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**Intelligent transport systems — ITS  
station management —**

**Part 3:  
Service access points**

*Systèmes intelligents de transport — Gestion des stations ITS —  
Partie 3: Points d'accès au service*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

This second edition cancels and replaces the first edition (ISO 24102-3:2013), which has been technically revised. It also incorporates the Amendment ISO 24102-3:2013/Amd1:2017.

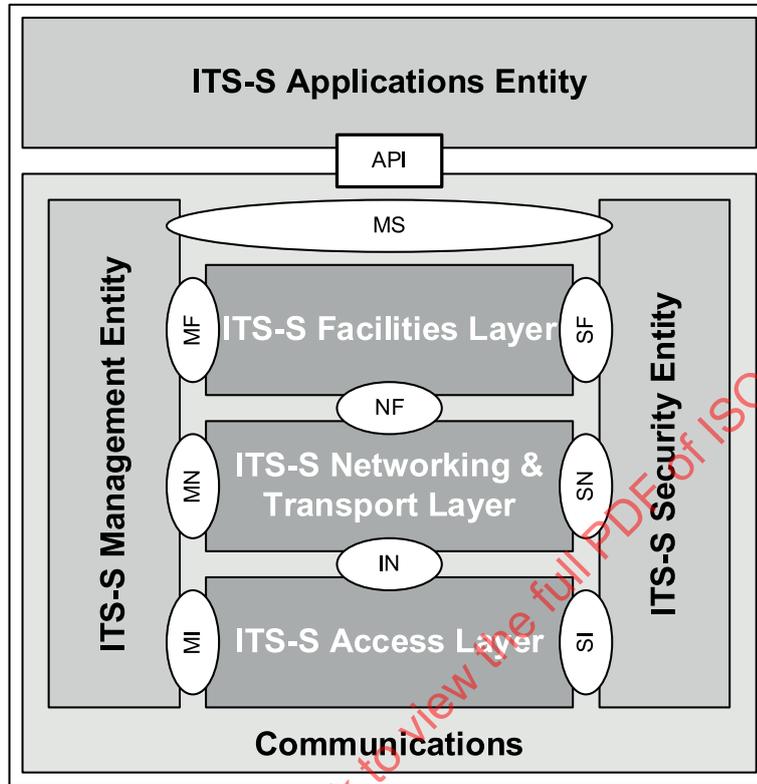
A list of all parts in the ISO 24102 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

NOTE The former ISO 24102-5 has been converted into a separate standard ISO 22418, as it is not a station management standard.

## Introduction

This document is part of a family of International Standards for communications in intelligent transport systems (ITS) based on the ITS station and communications architecture specified in ISO 21217 and illustrated in [Figure 1](#).



**Figure 1 — ITS station reference architecture with named interfaces**

This document is Part 3 of a multipart standard which determines the intelligent transport systems (ITS) station management service access points.

The ITS station management entity provides functionality related to the management of communication protocol layers and the security entity presented in the ITS station reference architecture specified in ISO 21217 and presented in [Figure 1](#).

ITS station management is specified as a distributed process, where no supervisory entity is employed.

# Intelligent transport systems — ITS station management —

## Part 3: Service access points

### 1 Scope

This document specifies the management service access points, i.e. the service access points of

- the interfaces between the ITS-S management entity and
  - the ITS-S access layer (MI-SAP),
  - the ITS-S networking & transport layer (MN-SAP),
  - the ITS-S facilities layer (MF-SAP);
- the interfaces between the ITS-S security entity and
  - the ITS-S access layer,
  - the ITS-S networking & transport layer,
  - the ITS-S facilities layer;
- the interface between the ITS-S management entity and the ITS-S security entity (MS-SAP)
- the interfaces between the ITS-S application entity and
  - the ITS-S management entity (MA-SAP),
  - the ITS-S security entity (SA-SAP).

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 21217, *Intelligent Transport Systems — Communications access for land mobiles (CALM) — Architecture*

ISO/IEC 8825-2, *Information technology — ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21217 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Symbols and abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO 21217 apply.

## 5 Service access points

The functionality of the management services and service primitives of the service access points (SAPs)

- MI-SAP, MN-SAP, MF-SAP,
- SI-SAP, SN-SAP, SF-SAP,
- MS-SAP,
- MA-SAP, SA-SAP

is specified in this document. The functionality shall be as specified using the abstract syntax notation ASN.1. These SAPs are internal functional interfaces of the ITS station architecture specified in ISO 21217, and illustrated in [Figure 1](#).

