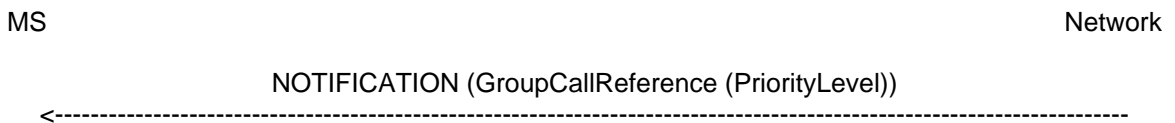
```
MS                                                                                              Network

                    NOTIFICATION (GroupCallReference (PriorityLevel))
   <-----------------------------------------------------------------------------------------------------------
```

Figure 5: Signalling information between the network and the called mobile stations required for the prioritization in case of a VGCS or VBS call

NOTIFICATION: L3 RR message NOTIFICATION/NCH_TYPE1 or NOTIFICATION/NCH_TYPE2 or NOTIFICATION/FACCH or NOTIFICATION/SACCH containing a group call reference or broadcast call reference of a notified voice group or broadcast call which includes a related priority level for that call.

4.2 Registration

The default eMLPP priority level has to be registered in the network:

An eMLPP registration request from a mobile user shall include the SS-Code of the eMLPP service and the default priority level.

If the registration is successful, the default eMLPP priority level will be registered. The network will then send a return result indicating acceptance of the request, including the default eMLPP priority level.

If the system cannot accept a registration request, a corresponding error indication is returned to the served mobile subscriber that eMLPP registration was not successful. Error values are specified in GSM 04.80.

```
MS                                                                                              Network
                                            REGISTER
   ------------------------------------------------------------------------------------------------------------>
                    Facility (Invoke = RegisterSS (eMLPP, DefaultPriorityLevel))

                                    RELEASE COMPLETE
   <-----------------------------------------------------------------------------------------------------------
                    Facility (Return result = RegisterSS (DefaultPriorityLevel))

                                    RELEASE COMPLETE
   <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                    Facility (Return error (Error))

                                    RELEASE COMPLETE
   <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                    Facility (Reject (Invoke_problem))
```
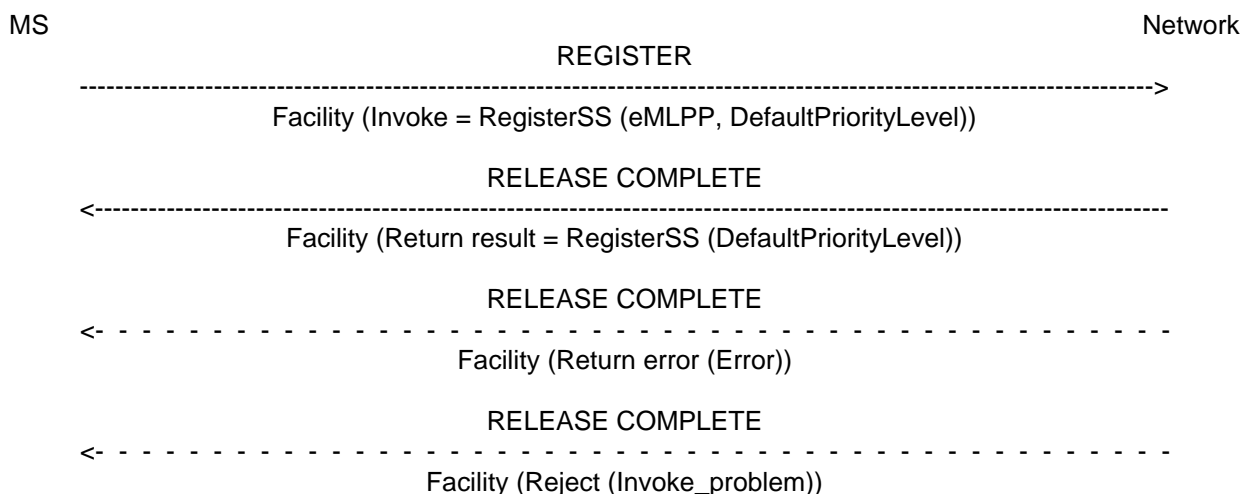
Figure 6: Registration default priority level

