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New presentation - see History box

Contents

Foreword

This ETSI Technical Report (ETR) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This ETR describes how interworking can be obtained between Phase 2 MSs and Phase 1 infrastructure of the European digital cellular telecommunication system (Phase 2).

This ETR is an informative document resulting from SMG studies which are related to the European digital cellular telecommunication system (Phase 2). This ETR is used to publish material which is of an informative nature, relating to the use or the application of ETSs and is not suitable for formal adoption as an ETS.

This Fourth Edition ETR is the result of further work in TC SMG and corresponds to GSM technical specification, GSM 09.90 version 4.6.0.

Reference is made within this ETR to GSM Technical Specifications (GSM-TS) (note).

NOTE: TC-SMG has produced documents which give the technical specifications for the implementation of the European digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TS). These TSs may have subsequently become I-ETSs (Phase 1), or ETSs (Phase 2), whilst others may become ETSI Technical Reports (ETRs). GSM-TSs are, for editorial reasons, still referred to in current GSM ETSs.

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1 Scope

The Scope of this ETSI Technical Report (ETR) is to clarify how interworking can be obtained between Phase 2 Mobile Stations (MS)s and Phase 1 infrastructure. The objective is to obtain this without changing the consolidated set of Phase 1 specifications. This ETR specifies the necessary amendments to the Phase 1 infrastructure so that an acceptable service is offered to MSs of Phase 2, guaranteeing that a Phase 2 MS obtains all Phase 1 services.

This ETR outlines the necessary changes as well as the necessary controls and clarifications with regard to Phase 1 implementation, which should be performed to the different interfaces in Phase 1 infrastructure before Phase 2 mobiles are offered service.

2 References

This ETR incorporates by dated and undated reference, provisions from other publications. These 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 ETR 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 100): "European digital cellular telecommunication system (Phase 2); Abbreviations and acronyms".

[2]   GSM 04.06 (ETS 300 555): "European digital cellular telecommunication system (Phase 2); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[3]   GSM 04.08 (ETS 300 557): "European digital cellular telecommunication system (Phase 2); Mobile radio interface layer 3 specification".

[4]   GSM 04.11 (ETS 300 559): "European digital cellular telecommunication system (Phase 2); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[5]   GSM 05.02 (ETS 300 574): "European digital cellular telecommunication system (Phase 2); Multiplexing and multiple access on the radio path".

[6]   GSM 04.06 Phase 1 (I-ETS 300 021):"European digital cellular telecommunication system (Phase 1); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[7]   GSM 04.08 Phase 1 (I-ETS 300 022-1): "European digital cellular telecommunication system (Phase 1); Mobile radio interface layer 3 specification Part 1: Generic".

[8]   GSM 04.08-DCS Phase 1 (I-ETS 300 022-2): "European digital cellular telecommunication system (Phase 1); Mobile radio interface layer 3 specification Part 2: DCS extension".

[9]   GSM 04.08-EXT Phase 1 (I-ETS 300 022-3): "European digital cellular telecommunication system (Phase 1); Mobile radio interface layer 3 specification Part 3: Signalling support of the second ciphering algorithm".

[10]   GSM 04.11 Phase 1 (I-ETS 300 023): Point-to-point short message service support on mobile radio interface".

2.1 Abbreviations

Abbreviations used in this document are listed in GSM 01.04.

3 General

To obtain compatibility between Phase 2 MSs and Phase 1 infrastructure, it has been attempted to design Phase 2 as an extension of the Phase 1 protocols. Basically meaning that the Phase 1 protocols are contained as a subset of the Phase 2 protocols and that for most Phase 1 functionality, Phase 1 and Phase 2 signalling are identical.

This approach in general has been followed. However, the requirement for introduction of the new Phase 2 features has in some cases required deviation from this general rule. Furthermore, due to freedom in the Phase 1 technical specifications there might be different Phase 1 infrastructure implementations. Therefore it has not in all cases been possible to ensure interworking with all potential implementations.

The remainder of this ETR describes how to overcome the possible impacts of the above mentioned factors.