NOTE 1 For the purpose of this document the SX-SAPs are also considered as management SAPs.

NOTE 2 SAPs can be non-exposed interfaces. Thus service primitives of SAPs are not subject to conformance tests.

NOTE 3 All interfaces towards the ITS-S applications are considered to be implemented in an API. Such an API provides, as a minimum, the functionality of the MA-SAP, the SA-SAP, and the FA-SAP; the FA-SAP is a communications SAP also considered in this document as it fits logically to MA-SAP and SA-SAP.

The service primitives contain functions that are specified in ASN.1 in other standards, providing management and security functionality.

Means to secure the access to management functionality need to be specified within the global context of the BSMD security introduced in ISO 21217. Details are outside the scope of this document.

## 6 XY-COMMAND service

### 6.1 Terminology

The term "ITS-S layer" means

- ITS-S access layer (Y=I), or
- ITS-S networking & transport layer (Y=N), or
- ITS-S facilities layer (Y=F),

see [Figure 1](#).

The term "ITS-S entity" means

- ITS-S management entity (X=M), or
- ITS-S security entity (X=S, Y=S), or
- ITS-S application entity (Y=A),

see [Figure 1](#).

The term XY-COMMAND identifies a service where X equals either M or S, and Y equals either I, N, F, or A, and a service where X equals M and Y equals S.

The term XY-REQUEST identifies a service where X equals either M or S, and Y equals either I, N, F, or A, and a service where X equals M and Y equals S.

XY-COMMAND.requests are commands presented by X to Y, and acknowledged by Y to X with XY-COMMAND.confirm.

XY-REQUEST.requests are commands presented by Y to X, and acknowledged by X to Y with XY-REQUEST.confirm.

An XY-COMMAND.request service primitive contains the service function XY-Command; an XY-COMMAND.confirm service primitive contains the service function XY-CmdConfirm.

An XY-REQUEST.request service primitive contains the service function XY-Request; an XY-REQUEST.confirm service primitive contains the service function XY-ReqConfirm.

The functionality of these service primitives, disregard of their implementation, shall be as defined in ASN.1; the respective ASN.1 specifications are provided in [Annex A](#).

These ASN.1 specifications become observable as PDUs for ITS station-internal management communications specified in ISO 24102-4[7]; thus for the specification of these PDUs, the respective ASN.1 definitions become normative and mandatory in the strict sense.

Service functions are identified by a unique reference number. A specific service function that is used in different SAPs is identified by the same reference number value in all of these SAPs.

## 6.2 XY-COMMAND

### 6.2.1 XY-COMMAND.request service primitive

The service primitive XY-COMMAND.request allows the ITS-S management entity or ITS-S security entity to trigger an action at an ITS-S layer or in the ITS-S application entity.

The parameters of the service primitive XY-COMMAND.request are as follows:

```
XY-COMMAND.request      (
                          Link-ID,
                          CommandRef,
                          XY-Command
                          )
```

**Table 1 — XY-COMMAND.request parameter description**

Name	Description
Link-ID	Only present in the service primitives of the MI-SAP and SI-SAP. Unique identifier of a VCI or CI specified in ISO 21218[4].
CommandRef	Cyclic reference number of command unique for the given XY-COMMAND.
XY-Command.No	Reference number of service function.
XY-Command.Value	Service function.

An XY-COMMAND.request shall be generated by the ITS-S management or security entity when the selected ITS-S layer or the ITS-S application entity shall perform an action.

Upon receipt of XY-COMMAND.request, disregard of its implementation, the requested action shall be performed. Details are outside the scope of this document.

**6.2.2 XY-COMMAND.confirm service primitive**

The service primitive XY-COMMAND.confirm reports the result of a previous XY-COMMAND.request.

The parameters of the management service primitive XY-COMMAND.confirm are as follows:

```
XY-COMMAND.confirm      (
                        Link-ID
                        CommandRef,
                        XY-CmdConfirm,
                        ErrStatus
                        )
```

**Table 2 — XY-COMMAND.confirm Parameter description**

Name	Description
Link-ID	Only present in the service primitives of the MI-SAP and SI-SAP. Unique identifier of a VCI or CI specified in ISO 21218 <sup>[4]</sup> .
CommandRef	Unique cyclic reference number of command. Same value as in related MN-COMMAND.request.
XY-CmdConfirm.No	Reference number of service function. Same value as XY-Command.No in related XY-COMMAND.request.
XY-CmdConfirm.Value	Service function; carries optional confirm data.
ErrStatus	Error/return code, see <a href="#">Table B.1</a> .

