

ETSI/TC SMG

Date : July 1993
Released by : ETSI/PT 12

RELEASE NOTE

Recommendation GSM 11.11-DCS

Specifications of the SIM-ME Interface

Previous released version: 3.1.3. (Release 92, Phase 1)
Updated version March/April 1992: 3.2.0
New Updated version July 1992: 3.3.0
New Updated version September 1993: 3.3.1
New Updated version January 1994: 3.3.2
New released version July 1994: 3.3.3

1. Reason for Change

SMG#11 approved CR 11.11-179 for GSM Phase 1 which resulted in version 3.15.0 of GSM 11.11. As a consequence, GSM 11.11-DCS should be changed accordingly.

2. Details of Change

The version numbers of GSM 11.11 and GSM 11.11-DCS on page 1 have been changed.

ETSI/GSM

Original Language: English

Released by: ETSI PT12

Date: July 1994

Recommendation: GSM 11.11-DCS

Title: Specifications of the SIM-ME Interface

Version 3.3.3 (based on GSM 11.11 version 3.15.0)

List of contents : (underlined sections indicate changes to GSM 11.11)

1. Scope
 - 1.1. Future GSM Operational Phase
 - 1.2. Administrative Management
 2. Definitions and abbreviations
 - 2.1. Definitions
 - 2.2. Abbreviations
 3. SIM logical memory organization
 - 3.1. Definitions of directories and data fields
 - 3.2. Definition of the actions on directories and on data-fields
 - 3.3. Algorithms
 - 3.4. Security policy
 - 3.5. Application data encoding
 4. GSM application protocol
 - 4.1. General
 - 4.2. Functional description of the procedures at the SIM interface in GSM operations
 - 4.3. Fundamental GSM instructions
 - 4.4. Instruction format and encoding
 5. SIM transmission protocols
 - 5.1. Transmission Protocol
 - 5.2. Answer to Reset
 - 5.3. Error Handling
 - 5.4. Bit/Char. duration and sampling time
 - 5.5. Error detection and char. repetition
 6. Physical characteristics of the SIM
 - 6.1. Mechanical Interface
 - 6.2. Electrical Interface
- Annex 1 : SIM Scenarios
Annex 2 : SIM SDL procedure charts
Annex 3 : SIM state transition diagram

Number of pages: 12

1. SCOPE

Recommendation GSM 02.17 states the basic concept of a split of the MS into a removable SIM (Subscriber Identity Module) which contains all network related subscriber information and a ME (Mobile Equipment) which is the remaining part of the MS, and realizes all the functions common to all GSM subscribers.

The implementations stated in Recommendation GSM 02.17 are :

- IC card SIM;
- plug-in SIM.

The phases of the SIM life distinguished in Recommendation GSM 02.17 are :

- GSM network operation phase (also called GSM operations);
- administrative management phase.

This recommendation defines the interface of the ME with the SIM and the internal organization of the SIM related to the GSM network operation phase. The aspects relevant to the administrative management phase are left to each network operator discretion and are not addressed in this recommendation.

This recommendation does not specify any internal technical realization sketches.

This recommendation is divided into five parts :

- Definitions of the concepts introduced in the document;
- Description of the data and the algorithms to be stored within the SIM and the access control associated with each of them;
- Definition of the application protocol for communications between the SIM and the outside world;
- Description of the transmission protocol(s) to be used at the lower layers for communication;
- Description and specification of the physical characteristics.

NOTE : In case of discrepancy between the text and the annexes, the text has priority.

The DCS1800 system shall utilise SIMs which support a new DCS1800-application with an associated DCS1800 directory. The DCS1800 directory shall contain all of the data-fields defined for the GSM directory, although the encoding of the BCCH-information data-field is changed. The DCS1800 application utilises the GSM application protocol, but there is no requirement that both the GSM- and DCS1800-applications are supported in the same card.

GSM 11.11-DCS consists of GSM 11.11 with pages 1, 2, 2a, 4, 4a, 6, 6a, 9, 27, 28, 40 and 61 replacing the equivalent pages in GSM 11.11.

