GSTK Events in Multinetwork Environment

Technical Memo

80-XXXX-1 C

August 31, 2011

Contents

Tables

Revision history

Revision	Date	Description
A	Apr 2010	Initial release
B	Aug 2011	Updates to Section 1.1, Section 2.1, Section 2.6 and Section 2.7
C	Aug 2011	Updates to Section 1.2

1 Introduction

1.1 Purpose

The purpose of this document is to provide a workaround to meet a licensee requirement, i.e., the Universal Subscriber Identity Module (USIM) card must not switch to International Mobile Subscriber Identity (IMSI) before the UE completes registration attempts on all available networks.

1.2 Scope

This problem resolution is applicable to all AMSS software releases on 6xxx, 7xxx, and 8xxx targets. The CR238432 is applicable to 9xxx target and all releases of QSCXXXX™ beginning with the 3.x release.

1.3 Conventions

Function declarations, function names, type declarations, and code samples appear in a different font, e.g., `#include`.

If you are viewing this document using a color monitor, or if you print this document to a color printer, **red boldface** indicates code that is to be **added**, and ~~blue strikethrough~~ indicates code that is to be replaced or removed.

Shading indicates content that has been added or changed in this revision of the document.

1.4 References

Reference documents, which may include COMPANY®, standards, and resource documents, are listed in Table 1-1. Reference documents that are no longer applicable are deleted from this table; therefore, reference numbers may not be sequential.

Table 1-1 Reference documents and standards

Ref.	Document	
Company		
Q1	*Application Note: Software Glossary for Customers*	CL93-V3077-1
Standards		
S1	*Card Application Toolkit*	3GPP TS 102.223, Version 8.1.0

1.5 Technical assistance

For assistance or clarification on information in this guide, submit a case to Company Technologies at https://xxx.com.

If you do not have access to the Support Service website, register for access or send email to xxx@Company.com.

1.6 Acronyms

For definitions of terms and abbreviations, see [Q1].

2 Software Update Description

2.1 Problem description

In a multinetwork environment, the USIM card switches IMSI before the UE completes registration attempts on all available networks.

The expected sequence of events when the registration fails is as follows:

1. The UE registers to the Home Public Land Mobile Network (HPLMN).

2. The UE loses service form the HPLMN and finds three (or more) Visited Public Land Mobile Networks (VPLMN).

3. USIM switches the IMSI and tries registering with the new IMSI.

Essentially, test scenario expects the AMSS software to attempt registration on all available PLMNs before the USIM switches to a new IMSI.

However, with the current design, USIM is switching the IMSI immediately after the first network registration failure due to Generic SIM application Toolkit (GSTK) event reported to USIM as per the 3GPP specification. Some licensees intend to block this GSTK event to avoid the switching of IMSI, until AMSS attempts registration on all available PLMNs.

2.2 Impact

Licensee requirements are not met due to this problem.

2.3 Current implementation

In the current AMSS implementation, AMSS sends GSTK events to a SIM/USIM card when:

- A Mobility Management (MM) device moves to an idle state after a radio connection release. The connection release might occur due to voice call, registration, SMS, etc.

- The UE service status is changed, for example:

  - □ From Limited Service to Full Service or vice-versa

  - □ UE enters No Service

- There is a change in the location, PLMN, etc.

The SIM/USIM card uses these events for tool kit applications. These events are also triggers for carrier specific algorithms.

2.4 Root cause of the issue

In a multinetwork environment, AMSS tries registering on all the available networks one after the other based on priority until the registration is successful. Currently, if AMSS fails to register with a network, it sends a GSTK event to USIM before it tries registering on the next available network in the order of priority.

This behavior is not compatible with USIM algorithms to switch (REFRESH) the stored IMSI. The algorithm expects a GSTK event with limited service after attempting registration on all available networks and if all networks reject the UE.

Because the current AMSS software sends GSTK event immediately after failure of the first network, the carrier's expected behavior is not obtained.

2.5 Change description

With the necessary code changes, AMSS software sends GSTK event to GSTK after registering in a multinetwork environment, i.e., if registration is successful after attempting one or more networks, it sends full service to GSTK. If registration fails with all the available networks, AMSS sends a GSTK event with limited service after attempting all the networks.

2.6 Code change

If you are viewing this document using a color monitor, or if you print this document to a color printer, **red boldface** indicates code that is to be **added**, and ~~blue strikethrough~~ indicates code that is to be replaced or removed.

2.6.1 Change 1

File: mmcoord.c

Function: mmcoord_process_mmr_stop_mode_req()

```
case SYS_STOP_MODE_REASON_DEEP_SLEEP:
        #if defined(FEATURE_GSTK)
                #ifndef FEATURE_NAS_VIVO_IMSI_SWITCH
                        mm_send_gstk_no_service_info();
                #endif
        #endif
    break;
```

2.6.2 Change 2

File: mmsim.c

Function: mmsim_write_loci()

```
#ifdef FEATURE_GSTK
/* Location Status Event to SIM may be required since LOCI is updated
*/
        #ifndef FEATURE_NAS_VIVO_IMSI_SWITCH
            mm_gstk_set_location_status_evt (TRUE);
        #endif
#endif
```

2.6.3 Change 3

File: mmsim.c

Function: mmsim_save_ps_location_information()

```
#ifdef FEATURE_GSTK
/* Location Status Event to SIM may be required since LOCI is updated
*/
        #ifndef FEATURE_NAS_VIVO_IMSI_SWITCH
            mm_gstk_set_location_status_evt (TRUE);
        #endif
#endif
```

2.7 Side effects of the change

Anticipated side effects of the code change:

- This modified behavior is a violation of Section 7.5 of [S1].

- The suggested code changes are not tested by Company. Licensees and carriers are responsible for testing the code thoroughly. The code changes do not allow normal GSTK events specified in Section 2.3 .

- Code changes may affect some tool kit functionalities.

- These code changes are suggested to licensees who have a specific need for this feature, even though they are in violation of 3GPP specifications. Company will not integrate these changes to the AMSS and the licensees are expected to own and maintain them.