In section 4, the unavoidable service restrictions a Phase 2 MS will encounter in Phase 1 infrastructure are explained. Sections 5, 6, 7 and 8 give general and specific behaviour of Phase 1 implementations which has been assumed and as a result must be ensured. The unavoidable changes and additions to Phase 1 infrastructure needed to obtain proper working of a Phase 2 MS in Phase 1 infrastructure is also given.

Within the scope of this ETR, the following definitions are used:

- a Phase 1 MS is a MS which is compliant with the protocols defined by the Phase 1 specifications;

- a Phase 2 MS is a MS which is compliant with the protocols defined by the Phase 2 specifications;

- a Phase 1 infrastructure is an infrastructure which is compliant with the protocols defined by the Phase 1 specifications;

- an upgraded Phase 1 infrastructure is a Phase 1 infrastructure which has been upgraded according to this ETR.

4 Service restrictions

When the specifying part of this ETR is implemented and an upgraded Phase 1 infrastructure has been created, a Phase 2 MS will have no service restrictions for the features and services defined for Phase 1. However, no means have been taken to provide a Phase 2 MS in an upgraded Phase 1 infrastructure, with the features and services added in the Phase 2 standard compared to the Phase 1 standard.

5 Air interface

This section deals with enhancements of the protocols at the air interface between Phase 1 and Phase 2 of GSM. The protocols concerned are defined in TS GSM 04.06, TS GSM 04.08, TS GSM 04.11 and TS GSM 05.02; the only paragraph for which TS GSM 04.06 is concerned is in section 5.2.1 of this ETR and tackles the treatment of spare bits.

For each change from Phase 1 to Phase 2, explanations are provided; this informative part is written in roman characters. Then a specifying part is provided which is written in italic characters. These specifications are those which are absolutely necessary for the service provision to a Phase 2 MS. In some cases, additional specifications of desirable upgrades to accommodate enhanced Phase 2 MSs are provided.

5.1 Physical layer on the radio path

This section deals with the enhancement of the radio path at the air interface between Phase 1 and Phase 2 of GSM.

5.1.1 Multiplexing and multiple access on radio path

A Phase 2 infrastructure transmits the system information type 2 bis message, when needed, in position 5 of the multiframe modulo 8 (i.e. TC = 5), whereas in Phase 1 infrastructure it can be transmitted in position 4 or 5 (i.e. TC = 4 or 5). A Phase 2 MS expects the system information type 2bis to be in position 5.

> *If a SI 2bis message is to be transmitted an upgraded Phase 1 infrastructure shall transmit it at least in position 5 of the multiframe modulo 8.*

5.2 General behaviour of upgraded Phase 1 infrastructures

5.2.1 Spare bits

The following rules about spare bits apply to both protocols defined in TS GSM 04.06 and 04.08 for the Phase 1 and Phase 2 specifications.

Where the description of information elements or messages in the Phase 1 specifications contains spare bits, these bits are indicated as being set to "0". Moreover, enhancements of the protocols have been done on the assumption that spare bits are ignored.

> *To ensure compatible evolution of the protocols, an upgraded Phase 1 infrastructure shall set spare bits to "0".*

> *An upgraded Phase 1 infrastructure is not allowed to reject messages simply because a bit which is defined as spare in the Phase 1 specifications and used by the Phase 2 specifications, is set to "1".*

> *In addition, it would be advisable that an upgraded Phase 1 infrastructure does not reject messages simply because a bit which is defined as spare in the Phase 1 specifications is set to "1".*

Section 5.3.6 summarizes the Phase 2 changes to TS GSM 04.08 which have made use of the Phase 1 spare bits.

5.2.2 Values "reserved for future use"

In the Phase 1 definition of information elements, some data fields may contain values that are defined as "reserved" or "reserved for future use".

> Except for those cases which are indicated in sections 5.3.1.1, 5.3.1.2, 5.3.4.2, and 5.3.5.1 of this ETR, if a value defined as "reserved" in the Phase 1 specifications is detected by an upgraded Phase 1 infrastructure in an information element, this shall be considered as an error and the action yielded by this error shall be taken according to the error handling already implemented.