4.3 Erasure

A previous registration can be erased in one of two ways:

-   the subscriber can register information for eMLPP for a new default priority level, thus causing the previous registration of eMLPP to be overridden;

-   all information is erased as a result of withdrawal of the supplementary service (administrative handling).

4.4 Activation, deactivation

Activation and deactivation of the supplementary service enhanced Multi-Level Precedence and Pre-emption are not applicable.

4.5 Interrogation

The interrogation procedure enables the mobile subscriber to obtain information about data stored in the PLMN. The eMLPP service subscriber may interrogate the maximum priority level he can use and the actual default priority level.

If the service is provisioned, the network shall sent a return result including the SS-Status parameter and the maximum priority level which the service subscriber is allowed to use and the actual default priority level.

If the service is not provisioned, the network shall send a return result including the SS-Status parameter.
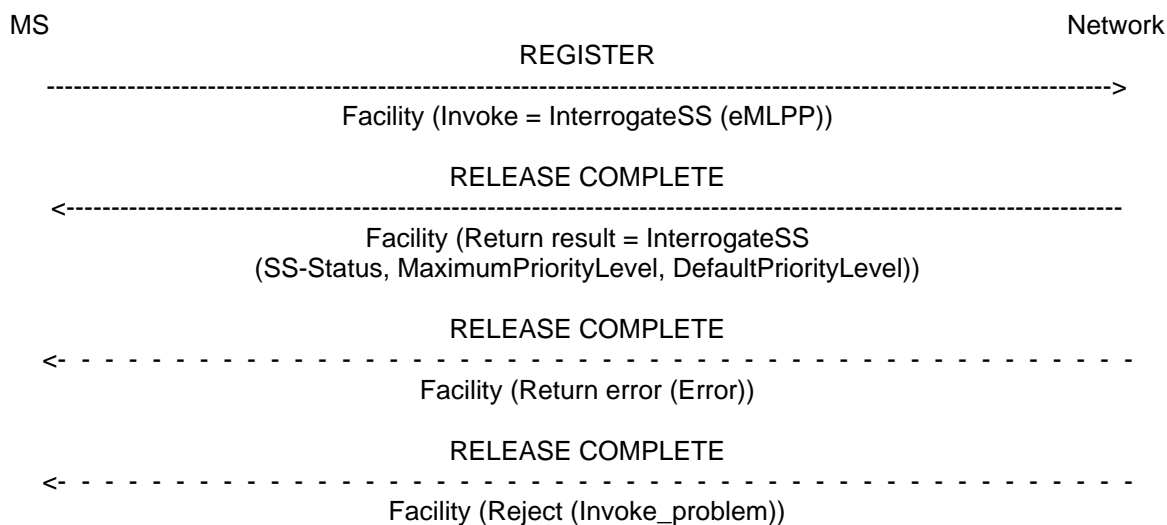
```
MS                                                                              Network
                                    REGISTER
  ------------------------------------------------------------------------------------->
                        Facility (Invoke = InterrogateSS (eMLPP))

                                RELEASE COMPLETE
  <-------------------------------------------------------------------------------------
                          Facility (Return result = InterrogateSS
                 (SS-Status, MaximumPriorityLevel, DefaultPriorityLevel))

                                RELEASE COMPLETE
  <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                            Facility (Return error (Error))

                                RELEASE COMPLETE
  <- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                           Facility (Reject (Invoke_problem))
```

Figure 7: Interrogation of the maximum and default priority levels

History

Document history		
December 1996	Unified Approval Procedure	UAP 61: 1996-12-16 to 1997-04-11