



Technical Document - Confidential

GSM PROTOCOL STACK

G23

RR – RADIO RESOURCE MANAGEMENT

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1. Initial version
2. New WCS template
3. English check

Table of Contents

1.1	References	4
1.2	Abbreviations	4
1.3	Terms	4
2	Introduction	4
3	Configuration.....	5
3.1	Headers.....	5
3.2	Dynamic Configuration	6
3.3	Custom Specific Functions	7
3.4	Monitoring.....	8
	Appendices.....	9
A.	Acronyms	9
B.	Glossary.....	9

List of Figures and Tables

List of References

- [ISO 9000:2000] International Organization for Standardization. Quality management systems - Fundamentals and vocabulary. December 2000

1.1 References

[C_8410.001]	8410.001.98.102; September 18, 1998 G23 Product Description; Condat
[C_8410.008]	8410.008.98.002; June 15, 1998 GTI Interface Description; Condat
[C_8410.003]	8410.003.98.103; September 09, 1998 Test Facilities Description; Condat

1.2 Abbreviations

IMEI	International Mobile Equipment Identity
MMI	Man Machine Interface
MS	Mobile Station
PEI	Protocol Stack Entity Interface

1.3 Terms

2 Introduction

G23 is a software package implementing Layers 2 and 3 of the ETSI-defined GSM air interface signaling protocol, and as such represents the 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 standardized 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.

For a detailed reference of G23 components, please refer the Product Description [C_8410.001]. For detailed information regarding integration into the target system, please refer the Generic Target Interface [C_8410.008]. For detailed information about the compiling and linking procedure, please refer the User Guide on the delivery CD.

This Technical Documentation document shows how to use the RR object in target systems. It lists the headers involved and describes how to link RR with other components. The customer specific functions included are listed and described.

3 Configuration

3.1 Headers

The modules include several header files. Header files which are changeable by the user are marked (*). These header files are used to integrate the protocol stack entities into a specific target system.

ccdapi.h (*)

This header defines the prototypes and some constants for the Condat Coder Decoder (CCD).

rr.h

This header contains constants for the radio resource management and the prototypes of the component.

cnf_rr.h (*)

Constants for the dynamic configuration of RR are defined in this header. It is acceptable to change the commands and the parameter names for the dynamic configurations supported.

custom.h (*)

This header defines global constants for the integration of the protocol stack entity into a specific target system. The user may define the identifier of the communication resource, the supported traces, the communication method (by copying primitives or by exchanging references of primitives), the custom specific primitive header, etc.

cus_rr.h (*)

Custom specific definitions for the protocol stack entity are located in this header. Timer values and identifiers are changeable. A version identifier is defined.

gsm.h

This header contains global definitions for all protocol stack entities. Depending on the definitions in custom.h, many options and traces are defined in this header.

mconst.cdg

This header is generated by the CCD compiler. It includes all message identifiers and some constants needed by the entities.

message.h

Constants for messages are defined. This header includes the header with the RR messages (m_rr.h).

m_rr.h

This header contains the C-structures for the RR messages. It is included by message.h.

mon_rr.h

Constants for monitoring RR are defined in this header.

pconst.cdg

This header is generated by the CCD compiler. It includes all primitive identifiers and some constants needed by the entities.

pei.h (*)

Prototypes for the protocol stack entity interface are defined in this header. Some parameters and the return type of this function are changeable by the user.

prim.h

Constants for primitives are defined and service access point dependent primitive header files are included (p_mph.h., p_dl.h and p_rr.h).

p_mph.h

This header is generated by the CCD compiler. It includes the C-struct type definitions for primitives of the service access point MPH. The header is included by prim.h

p_dl.h

This header is generated by the CCD compiler. It includes the C-struct type definitions for primitives of the service access point DL. The header is included by prim.h

p_rr.h

This header is generated by the CCD compiler. It includes the C-struct type definitions for primitives of the service access point RR. The header is included by prim.h

stddefs.h

This header contains several standard definitions used by the protocol stack entities.

string.h

This header is a the standard string header from the target compiler. It defines string and memory functions.

tok.h

The prototypes and some constants for the parse function of the TOK module are defined in this header.

vsi.h (*)

Prototypes for the virtual system interface are defined in this header. Some parameters and the return types of these functions are changeable by the user for integration into a specific target system.