5.3 Specific behaviour of upgraded Phase 1 infrastructures

This section deals with the changes which have been introduced to TS GSM 04.08 and TS GSM 04.11 for Phase 2 and which have impact on the interworking between Phase 1 infrastructure and Phase 2 MSs.

5.3.1 Radio resource procedures

5.3.1.1 RR-connection establishment

New values for the field "establishment cause" of the CHANNEL REQUEST message have been introduced to improve the RR-connection establishment procedure. However there will be no problem because a Phase 1 infrastructure does not indicate support of new establishment causes nor add any paging indication in the PAGING REQUEST messages; hence a Phase 2 MS uses only the Phase 1 values when sending CHANNEL REQUEST messages.

> To foresee the future enhancements of the CHANNEL REQUEST message, an upgraded Phase 1 infrastructure should not reject a CHANNEL REQUEST message simply because the "establishment cause" field is coded with a reserved value; moreover, when receiving such a reserved establishment cause value, an upgraded Phase 1 infrastructure should allocate an SDCCH if it is not able to determine the MS capabilities.

If the above advice is taken into account, this case is one of the exceptions to section 5.2.2 of this ETR.

5.3.1.2 Assignment and handover procedures

After reception of ASSIGNMENT COMMAND or HANDOVER COMMAND messages the MS may send ASSIGNMENT FAILURE or HANDOVER FAILURE messages containing new error causes: "channel mode unacceptable" or "frequency not implemented".

This ETR does not cover the recovery mechanisms in cases where the infrastructure has made errors. However,

> An upgraded Phase 1 infrastructure is not allowed to consider as erroneous or invalid ASSIGNMENT FAILURE or HANDOVER FAILURE messages containing one of the following error causes: "channel mode unacceptable" or "frequency not implemented".

> It is up to the upgraded Phase 1 infrastructure whether or not to treat these new error causes as the error causes already defined in the Phase 1 specifications.

This case is one of the exceptions to section 5.2.2 of this ETR.

5.3.1.3 Transmission mode change

On reception of a CHANNEL MODE MODIFY message, if a Phase 2 MS finds that it can not change to the indicated new mode, it shall retain the old mode and return a CHANNEL MODE MODIFY ACKNOWLEDGE message including a "channel mode" information element describing the old mode.

> An upgraded Phase 1 infrastructure (which expects a description of the new mode) shall check whether the mode included in the CHANNEL MODE MODIFY ACKNOWLEDGE message is the mode that was ordered in the CHANNEL MODE MODIFY message, and if not it shall conclude to a failure of the transmission mode change procedure.

5.3.2 Mobility management procedures

5.3.2.1 MM-connection establishment

During the first mobile originated MM-connection establishment, a Phase 2 MS can force a release before the completion of the establishment Phase by sending a CM-SERVICE ABORT message. This message is a new one in Phase 2, but in any case if the RR-connection is not released a Phase 2 MS will abort the RR-connection at expiry of timer T3240.

> An upgraded Phase 1 infrastructure is not allowed to consider as erroneous or invalid a MS simply because it has sent a CM-SERVICE ABORT message. Hence, sending by a MS of a CM-SERVICE ABORT message will not cause the blacklisting of this MS.

5.3.2.2 Location updating procedure

When a Phase 2 MS is in service state LIMITED SERVICE of state MM-IDLE it is not obliged to respond to paging with IMSI. Under the same conditions a Phase 1 MS shall respond to paging with IMSI.

> An upgraded Phase 1 infrastructure, after having rejected a location updating request with cause "Location area not allowed" or "PLMN not allowed" shall take into account the fact that Phase 2 MSs need not respond when paged with IMSI.

The value "FFFE" is used in Phase 2 for the MS to indicate a deleted LAC, for example after reception of a LOCATION UPDATING REJECT message with cause "location area not allowed".

> An upgraded Phase 1 infrastructure is not allowed to allocate value FFFE to describe one of its location areas, and shall consider value FFFE (for location area code) as meaning a deleted location area code.

5.3.2.3 Re-establishment procedure

A Phase 2 MS may indicate its IMEI as its mobile identity in a CM REESTABLISHMENT REQUEST message. It was not clear whether this is allowed on re-establishment for Phase 1.