An XY-COMMAND.confirm shall be generated by the respective ITS-S layer or the ITS-S application entity upon performance of a previous XY-COMMAND.request in case ErrStatus indicates error, or XY-CmdConfirm is present. It may be generated in case ErrStatus indicates success or XY-CmdConfirm is not present.

Upon receipt of XY-COMMAND.confirm, disregard of its implementation, ErrStatus and XY-CmdConfirm shall be evaluated and a possible action shall be performed properly. Details are outside the scope of this document.

**6.3 XY-REQUEST service**

**6.3.1 XY-REQUEST.request service primitive**

The service primitive XY-REQUEST.request allows an ITS-S layer or the ITS-S application entity to trigger an action at the ITS-S management or security entity.

The parameters of XY-REQUEST.request are as follows:

```
XY-REQUEST.request      (
                        CommandRef,
                        XY-Request
                        )
```

**Table 3 — XY-REQUEST.request parameter description**

Name	Description
CommandRef	Unique cyclic reference number of command.
XY-Request.No	Reference number of service function.
XY-Request.Value	Service function.

An XY-REQUEST.request shall be generated by an ITS-S layer or the ITS-S application entity when the ITS-S management or security entity shall perform an action.

Upon receipt of XY-REQUEST.request, disregard of its implementation, the required action shall be performed. Details are outside the scope of this document.

### 6.3.2 XY-REQUEST.confirm service primitive

The service primitive XY-REQUEST.confirm reports the result of a previous XY-REQUEST.request.

The parameters of XY-REQUEST.confirm are as follows:

```
XY-REQUEST.confirm      (
                          CommandRef,
                          XY-ReqConfirm,
                          ErrStatus
                          )
```

**Table 4 — XY-REQUEST.confirm Parameter description**

Name	Description
CommandRef	Unique cyclic reference number of command. Same value as in related XY-REQUEST.request.
XY-ReqConfirm.No	Reference number of service function. Same value as XY-Request.No in related MN-REQUEST.request.
XY-ReqConfirm.Value	Service function; carries optional confirm data.
ErrStatus	Error/return code, see <a href="#">Table B.1</a> .

An XY-REQUEST.confirm shall be generated by the respective ITS station management or security entity upon performance of a previous XY-REQUEST.request in case ErrStatus indicates error or XY-ReqConfirm is present. It may be generated in case ErrStatus indicates success or XY-ReqConfirm is not present.

Upon receipt of XY-REQUEST.confirm, disregard of its implementation, ErrStatus and MN-ReqConfirm shall be evaluated and a possible action shall be performed properly. Details are outside the scope of this document.

## 7 MI-SAP

### 7.1 General

In addition to the MI-COMMAND, MI-REQUEST, SI-COMMAND, and SI-REQUEST service, the following services are specified for the MI-SAP:

- a) the service MI-SET that allows the ITS-S management entity to set I-Parameter values in a "(Virtual) Communication Interface" (CI, VCI); see ISO 21218<sup>[4]</sup>;
- b) the service MI-GET that allows the ITS-S management entity to read I-Parameter values from a (virtual) CI.

Setting of I-Parameter values is built on the service primitives MI-SET.request and MI-SET.confirm.

Reading of I-Parameter values is built on the service primitives MI-GET.request and MI-GET.confirm.

The functionality of these service primitives, disregard of their implementation, shall be as defined in ASN.1; the respective ASN.1 specifications are provided in [Annex A](#):

- MI-SET.request is of ASN.1 type MI-Set-request;
- MI-SET.confirm is of ASN.1 type MI-Set-confirm;
- MI-GET.request is of ASN.1 type MI-Get-request;
- MI-GET.confirm is of ASN.1 type MI-Get-confirm.

NOTE Station-internal management communications between the ITS-S management entity and the ITS-S access layer in other ITS-SCUs is provided by the PDUs "MI-rset", "MI-rget", "MI-rcmd" and "MI-req" specified in ISO 24102-4[7].

## 7.2 MI-SET service

### 7.2.1 MI-SET.request service primitive

The service primitive MI-SET.request allows setting of I-Parameters by the ITS-S management.

