



LLD Interface NITZ Feature

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0.1 Document History

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0.2 References

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 04.08: "Mobile radio interface layer 3 specification".
- [3] 3GPP TS 27.007: "AT command set for UE".

0.3 Abbreviations, Terms

ACI	Application Control Interface (AT Commands Interpreter)
MM	Mobility Management
MMI	Man Machine Interface
MT	Mobile Terminal
NI	Network Identity
NITZ	Network Identity and Time Zone
TZ	Time Zone

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1 Introduction

G23 is a software package implementing Layers 2 and 3 of the ETSI-defined GSM air interface signalling protocol, and as such represents that part of a GSM mobile station's protocol software, which is both platform and manufacturer independent. Therefore, G23 can be viewed as a building block providing standardised functionality through generic interfaces for easy integration.

The G23 suite of products consists of the following items:

- Layers 2 and 3 for speech & short message services,
- Layers 2 and 3 for fax & data services,
- Application Control Interface,
- Slim MMI [02.30] and
- Test and integration support tools.

2 Overview

2.1 General

This document is a Low Level Design (LLD) document, which describes the implementation of the NITZ feature related functionalities in ACI.

NITZ is a new, optional feature in GSM Phase 2+. It allows the network operator to transmit different types of information, network name and the current time information like current time and current time zone. The presence of them is optional.

When ACI receives the information from MM, ACI will handle the different types of information accordingly. Detailed description is provided below.

2.2 Detailed Description

2.2.1 Standard Implementation

Recommendation GSM 04.08 sub clause 4.3.6 describes the MM information procedure.

3GPP TS 27.007 describes two NITZ feature related AT commands.

+CTZU:

It is a standard AT command for automatic Time Zone Update. If this feature is set to on, the time zone information of the MT will be automatically updated. The implementation of this AT command is described in section 3.1.

+CTZR:

It is a standard AT command for Time Zone Reporting. If this is set to on, an unsolicited report about the current TZ will be sent to the MT in the following syntax when TZ has been changed.

+CTZV: <tz>

This AT command has been implemented in the ACI and will not be described here.

2.2.2 Customized Implementation

Other than the two standard AT commands, the implementation described here will also support the following customized NITZ related features.

%CTZV:

It is a customized AT command for automatic time and date reporting. For the standard implementation, only the TZ information will be reported to the MT. In the implementation here, the time and date information will also be reported to the MT if this command is set to %CTZV=1. The format of the unsolicited report is:

%CTZV: "yy/mm/dd, hh:mm:ss+/-tz", where letters indicate year (two last digits), month, day, hour, minutes, seconds and time zone.

%CNIV:

It is a customized AT command for automatic network identity reporting. Depends on the different usage of the network ID information there are two different options to implement this:

1. ACI provides an unsolicited report about the network identity (NI) to MT when NI has changed
2. ACI provides an unsolicited report about the NI to MT and stores the up to date NI in the non-volatile memory so that the NI can be access any time via %CNIV.

According to the different options two proposals are provided in section 3.3.

3 Implementation

3.1 Time Zone Automatic Update +CTZU

3.1.1 Description

Command	Possible response(s)
+CTZU = <onoff>	+CME ERROR: <err>
+CTZU?	+CTZU: <onoff> +CME ERROR: <err>
+CTZU=?	+CTZU: (list of supported <onoff>s) +CME ERROR: <err>

Set command enables and disables automatic time zone update via NITZ. If setting fails in an MT error, +CME ERROR: <err> is returned.

Read command returns the current settings in the MT.

Test command returns supported on- and off-values.

<on/off>: integer type value indicating:

- 0 – Disable automatic time zone update via NITZ (default).
- 1 – Enable automatic time zone update via NITZ.

3.1.2 Implementation:

3.1.2.1 CTZUMode

Definition:

```
typedef enum
{
    CTZU_MODE_OFF = 0,
    CTZU_MODE_ON
} T_ACI_CTZU_MODE;
```

Use:

This is the CTZU flag, which indicates if the automatic TZ update is on or off. This mode is set by calling the setting function of +CTZU, can be queried by the query function of +CTZU.

3.1.2.2 setatPlusCTZU

Prototype:

Returns:

T_ACI_RETURN

Description:

This is the functional counterpart to the %CNIV AT command, which sets the status of %CNIV mode, indicating whether NI report feature is enabled or disabled.

3.3.2.2.3 qAT_PercentCNIV()

Prototype:

GLOBAL T_ACI_RETURN qAT_PercentCNIV (T_ACI_CMD_SRC srcId, T_ACI_CNIV_MODE *mode)

Parameters:

SrcId Source Id;
Mode CNIV mode.