> An upgraded Phase 1 infrastructure is not allowed to consider as erroneous or invalid a MS simply because it has sent a CM REESTABLISHMENT REQUEST message including an IMEI as mobile identity.

5.3.3 Call control procedures

5.3.3.1 Compatibility checking at call establishment

New requirements have been introduced about compatibility checking when two "bearer capability" information elements are sent in the SETUP message.

The following procedure shall be taken into account by an upgraded Phase 1 infrastructure: At the receipt of a SETUP message including two "bearer capability" information elements, a Phase 2 MS may as a result of compatibility checking accept one bearer capability and reject the other one. In this case the Phase 2 MS answers to the SETUP message with a CALL CONFIRMED message including the bearer capability which is accepted.

> In those cases where one of the bearer capabilities provided to a Phase 2 MS is not supported by this MS, an upgraded Phase 1 infrastructure shall either release the call or establish the call according to the bearer capability supported by the MS.

5.3.3.2 Mobile originated call

A Phase 2 mobile station may include a new information element "CLIR suppression" (coded as a Type 2 information element) in the SETUP message to override the CLIR (Calling Line Identification Restriction) service.

> If a "CLIR suppression" information element is included in the SETUP message, an upgraded Phase 1 infrastructure shall process the SETUP message in a normal way.

> In addition, an upgraded Phase 1 infrastructure should either ignore or take into account the "CLIR suppression" information element.

A Phase 2 MS may include a new information element, "CLIR invocation" (coded as a Type 2 information element), in the SETUP message to override the CLIR presentation mode temporary (presentation allowed).

> If a "CLIR invocation" information element is included in the SETUP message, an upgraded Phase 1 infrastructure shall process the SETUP message in a normal way.

> In addition, an upgraded Phase 1 infrastructure should either ignore or take into account the "CLIR invocation" information element.

5.3.3.3 Mobile terminating call

In Phase 1, the MS may send one or several "bearer capability" information elements in the CALL CONFIRMED message in the following two cases:

- the MS wishes another bearer capability than that given in the incoming SETUP message;
- the "bearer capability" information element is missing or not fully specified in the SETUP message.

A Phase 2 dual rate Mobile Station will send a Bearer Capability IE in the CALL CONFIRMED message even if the one in the SETUP message is accepted.

An upgraded infrastructure shall not consider as invalid a Mobile Station only because it sends a Bearer Capability IE in CALL CONFIRMED message with the same information as sent in the SETUP message and the upgraded infrastructure shall continue the call establishment in this case.

In addition, an upgraded Phase 1 infrastructure need not take into account the received radio channel requirement.

A Phase 2 MS may include a new information element "connected subaddress" (coded as a Type 4 information element) in the CONNECT message.

If a "connected subaddress" information element is included in a CONNECT message, an upgraded Phase 1 infrastructure shall process normally the CONNECT message.

In addition, an upgraded Phase 1 infrastructure should either ignore or take into account the "connected subaddress" information element.

To avoid speech clipping a Phase 2 MS will attach the user connection for speech at latest when sending the CONNECT message, except if there is no compatible radio resource available at this time.

An upgraded Phase 1 infrastructure should ensure that the downlink speech path does not contain disturbing sound during the interval (if any) beginning at channel assignment and ending at through connection in the network. Typically, comfort noise or silence may be sent in this interval.

5.3.3.4 In-call modification

In Phase 2, the MS may include a reverse call setup direction information element in a MODIFY message to indicate that the direction of the data call is opposite to the direction of the call setup.

An upgraded Phase 1 infrastructure shall ignore that information element and proceed as if the information element was not present.

5.3.4 SMS procedures

5.3.4.1 Error Cause Mapping

Additional error causes have been specified for Phase 2.

Where an error cause is not understood by the infrastructure it shall be treated as "unspecified error".

5.3.5 Messages

5.3.5.1 General message coding

In the Phase 1 specifications, it is stated that optional information elements of "types 1 and 2 may appear at any point among the optional information elements in a message" (see 10.5 of TS GSM 04.08). In the Phase 2 specifications, a general statement indicates that the order of appearance for information elements in a message is given by the table describing that message. Therefore, a Phase 2 MS expects these elements in that precise order.