The parameters of MI-SET.request are as follows:

```
MI-SET.request      (
                    Link-ID,
                    CommandRef,
                    Sequence of I-Param
                    )
```

**Table 5 — MI-SET.request parameter description**

Name	Description	Component of MI-Set-request
Link-ID	Unique identifier of a VCI/CI.	linkID
CommandRef	Unique cyclic reference number of command.	commandRef
Sequence of I-Param	I-Parameters specified in ISO 21218[4].	set-params

An MI-SET.request is generated by the ITS-S management entity when I-Parameters specified in ISO 21218[4] shall be set.

Upon receipt of MI-SET.request, disregard of its implementation, the selected parameters shall be set if applicable.

### 7.2.2 MI-SET.confirm service primitive

The service primitive MI-SET.confirm reports the result of a previous MI-SET.request.

The parameters of MI-SET.confirm are as follows:

```
MI-SET.confirm      (
                    Link-ID,
                    CommandRef,
                    SequenceOfErrors,
                    ErrorCode
                    )
```

The optional element "Sequence of Errors" shall be available once at least one of the requested settings was in error. It may be available in order to acknowledge settings explicitly.

**Table 6 — MI-SET.confirm parameter description**

Name	Description	Component of MI-Set-confirm
Link-ID	Unique identifier of a VCI/CI.	linkID
CommandRef	Unique cyclic reference number of command.	commandRef
SequenceOfErrors	Sequence of information elements for I-Parameters (I-Param.No and error status code) where setting of a value failed.	errors
ErrorCode	General error status code of the MI-SET.request	errStatus

Error status codes shall be as specified in [Annex B](#). These are used in the parameter SequenceOfErrors, and in the parameter ErrorCode.

Possible error status codes used in the parameter SequenceOfErrors are listed below.

- A request to set a defined "read only" I-Parameter shall be acknowledged with ErrStatus 7 "ACCESS VIOLATION".
- A request to set an undefined I-Parameter shall be acknowledged with ErrStatus 2 "INVALID PARAMETER NUMBER".
- A request to set a defined I-Parameter with an illegal value shall be acknowledged with ErrStatus 3 "INVALID PARAMETER VALUE".
- A request to set a defined I-Parameter with an illegal type of value shall be acknowledged with ErrStatus 1 "UNSPECIFIED FAILURE".
- In case a general error not covered by the above error codes occurs, the request shall be acknowledged with ErrStatus 1 "UNSPECIFIED ERROR"

Possible error status codes used in the parameter ErrorCode are listed below

- Successful setting of all parameters may be acknowledged with ErrStatus 0 "SUCCESS".
- Any kind of failure shall be acknowledged with ErrStatus 1 "UNSPECIFIED ERROR" with details to be reported in the parameter Sequence of errors.

An MI-SET.confirm is generated by the MAE upon reception of a previous MI-SET.request.

Upon receipt of MI-SET.confirm, the ITS-S management entity shall evaluate the sequence of errors, if applicable, and act accordingly. Details are outside the scope of this document.

## 7.3 MI-GET service

### 7.3.1 MI-GET.request service primitive

The service primitive MI-GET.request requests reporting of I-Parameter values to the ITS-S management entity.

The parameters of the management service primitive MI-GET.request are as follows:

```
MI-GET.request
    (
    Link-ID,
    CommandRef
    SequenceOf_I-ParamNo
    )
```

**Table 7 — MI-GET.request parameter description**

Name	Description	Component of MI-Get-request
Link-ID	Unique identifier of a VCI/CI.	linkID
CommandRef	Unique cyclic reference number of command.	commandRef
SequenceOf_I-ParamNo	Sequence of I-Paramter reference numbers, see ISO 21218[4].	get-param-no

An MI-GET.request is generated by the ITS-S management entity when I-Parameter values shall be retrieved.

On receipt of MI-GET.request, disregard of its implementation, I-Parameters shall be reported to the ITS-S management entity.

### 7.3.2 MI-GET.confirm service primitive

The service primitive MI-GET.confirm reports I-Parameter values to the ITS-S management entity.

The parameters of MI-GET.confirm are as follows:

```
MI-GET.confirm
    (
    Link-ID,
    CommandRef,
    SequenceOf_I-Param
    )
```

**Table 8 — MI-GET.confirm parameter description**

Name	Description	Component of MI-Get-confirm
Link-ID	Unique identifier of a VCI/CI.	linkID
CommandRef	Unique cyclic reference number of command.	commandRef
SequenceOf_I-Param	Sequence of successfully retrieved I-Parameters, followed by sequence of status information elements for I-Parameters (I-Param.No and error status code) where retrieval of a value failed..	get-param
ErrorCode	General error status code of the MI-GET.request	errStatus

Error status codes shall be as specified in [Annex B](#). These are used in the parameter SequenceOf\_I-Params, and in the parameter ErrorCode.