1.1. Future GSM operational phase

The following codings are reserved for the future operational phase of the SIM.

Application protocol

It describes the communication aspects between entities needed by the application.

Block

Contiguous data memory space which is allocated when requested for data-field. Each Block is linked to a unique binary data-field.

Data-field

A logical data area which contains information having the same security access conditions and data management characteristics.

A data-field may be either "binary" (non structured data-field composed of a fixed length block) or "formatted" (organised in logical records of fixed length).

Directory

Data-fields are grouped within directories.

GSM-application

This has been specified using data-fields and directories necessary to GSM operation. Two application directories have been defined to allow additional services and basic GSM functions to be handled by another application.

DCS1800-application

The DCS1800-application uses the GSM-application protocol, GSM operations and GSM-instructions, but utilises a DCS1800 directory in place of the GSM directory.

GSM-session

In the GSM application, this is the interval of time starting at the completion of the SIM activation procedure and ending either at the completion of the deactivation procedure or at the first instant the link between the SIM and the ME is interrupted for any reason.

Pattern

A string of bytes that is sought from the beginning of records.

Record

In the case of formatted data-fields, a record is a string of bytes handled as an entity by the SIM, containing application elementary data. Records are always of the same length in a specific data-field. A record may be selected by its number (position) in the data-field, or by searching throughout the data-field using the beginning of the record as an argument.

Application directories (AD) are under the root directory (RD). For the GSM-application, there are two application directories : the GSM directory (GSM-AD) and the Telecom directory (Tel-AD). For the DCS1800-application there are two application directories: the DCS1800 directory (DCS1800-AD) and the Telecom directory.

3.1.1.1. Structure of the directory

A directory is a fonctionnal grouping of data-fields and sub-directories. There may be access rules attached to the directory. The GSM-AD and DCS1800-AD share the same access rules.

3.1.2. Data-fields

There are two types of Data-fields :

- binary Data-fields;
- formatted Data-fields.

3.1.2.1. Structure of binary data fields

A binary data-field is composed of a header and of a body part.

The header (which is managed by the SIM) contains :

- * a data-field identifier used to select it among the others of the same application. This identifier consists of 2 bytes
- * the type of the data-field : binary. (The type is coded on 1 byte)
- * a security policy giving the conditions required to access the data contained in the data-field and to operate on it. This security policy is described in section 3.4.2. The security policy for each action is coded on 4 bits
- * the length in bytes of the body part of the data-field (coded on two bytes).

The body of the data-field is a block containing data. Several funtional entities may exist in the block body of the same data-field. The ME should manage them separately if needed.

3.1.2.2. Structure of formatted data-fields

A formatted data-field is composed of a header and of a body part.

The header (which is managed by the SIM) contains :

- * a data-field identifier used to select it among the others of the same application. This identifier consists of 2 bytes.
- * the type of the data-field : formatted. (The type is coded on 1 byte)

3.2. DEFINITION OF THE ACTIONS ON DIRECTORIES AND DATA-FIELDS

The actions defined below are those which may be invoked when the SIM is in GSM operations, i.e., associated with a ME. The actions which are needed for the administrative management of the SIM are not addressed in this recommendation.

3.2.1. Definition of the actions on directories

In GSM operations, the only action allowed on directories is :

* Selection : action of selecting a specific directory by giving its identifier to the SIM. Once a directory is selected, all actions related to data-fields in GSM or DCS1800 applications will implicitly refer to this 'current' directory.

3.2.2. Definition of the actions on data-fields

3.2.2.1. General actions on data-fields

In GSM operations, the following actions are possible on data-fields :

* Selection: action of selecting a specific data-field by giving its identifier to the SIM. A selection of a data-field is done under the current directory. Once a data-field is selected, all actions will implicitly refer to this 'current' data-field.

Once the data-field has been selected, the SIM shall ensure that the security policy is fulfilled for each action described below :

* Updating: action by which data is changed. It may be a string of bytes in a binary data-field or a record in a formatted data-field.

