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Title: Proposed new TR 29.abc on network errors

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Introduction

Several network implementation errors have been detected when the testing of R99 UEs. Due to complicated logistics it has not been possible to install corrections to every existing network and therefore the R99 mobiles will not work in those non-updated networks which contain the errors.

Proposal

R99 UEs can not be distributed before *all* networks in the world have been updated, unless some rapid actions are taken and the it is proposed that a new TR is started to share the identified workarounds in the R99 and later UEs.

The intention is not to not to mandate any specific behaviour but just to document the solutions which have been identified and analysed for correctness in the appropriate working group.

There are no revision markers in the proposed TR document, since all text is new.

3GPP TR ab.cde V0.0.1 (2003-02)

Technical Report

3rd Generation Partnership Project; Technical Specification Group TSG Core Networks; Specific network implementation faults and possible UE workaround procedures (Release 6)

Keywords
GSM, UMTS, network, terminal

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Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

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

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

Sometimes network implementation errors are found only after the introduction of some new protocol extension or a new capability indicated by UE. This is particularly harmful if the time between the rollout of the network implementation containing the error and the detection of the error is long, since it means that network implementations containing the error will be very wide spread when the problem is detected.

Specifically some GSM phase 2 network implementations either provide degraded service or fail to provide any service to a R99 or later UE. This could delay significantly the rollout of R99 UEs.

In general such network implementations must be corrected without any delay but before this has happened, meanwhile a UE manufacturer can implement some workaround solutions so that the R99 and later UEs will get at least GSM phase 2 level services.

The intention is not to mandate any of the workaround solutions which are described in the present document or any combination of them. It is an implementation specific issue to choose whether any of the solutions is supported. It is also possible to choose another workaround solution.

The primary solution is rapid installation of corrections to known network errors in the existing networks. Therefore it is recommended that if any workaround solutions are implemented by the UE, these should be used for a transitory period only to overcome unacceptable difficulty or delay in bringing new mobiles to the market.

The present document allows sharing information on the known problems within the 3GPP community and documenting the known interim solutions so that these can be reviewed before adding to the present document and also considered when extending the protocol in the later releases.

1 Scope

The present document describes possible measures which can be adopted by 3GPP UE utilising UTRAN, GSM or GERAN as access network to enable inter-working to be obtained between various network implementations of the 3GPP specification. The objective is to obtain compatibility without changing the consolidated set of specifications. The present document describes the recommended changes to the UE to cater for specific faults within some network impelementations.

The present document is intended to contain documented workaround solutions which can be adopted by a R99 or later UE implementation to overcome interoperability problems with networks of earlier releases which suffer from any of the known and documented errors. It is intended to document only those cases which the 3GPP group responsible for the corresponding core specification has analysed and judged to be error cases.

Therefore the workarounds are of temporary nature to allow the rollout of R99 UEs before all networks in the world have been updated. The lifetime of the herein described measures together with their potential impact on optimal network performance is out of the scope of the present document.

In case multiple solutions to the same problem do exist, then it is recommended to document all of them without a beauty contest on the merits of the different solutions. The choice between such alternative methods, if any of them is supported, is implementation specific.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TR 21.905: " Vocabulary for 3GPP Specifications".

[2] 3GPP TS 24.007: "Mobile radio interface signalling layer 3 General aspects".

[3] 3GPP TS 24.008: "Mobile radio interface layer 3 specification Core Network Protocols-Stage 3".

[4] 3GPP TS 23.107: "Quality of Service, Concept and Architecture".

[5] 3GPP TS 04.60: “Radio Access Network; General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/ Medium Access Control (RLC/MAC) protocol”

3 Definitions, symbols and abbreviations

Definitions and abbreviations used in the present document are listed in 3GPP TR 21.905 [1].

4 Recommended UE implementations to overcome specific network faults

4.1 Revision level in MS Classmark

4.1.1 Justification

Three different values have been defined for UE revision level in 3GPP TS 24.008 [3]. These are GSM phase 1, GSM phase 2 including GSM phase 2+ and R99 and later.

GSM phase 2 and phase 2+ specification 04.08 defined two code points in revision level field in MS Classmark:

0 0 Reserved for phase 1

0 1 Used by phase 2 MSs

All other code points are defined to be ‘reserved for future use’ from GSM phase2 until GSM phase 2+ R98.