Possible error status codes used in the parameter SequenceOf\_I-Params are listed below.

- A request to get the value of a defined "write only" I-Parameter shall be acknowledged with ErrStatus 7 "ACCESS VIOLATION".
- A request to get the value of an undefined I-Parameter shall be acknowledged with ErrStatus 2 "INVALID PARAMETER NUMBER".

Possible error status codes used in the parameter ErrorCode are listed below.

- Successful setting of all parameters may be acknowledged with ErrStatus 0 "SUCCESS".
- Any kind of failure shall be acknowledged with ErrStatus 1 "UNSPECIFIED ERROR" with details to be reported in the parameter Sequence of errors.

The management service primitive MI-GET.confirm shall be generated by the MAE upon reception of a previous MI-GET.request.

Upon receipt of MI-GET.confirm, the ITS-S management entity shall evaluate the parameter values and act accordingly. Details are outside the scope of this document.

#### 7.4 MI-COMMAND service

The ASN.1 code of the MI-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.6](#). Details on MI-Commands presented by the ITS-S management entity to the ITS-S access layer are specified in other standards.

The functionality of MI-Commands shall be as specified in ASN.1.

#### 7.5 MI-Request service

The ASN.1 code of the MI-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.11](#). Details on MI-Requests presented by the ITS-S access layer to the ITS-S management entity are specified in other standards.

The functionality of MI-Requests shall be as specified in ASN.1.

### 8 MN-SAP

#### 8.1 General

NOTE Station-internal management communications between the ITS-S management entity and the ITS-S networking & transport layer in other ITS-SCUs is provided by the PDUs "MN-rcmd" and "MN-rreq" specified in ISO 24102-4.

#### 8.2 MN-COMMAND service

The ASN.1 code of the MN-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.5](#). Details on MN-Commands presented by the ITS-S management entity to the ITS-S networking & transport layer are specified in other standards.

The functionality of MN-Commands shall be as specified in ASN.1.

#### 8.3 MN-REQUEST service

The ASN.1 code of the MN-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.10](#). Details on MN-Requests presented by the ITS-S networking & transport layer to the ITS-S management entity are specified in other standards.

The functionality of MN-Requests shall be as specified in ASN.1.

## 9 MF-SAP

### 9.1 General

NOTE Station-internal management communications between the ITS-S management entity and the ITS-S facilities layer in other ITS-SCUs is provided by the PDUs "MF-rcmd" and "MF-rreq" specified in ISO 24102-4[7].

### 9.2 MF-COMMAND service

The ASN.1 code of the MF-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.4](#). Details on MF-Commands presented by the ITS-S management entity to the ITS-S facilities layer are specified in other standards.

The functionality of MF-Commands shall be as specified in ASN.1.

### 9.3 MF-REQUEST service

The ASN.1 code of the MF-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.4](#). Details on MF-Requests presented by the ITS-S facilities layer to the ITS-S management entity are specified in other standards.

The functionality of MF-Requests shall be as specified in ASN.1.

## 10 SI-SAP

### 10.1 General

Void.

### 10.2 SI-COMMAND service

The ASN.1 code of the SI-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.15](#). Details on SI-Commands presented by the ITS-S security entity to the ITS-S access layer are specified in other standards.

The functionality of SI-Commands shall be as specified in ASN.1.

### 10.3 SI-REQUEST service

The ASN.1 code of the SI-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.19](#). Details on SI-Requests presented by the ITS-S access layer to the ITS-S security entity are specified in other standards.

The functionality of SI-Requests shall be as specified in ASN.1.

## 11 SN-SAP

### 11.1 General

Void.

## 11.2 SN-COMMAND service

The ASN.1 code of the SN-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.14](#). Details on SN-Commands presented by the ITS-S security entity to the ITS-S networking & transport layer are specified in other standards.

The functionality of SN-Commands shall be as specified in ASN.1.

## 11.3 SN-REQUEST service

The ASN.1 code of the SN-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.18](#). Details on SN-Requests presented by the ITS-S networking & transport layer to the ITS-S security entity are specified in other standards.

The functionality of SN-Requests shall be as specified in ASN.1.

## 12 SF-SAP

### 12.1 General

Void.