3.2 Dynamic Configuration

Dynamic configuration means to change the behavior of the protocol stack entity at run-time. This is carried out by sending a string with a dedicated format as described in Test Facilities [C_8410.003]. An additional feature is to request the old configuration. This feature can be switched off by an option defined in custom.h.

The dynamic configuration string is a parameter of the `pei_config()` function which is part of the protocol stack entity interface (PEI).

TIMER_SET =<timer, value>

The timer mode `TIMER_SET` defines a new timer value instead of the original start value.

TIMER_RESET =timer

The default timer mode is `TIMER_RESET` which does not manipulate the start value.

TIMER_SPEED_UP =<timer, factor>

`TIMER_SPEED_UP` is used to speed up a timer by the given factor. The start value is divided by the factor. The minimum time is one unit.

TIMER_SLOW_DOWN = <timer, factor>

The opposite mode is `TIMER_SLOW_DOWN`. The start value is increased by the given factor.

TIMER_SUPPRESS = <timer>

`TIMER_SUPPRESS` is used to suppress the timer start.

NO_SYS_TIME

This configuration disables the random function of RR, which is bases on the system time. This is helpful for tests to have the same contents in channel request messages.

3.3 Custom Specific Functions

Custom specific functions are implemented in the module `rr_csf.c`. It is acceptable to replace the functions in this module with functions from the customer. It is absolutely no acceptable to change the parameters of the functions.

The idea behind custom specific functions is to have a mechanism with which to configure the protocol stack entity at run-time by a source outside the protocol stack entity, for example a non-erasable memory.

GLOBAL BOOL `csf_init_timer` (void)

This function initializes the timer pool. The timer pool allocates a number of timer resources. These timer resources are allocated to instances on demand.

GLOBAL void `csf_close_timer` (void)

All timer resources are closed. This function is carried out during shutdown or reset.

GLOBAL void `csf_alloc_timer` (UBYTE id, T_RR_DATA * rr_data, T_VSI_TVALUE value)

This function allocates one timer of the timer pool and starts this timer.

GLOBAL void `csf_free_timer` (T_VSI_THANDLE handle)

This function frees one timer. The timer is stopped and returned to the timer pool.

GLOBAL BOOL `csf_vdb_timeout` (T_VSI_THANDLE handle, T_RR_DATA ** rr_data, USHORT * timer)

After time-out, the corresponding instance is searched. The timer is returned to the timer pool.

GLOBAL void `rr_csf_read_imei` (T_mob_ident * imei)

This function reads IMEI from flash.

GLOBAL void `rr_csf_ms_cap` (void)

This function reads MS capabilities from flash.

GLOBAL void `rr_csf_read_mobile_class_2` (T_mob_class_2 * mob_class_2)

This function reads mobile station classmark 2 from flash.

GLOBAL void `rr_csf_read_mobile_class_3` (T_mob_class_3 * mob_class_3)

This function reads mobile station classmark 3 from flash.

3.4 Monitoring

The monitor struct includes the relevant physical parameters of the protocol stack entity. The parameters are updated continuously. This way the environment always has the possibility of accessing parameters of the protocol stack. These parameters are used to create monitor reports about a display or test system, to create statistical data, etc. outside the functionality of a protocol stack but with access to protocol stack parameters. It is acceptable to read the parameters of the monitor struct, but it is absolutely not acceptable to write to the monitor struct. The first parameter of the monitor struct is the version of the protocol stack entity.

The following monitor struct is defined for the protocol stack entity:

```
typedef struct
{
    T_VERSION    *version;
} T_MONITOR;
```

Appendices

A. Acronyms

DS-WCDMA Direct Sequence/Spread Wideband Code Division Multiple Access

B. Glossary

International Mobile Telecommunication 2000 (IMT-2000/ITU-2000) Formerly referred to as FPLMTS (Future Public Land-Mobile Telephone System), this is the ITU's specification/family of standards for 3G. This initiative provides a global infrastructure through both satellite and terrestrial systems, for fixed and mobile phone users. The family of standards is a framework comprising a mix/blend of systems providing global roaming. <URL: <http://www.imt-2000.org/>>