An upgraded Phase 1 infrastructure shall include optional type 1 and 2 information elements at their correct place in a message (this correct place is defined in the Phase 2 table which describes the message).

This statement covers the following cases: optional "synchronisation indication" information element in HANDOVER COMMAND message; and optional "repeat indicator" information element in CALL CONFIRMED, CALL PROCEEDING and SETUP messages.

5.3.5.2 CLASSMARK CHANGE message

A new information element "mobile station classmark 3" (coded as a Type 4 information element) may be included by a Phase 2 MS in the CLASSMARK CHANGE message.

An upgraded Phase 1 infrastructure is not allowed to consider as erroneous or invalid a MS simply because it has sent a CLASSMARK CHANGE message including a "mobile station classmark 3" information element.

5.3.5.3 RR-STATUS message

The rewriting of error handling of the MS for Phase 2 has introduced a new error cause value "invalid mandatory information" sent in the RR-STATUS message at detection of errors on mandatory information elements.

This ETR does not cover the recovery mechanisms in cases where the infrastructure has made errors. However,

An upgraded infrastructure is not allowed to consider as erroneous or invalid a MS simply because it has sent a RR-STATUS message with cause value "invalid mandatory information".

It is up to the upgraded Phase 1 infrastructure to decide how to treat this new error cause.

This case is one of the exceptions to section 5.2.2 of this ETR.

5.3.5.4 STATUS message

In TS GSM 04.08 section 5.5.3.2, it is made mandatory to release a call in some cases where a STATUS message is received. This can lead to very bad consequences as a call can be released when it could have been maintained. As a matter of fact the definition of "non implemented" being somehow ambiguous in Phase 1, a Phase 1 infrastructure having not implemented an information element or message can consider this signalling element a "non implemented" although it is defined in a Phase 1 recommendation.

This ETR does not cover the recovery mechanisms in cases where the infrastructure has made errors, so it does not cover the cases when the MS sends a STATUS message after it has detected an error caused by the infrastructure.

An upgraded Phase 1 infrastructure shall not send STATUS messages, except for the cases where the STATUS message is sent in response to a status enquiry procedure.

On reception of a STATUS message containing one of the following causes #96, #97, #99 or #100, a Phase 1 MS shall clear the call but a Phase 2 MS may decide not to clear the call. So, after having sent a STATUS message with one of the four causes above, the infrastructure can not rely on the MS clearing the call.

In those cases where, after having sent a STATUS message with one of the following causes #96, #97, #99 or #100, an upgraded Phase 1 infrastructure aims to release the call, it should perform it explicitly after the sending of the STATUS message.

5.3.5.5 Messages relative to the SMS Point-to-Point

5.3.5.5.1 General

A Phase 2, mobile may submit a short message containing in the Type-of-address a value for Type-of-Number or Numbering-Plan-Identification which is unknown to the SC.

Such short messages shall be rejected by a Phase 1 SC with the error "Invalid SME address" conveyed by MAP, and forwarded by the VMSC to the MS as "SME transfer rejected".

5.3.5.5.2 CP-ERROR message

In the Phase 1, the CP-ERROR message is only used in the network to MS direction. In Phase 2 the CP-ERROR message is used in both directions. Therefore a Phase 2 MS may send a CP-ERROR message that is unexpected in Phase 1 infrastructure.

An upgraded Phase 1 infrastructure is not allowed to consider as erroneous or invalid a MS simply because it has sent a CP-ERROR message. This message shall simply be discarded. including an "auxiliary states" information element.

5.3.5.5.3 RP-ERROR message

In the Phase 2, the RP-ERROR message (GSM 04.11) can contain an additional (optional) information element "RP-User Data" which is used to convey failure causes between SC and MS. A Phase 2 MS may send a RP-ERROR message, containing this element.

Upon receipt of a RP-ERROR message containing the parameter RP-User-Data, the upgraded Phase 1 VMSC shall discard the information element RP-User-Data and then pass an error back to the SC as in Phase 1, based on the value of RP-Cause from mobile.