Returns:

T_ACI_RETURN

Description:

This is the functional counterpart to the %CNIV AT command, which will query the current status of CNIV mode.

3.3.2.2.4 queatPercentCNIV ()

Prototype:

GLOBAL T_ATI_RSLT queatPercentCNIV (char *cl, UBYTE srcId)

Parameters:

cl command line;
srcId source Id.

Returns:

T_ATI_RSLT

Description:

This is the implementation of %CNIV query AT command in the ATI side, which will actually call the functional counterpart qAT_PercentCNIV() in ACI.

3.3.3 Proposal 2

Proposal 2 includes proposal 1 but with the following different functionalities in the query function.

The query of the AT command %CNIV will look into the non-volatile memory where the most up to date NI name is stored and then return the NI name together with the status of the CNIV mode. The network operator name will be stored every time when ACI receives the new network name via the NITZ primitive MMR_INFO_IND.

Command	Possible response(s)
%CNIV?	%CNIV:on/off, name of NI +CME ERROR: <err>

Proposal 1 was chosen for the current implementation after discussion.

3.4 Interface to Application

3.4.1 Implementation:

3.4.1.1 T_MMR_INFO_IND

```
#define MMR_MAX_TEXT_LEN 40
#define SIZE_MCC 3
#define SIZE_MNC 3
typedef struct
{
    U8          v_plmn;          /*valid flag*/
    U8          mcc[SIZE_MCC];  /*mobile country code*/
    U8          mnc[SIZE_MNC];  /*mobile network code*/
    U8          _align0;        /*alignment*/
} T_plmn;

typedef struct
{
    U8          v_name;          /*valid flag*/
    U8          dcs;             /*data coding scheme*/
    U8          add_ci;          /*add ci indicator*/
    U8          num_spare;       /*num spare bits*/
    U8          c_text;          /*counter*/
    U8          text[MMR_MAX_TEXT_LEN]; /*name*/
    U8          _align0;         /*alignment*/
    U8          _align1;         /*alignment*/
    U8          _align2;         /*alignment*/
} T_full_name;

typedef T_full_name T_short_name;

typedef struct
{
    U8          v_tz;           /*timezone valid*/
    U8          tz;             /*timezone*/
    U8          _align0;        /*alignment*/
    U8          _align1;        /*alignment*/
} T_ntz;

typedef struct
{
    U8          v_time;         /*time valid*/
```


Changes:

Since the time information in the MM information is universal time, and in the RTC module the local time is stored. So it is necessary to store the time zone information in the non-volatile memory for later reference in case only time zone is received.

According to the information passed in by primitive MMR_INFO_IND, the following scenarios will be covered:

1. Time Zone Information Only:

When the primitive is received, the CTZU mode will be checked, if it is set to on, ACI will reset the time zone stored in RTC by using the RTC API: RTC_SetCurrentTZ(T_RTC_TZ currentTimeZone). If the CTZU is off nothing will be done.

The CTZR mode will also be checked to see if the non-solicited report should be provided. If the CTZR mode is set to on, ACI will give a non-solicited report to the MT about the time zone information in the following syntax:

+CTZV: <tz>

2. Universal Time and Time Zone Information:

When the primitive is received, the CTZU mode will be checked, if it is set to on, ACI will reset the time zone stored in RTC by using the RTC API: RTC_SetCurrentTZ(T_RTC_TZ currentTimeZone).. The new time is based on the network time because it is more accurate than the RTC time. If the CTZU is off nothing will be done.

The CTZR mode will be checked to see if the non-solicited report should be provided. If the CTZR mode is set to on, ACI will give a non-solicited report to the MT about the time zone information in the following syntax:

+CTZV: <tz>

The PCTZV mode will also be checked. If it is set to on, ACI will supply a non-solicited report to the MT about the time and date in the following syntax:

%CTZV: "yy/mm/dd,hh:mm:ss+/-tz", where letters indicate year (two last digits), month, day, hour, minutes, seconds and time zone.

3. Network Name Information:

If the CNIV mode is set to on, for proposal 1, the following non-solicited information will be sent to the MT:

%CNIV: long alphanumeric <full_name>,short alphanumeric <short_name>,numeric <plmn>, where the first parameter is the long network name, the second parameter is the short network name and the third parameter is the plmn of the network.

For proposal 2, the following non-solicited information will be sent to the MT:

%CNIV: <name>

And then the operator name will be stored in the non-volatile memory for later reference. Since the FFS has very limited memory, a look up table in ACI will be considered.

Please note that the NITZ feature only applies for Calyps o+ and P2 sample.

4 Test Plan

TBD