Note : the memory location is erased before the write occurs.

* Read: action by which information data are transferred from the SIM memory to the external world on the I/O line. This action may occur on a string of bytes or a record, depending on the data-field in which the action occurs.

* Seek: each action by which a search is made through a formatted data-field to locate a record. The seek will compare the given pattern with the beginning of the record. When the pattern is found, the SIM sets a pointer at the found location in the current data-field where further actions such as read/update on the current record will be performed. If the pattern is not found, then the SIM will not change the pointer.

DATA-FIELD - 74 : BCCH INFORMATION

Purpose:

Storing the BCCH information according to Rec. GSM 04.08.

BCCH storage may reduce the extent of a Mobile Stations search of BCCH carriers when selecting a cell. The BCCH carrier lists in an MS shall be in accordance with the procedures specified in recommendation GSM 04.08. The MS should only store BCCH information from the System Information 2 message and not the 2bis extension message.

High update activity: Yes

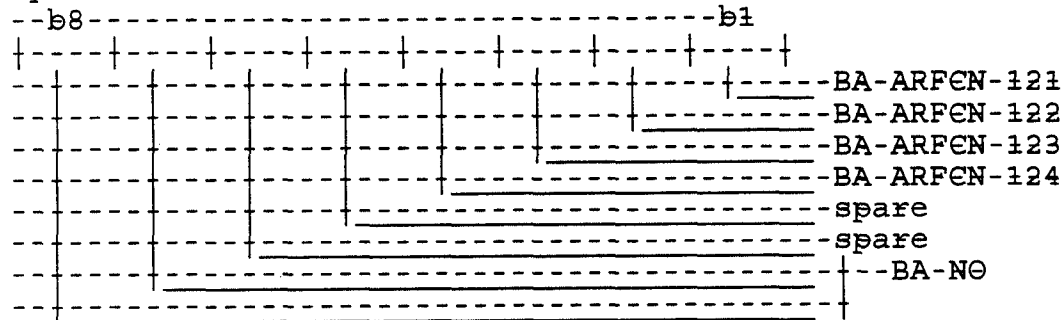
Data-field attributes:

Identifier: 74
 Type.....: Binary.
 Security Policy..:
 Read : PIN.
 Update : PIN.
 Block Length.....: 16 bytes

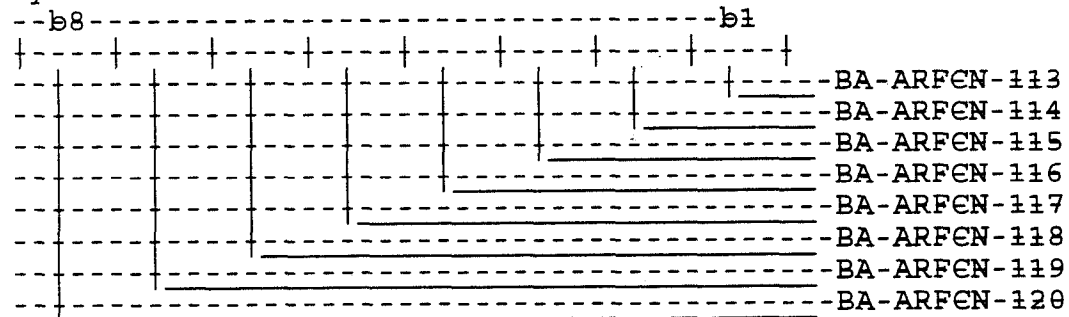
Structure of the data-field :

The data-field is coded as octets 2-17 of the 'neighbour cells description information element' as defined in GSM 04.08-DCS.