5.3.5.5.4 SMS-SUBMIT

Within the SMS-SUBMIT, values for a number parameters have been extended in Phase 2.

On receipt of an unknown value of any parameter, or use of bits in the first octet unspecified in Phase 1, the upgraded Phase 1 SC should reject the SMS-SUBMIT with the error "Invalid SME address" conveyed by MAP, and forwarded by the VMSC to the MS as "SME transfer rejected". However, if only the Data Coding Scheme is set to a value unspecified in Phase 1, and the SC is merely forwarding the message to another entity (i.e. not performing any translation), the SC shall accept the message.

5.3.5.5.5 RP-SMMA message

A Phase 2 MS may send a RP-SMMA message to attempt a memory capacity available notification to the network.

Upon receipt of a RP-SMMA message, the upgraded Phase 1 VMSC shall answer to the MS with a RP-ERROR message with 'Requested facility not implemented' error cause.

5.3.5.6 Messages relative to SMS Cell Broadcast

5.3.5.6.1 Serial Number

In Phase 2, the format of the Serial Number has been changed to include a Geographical Scope indicator.

> An upgraded Phase 1 infrastructure shall always set the highest two bits of the Serial Number to '00'.

5.3.5.7 Supplementary Services messages

A Phase 2 MS may include a new information element "SS version indicator" (coded as a Type 4 information element) in some messages which contain a "Facility" information element, to aid the decoding of this "Facility" information element.

> An upgraded Phase 1 infrastructure is not allowed to consider as erroneous or invalid a MS simply because it has included a "SS version indicator" information element in one of the following messages: ALERTING, CONNECT, DISCONNECT, FACILITY, RELEASE, RELEASE COMPLETE and SETUP.

5.3.6 Information elements

5.3.6.1 "Mobile station classmark"

A new value is used for the "revision level" field of the "mobile station classmark 1 and 2" information elements to indicate that the MS supports the 04.08 protocols defined for Phase 2; this value was marked as "reserved for future use" in the Phase 1 specifications.

Moreover, this "revision level" field has been reduced from 3 bits to 2 bits. The bit which has been freed is marked as spare for Phase 2. The remaining bits are still used to indicate the revision level of the MS.

> On reception of a "mobile station classmark" information element with the "revision level" field set to one of the two following values: 000 or 001, an upgraded Phase 1 infrastructure is not allowed to consider this information element as invalid and shall process the message which contains this "mobile classmark" information element.

> In addition, it would be advisable that whatever the value of the "revision level" field, an upgraded Phase 1 infrastructure should not consider this information element as invalid and should process the message containing the "mobile station classmark" information element.

This case is one of the exceptions to section 5.2.2 of this ETR.

The "frequency capability" field of the "mobile station classmark 2" information element has been reduced from 3 bits to 1 bit. The 2 bits which have been freed are marked as spare for Phase 2. The remaining bit is used to indicate whether a MS supports the extension band for GSM.

> An upgraded Phase 1 infrastructure is not allowed to reject a "frequency capability" field which contains value 001 .

> Moreover, the upgraded Phase 1 infrastructure should assume that the MS supports band number 0.

This case is one of the exceptions to section 5.2.2 of this ETR.

The "encryption algorithm" field of the "mobile station classmark 1 and 2" information elements has been reduced from 2 bits to 1 bit. The bit which has been freed is used in Phase 2 to indicate whether the Mobile Station supports autonomous Early Sending of Classmark Change message: "ES IND" bit. The other bit is used to indicate whether the MS supports the standard A5 encryption algorithm.

> An upgraded Phase 1 infrastructure should only check in the "encryption algorithm" field the bit which indicates support of the standard A5 algorithm.

> An upgraded Phase 1 infrastructure is not allowed to reject an "encryption algorithm" field because the "ES IND" bit is set to 1.

This case is one of the exceptions to section 5.2.2 of this ETR.

5.3.6.2 "Repeat indicator"

A clarification about the use of the "repeat indicator" information element has been added in Phase 2. The purpose of the "repeat indicator" information element is to indicate how repeated information elements shall be interpreted when included in a message. The "repeat indicator" information element is included before the first occurrence of the information element which will be repeated in a message.