Third code point ‘10’, ‘Used by mobile stations supporting R99 or later versions of the protocol’, was defined first for R99.

Some GSM ph. 2, R96, R97 and R98 MSC implementations either perform a fallback to GSM phase 1 functionality or completely fail to provide CS service to UE which indicates a later revision level, such as the code point allocated for R99 and later UE. The reason is that the network considers it an error when a UE indicates to the network its support of this later version of the protocol.

4.1.2 Solution

To allow early introduction of R99 mobiles a UE can check whether the serving MSC node is at R99 level or older. A R99 MSC node will indicate its revision in MSC-R.

Based on this downlink indication a R99 or later UE can adapt the revision level it indicates to a pre-R99 MSC in the following IEs:

MS Classmark 1,

MS Classmark 2

A compliant GSM phase 2 network does not need to change its behaviour when serving a UE which is based on a later revision level. Therefore it is sufficient for the UE to only indicate revision level '01' corresponding to R98 and older GSM phase 2+ releases. While full fallback to Phase 2 behaviour is not needed in an R99 UE operating on a Phase 2 network, selective fallback to R97/R98 behaviour can be necessary for certain aspects of the UE, such as those addressed in Section 4.2 and 4.3 of this document.

NOTE 2: This subclause was added to the present document in 3GPP TSGN #20

4.2 QoS IE length between R97 and R99 implementations

4.2.1 Justification

Quality of Service was initially defined in R97 specifications as a type 4 TLV coded IE but with fixed length of 5 octets.

Subsequently the length of the IE was extended to maximum 13 octets in R99 and further on to 14 octets in Rel-5.

Some types of R97 SGSNs fail to comply with the rules set for TLV encoded IEs in 24.007 [2] and do not accept new length for this IE which used to be fixed in R97 reference version. Such SGSN will diagnose an erroneous mandatory IE and consequently reject the PDU containing the IE and send back SM status with cause #96.

This means that such a R97 SGSN can not support GPRS procedures for PDP context activation or PDP context modification for R99 UE.

4.2.2 Solution

To enable GPRS operation, the UE can observe the SGSN revision level indicated in the SGSN-R. The UE can then adapt the length of the QoS IE it uses in both UL and DL directions and its revision level indication in MS Network Capability and MS Radio Access Capability IEs when the serving SGSN indicates R98 or older version.

NOTE 1: The mapping between the information in the original R97/98 part of QoS and later extension part is defined in 3GPP TS 23.107 [4].

NOTE 2: This subclause was added to the present document in 3GPP TSGN #20.

4.3 Incorrect padding of control messages leading to GPRS failure

4.3.1 Justification

It has been found out that there are R97/R98 BSS in commercial use that incorrectly terminate a TBF resource assignment message, leading to the situation in which a correctly implemented R99 mobile sees R99 extension parameters assigning EGPRS TBF to the MS. Therefore, a R99 MS either accepts the message (if the MS supports EGPRS) or rejects the message (if the MS does not support EGPRS). In both cases, the TBF fails (either establishment or operation on the TBF) and leads to a situation in which GPRS cannot be used at all.

4.3.2 Solution

UE can check whether EGPRS is supported on the cell, and then decode the assignment message based on that information. The EGPRS support indicator is present in GPRS Cell Options IE only in R99 or onwards (see 3GPP TS 04.60 [5] v6.14.0 for R97, v8.15.0 for R99). This way any EGPRS or non-EGPRS R99 MS can handle the assigments in a network having this problem. Detailed description:

1. An assignment message (IMMEDIATE ASSIGNMENT for DL TBF establishment in this particular case) is received

2. The MS checks whether the cell supports EGPRS

3. If the cell supports EGPRS, the assignment is decoded completely

4. If the cell does not support EGPRS, the decoding of the assignment is stopped directly after the content specified for R97 are decoded. This way (there is no R99 related other information than for EGPRS present in the additional part) possibly incorrectly set spare padding do not cause the message to be ignored and GPRS operation can succeed.

The above principle can be applied also to any other messages where erroneous content might trigger an error situation. The MS can filter errors in downlink messages based on signalled network capabilities.

NOTE 1: This subclause was added to the present document in 3GPP TSGN #20.

Annex <X>:
Change history

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