Byte-1:

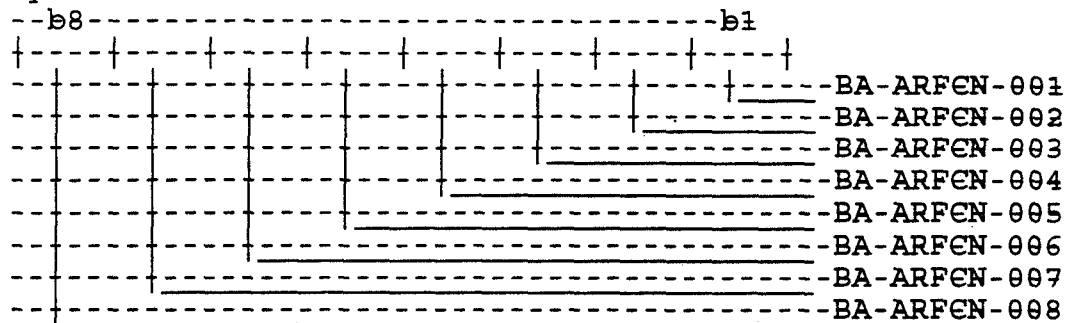


Byte-2:



...

Byte-16



Note-:

BA-NO-means-BCCH-allocation-number

BA-ARFCN-means-allocation-absolute-radio-frequency-channel number-N

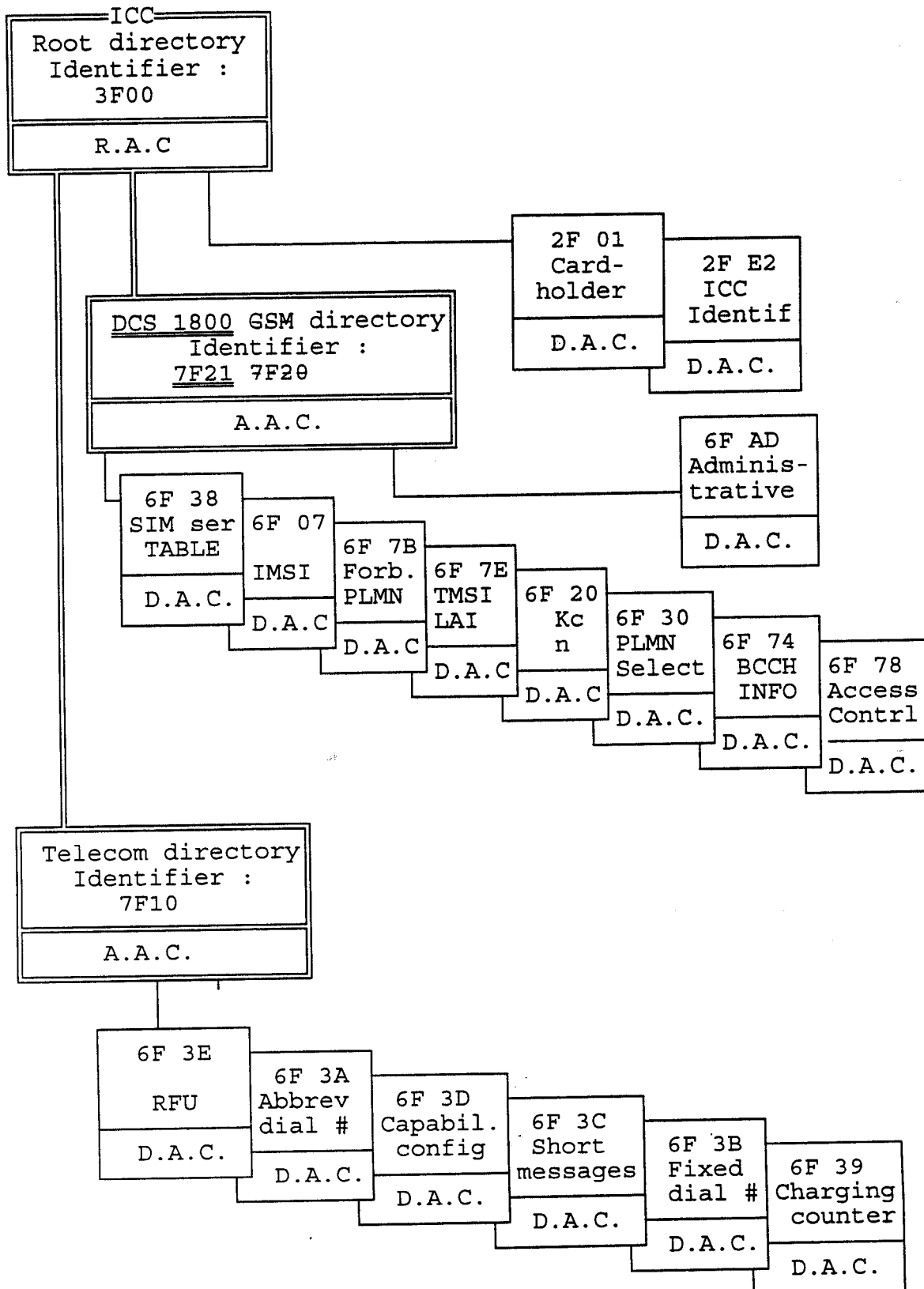
ARFCN-means-absolute-radio-frequency-channel-number-N-N=1 corresponds-to-the-lowest-frequency.