> An upgraded Phase 1 infrastructure shall include the "repeat indicator" information element only in those cases identified in the Phase 2 specifications, namely: when two "bearer capability", two "low layer compatibility", or two "high layer compatibility" information elements are included in a message.

5.3.6.3 "Starting time"

For Phase 2, a clarification has been made about the treatment of the "starting time" information element. The time interval during which the MS considers that the starting time has not been yet reached now lasts 32024 frames (instead of 42431 frames for Phase 1) from the reception of the message which contained the "starting time" information element.

> An upgraded Phase 1 infrastructure must take into account the fact that if it sends a starting time that adds a substantial number of frames (32024 frames + the number of frames for transmission of the message) to the current frame number, a Phase 2 MS will consider this starting time as having already been reached.

5.3.6.4 "Mobile Identity"

For Phase 2 the option of having a TMSI of variable length has been deleted, in Phase 2 the length is always 4 octets.

> An upgraded Phase 1 infrastructure is not allowed to send a mobile identity information element containing a TMSI with length of less than 4 octets.

5.3.7 Use of Phase 1 spare bits

Phase 2 changes which are presented under this section are those which have made use of Phase 1 spare bits; for these changes the general rule specified in section 5.2.1 of this ETR has to be applied.

In the "location updating type" information element, a bit marked as spare in Phase 1 is now used to indicate whether a follow-on request is pending at the MS, for example to speed up call setup after the MS has been switched on.

In the "mobile station classmark 2" information element, two bits marked as spare in Phase 1 are now used as a "SS screening indicator" field to indicate some supplementary service attributes.

In the "mobile station classmark 2" information element, a bit marked as spare in Phase 1 is now used to indicate that the MS supports the pseudo-synchronized handover procedure.

The last octet of the "mobile station classmark 2" information element has been modified to indicate which encryption algorithms are supported by the MS. This octet was marked as spare in the Phase 1 specifications.

In the "bearer capability" information element, a bit marked as spare in Phase 1 is now used to indicate the 6 kbit/s radio interface data rate capability and a request for a further negotiation of an intermediate data rate.

6 A / Abis interface

6.1 A interface

No cross Phase compatibility problems are found for the A-interface.

6.2 Abis interface

No cross Phase compatibility problems are found for the Abis-interface.

7 Supplementary Service handling

7.1 General aspects

Due to MAP version negotiation, a supplementary service interacting with mixed Phase infrastructure will operate according to Phase 1.

Unused bits within ASN.1 components parameters shall be set to zero by an upgraded Phase 1 infrastructure.

Supplementary service subscription information shall be stored against Elementary Basic Service Groups (EBSG) in HLRs and VLRs in an upgraded Phase 1 infrastructure.

Individual basic service codes shall not be used for subscriber data management in an upgraded Phase 1 infrastructure.

The following BSG Codes shall not be used in an upgraded Phase 1 infrastructure:

- MHS;
- Videotext;
- Teletext;
- 3.1 kHz speech.

The alternate and followed by service codes are not used in Phase 1 infrastructure. However, if an upgraded Phase 1 infrastructure supports, the procedures for application of supplementary services to alternate and followed by services, these procedures shall be as specified in the Phase 2 specifications.

7.2 Service Aspects

7.2.1 Call Forwarding Services

No upgrades to a Phase 1 infrastructure are required.

7.2.2 Call Barring Services

No upgrades to a Phase 1 infrastructure are required.

7.2.3 Unstructured SS Data

No upgrades to a Phase 1 infrastructure are required.

7.2.4 Password Handling

The parameters badPW-TryAgain and badPWFormat-TryAgain shall not be sent over the air interface by an upgraded Phase 1 infrastructure.

Phase 1 infrastructure runs a timer during the register password procedure lasting 15 seconds. In an upgraded Phase 1 infrastructure the value of this timer should be increased. Refer to the Phase 2 specification.

7.2.5 Forward Check SS Indication

An upgraded Phase 1 infrastructure shall only send ForwardCheckSSIndication on a new call independent SS transaction.

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