For-a-RF-channel-with-ARFCN=N-belonging-to-the-BCCH-allocation the-BA-ARFCN-bit-is-coded-with-a-"1"-N=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123,124.

For-a-RF-channel-with-ARFCN=N-not-belonging-to-the-BCCH allocation-the-BA-ARFCN-bit-is-coded-with-a-"0"-N=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123,124.

Reference:-Rec.-GSM-04.08-paragraph-10.5.2.13

SIM IMPLEMENTATION MODEL (Numbers are Hexadecimal)



R.A.C = Root Access Conditions
 A.A.C = Application Access Conditions
 D.A.C = Data-Field Access Conditions.
 DF xx = Data-Field identifier.

STATUS INFORMATION :

See the tables of Section 4.4.3.

Note : Hereafter are described the Select(directory) and the Select(data-field) using this instruction Select.

Case 1: SELECT(DIRECTORY)

DEFINITION :

This is an instruction which selects a specific directory in a multi-application card. For GSM DCS 1800 application, 3 | directories can be selected :

- the Root directory
- the Telecom directory
- the GSM DCS 1800 directory

CONDITION OF USE :

This instruction is mandatory to have any action on the data-fields of a specific directory. When the SIM is activated, the root directory is implicitly selected.

COMMAND PARAMETERS/DATA :

- Identifier of the Directory (type and sub-identifier)

RESPONSE PARAMETERS/DATA :

- No response except the SW1 SW2 bytes. To have the possibility of reading the characteristics and the security policy of the directory, one uses a GET RESPONSE instruction. The definition of the characteristics and of the security policy of the directory is FOR FS (no use for the moment in the SIM-ME interface).

STATUS INFORMATION :

See the tables of Section 4.4.3.

- note 1 : The use of the Telecom directory by other applications than the GSM application is FOR FS.
- note 2 : Depending on the response, the ME may have to adapt its behaviour [i.e. PIN handling etc]
- note 3 : In the case of multi-application cards, the use of this instruction to access other directories than the ones discussed in this document is FOR FS.

ETSI/TC GSM

Date : July 1994
Released by : ETSI/PT 12

DOCUMENT CHANGE CONTROL RECORD

Recommendation GSM 11.11-DCS

Specification of the SIM-ME Interface

Previous released version: 3.1.3 (Release 92, Phase 1)
Updated version March/April 1992: 3.2.0
New Updated version July 1992: 3.3.0
New Updated version September 1993: 3.3.1
New Updated version January 1994: 3.3.2
New Updated version July 1994: 3.3.3

Subject	Decided at	Pages Marked	Doc GSM	Pages affected
SMS storage in the SIM	SMG#2		171/92	1
Subaddress	SMG#3		333/92	1, 40
Change of 11.11 reference version	SMG#8		682/93	1+all
Change of 11.11	SMG#9		16&53/94	1+all
Change of 11.11 reference version	SMG#11		466/94	1+all

END OF DOCUMENT CHANGE CONTROL RECORD