### 12.2 SF-COMMAND service

The ASN.1 code of the SF-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.13](#). Details on SF-Commands presented by the ITS-S security entity to the ITS-S facilities layer are specified in other standards.

The functionality of SF-Commands shall be as specified in ASN.1.

### 12.3 SF-REQUEST service

The ASN.1 code of the SF-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.17](#). Details on SF-Requests presented by the ITS-S facilities layer to the ITS-S security entity are specified in other standards.

The functionality of SF-Requests shall be as specified in ASN.1.

## 13 MS-SAP

### 13.1 General

NOTE Station-internal management communications between the ITS-S management entity and the ITS-S networking & transport layer in other ITS-SCUs is provided by the PDUs "MS-rcmd" and "MS-rreq" specified in ISO 24102-4[2].

### 13.2 MS-COMMAND service

The ASN.1 code of the MS-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.2](#). Details on MS-Commands presented by the ITS-S management entity to the ITS-S security entity are specified in other standards.

The functionality of MS-Commands shall be as specified in ASN.1.

### 13.3 MS-REQUEST service

The ASN.1 code of the MS-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.7](#). Details on MF-Requests presented by the ITS-S management entity to the ITS-S security entity are specified in other standards.

The functionality of MS-Requests shall be as specified in ASN.1.

## 14 Interfaces towards the ITS-S application entity

### 14.1 SAPs and API

The API illustrated in [Figure 1](#) contains the functionality of the interfaces MA, FA, and SA specified in ISO 21217. The MA-SAP and the SA-SAP, and some basic features of the FA-SAP are specified in this document.

NOTE Station-internal management communications between the ITS-S management entity and the ITS-S application entity in other ITS-SCUs is provided by the PDUs "MA-rcmd" and "MA-rreq" specified in ISO 24102-4[7].

### 14.2 MA-COMMAND service

The ASN.1 code of the MA-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.3](#). Details on MA-Commands presented by the ITS-S management entity to the ITS-S application entity are specified in other standards.

The functionality of MA-Commands shall be as specified in ASN.1.

### 14.3 MA-REQUEST service

The ASN.1 code of the MA-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.8](#). Details on MA-Requests presented by the ITS-S management entity to the ITS-S application entity are specified in other standards.

The functionality of MA-Requests shall be as specified in ASN.1.

### 14.4 SA-COMMAND service

The ASN.1 code of the SA-COMMAND service, its service primitives, and the current status of service primitive functions is specified in [A.12](#). Details on SA-Commands presented by the ITS-S security entity to the ITS-S application entity are specified in other standards.

The functionality of SA-Commands shall be as specified in ASN.1.

### 14.5 SA-REQUEST service

The ASN.1 code of the SA-REQUEST service, its service primitives, and the current status of service primitive functions is specified in [A.16](#). Details on SA-Requests presented by the ITS-S application entity to the ITS-S security entity are specified in other standards.

The functionality of SA-Requests shall be as specified in ASN.1.

### 14.6 FA-SAP

#### 14.6.1 General

As there is still no International Standard on general services for the FA-SAP, the respective specifications already contained in the predecessor of this document are maintained.

### 14.6.2 FA-COMMAND and FA-REQUEST service

Instead of defining FA-COMMAND and FA-REQUEST services in the same way as XY-COMMAND and XY-REQUEST, extendible sets of service primitives in the two directions

- up from ITS-S facilities layer to the ITS-S application entity (i.e. the FA-REQUEST service of ASN.1 type `FAsapRequest`),
- down from the ITS-S application entity to the ITS-S facilities layer (i.e. the FA-COMMAND service of ASN.1 type `FAsapIndication`)

were defined using the anytype approach of ASN.1 with CLASS.

Details on how to design instantiations of the FA-SAP services are out of scope of this document.

The ASN.1 code of the FA-COMMAND and FA-REQUEST service, their service primitives, and the current status of service primitive functions is specified in [A.21](#). Details on FA-Commands and FA-Requests presented by the ITS-S security entity to the ITS-S application entity are specified in other standards.

## 15 Service primitive functions

The service primitives specified in [Clause 6](#) carry service primitive functions, i.e. the payload.

- The payload contained in the XY-COMMAND.request service primitives is identified by an XY-Command.No of ASN.1 type INTEGER (0..65535), pointing to the payload XY-Command.Value; see [6.2.1](#).
- The payload contained in the XY-COMMAND.confirm service primitives, [6.2.2](#), [6.3.2](#), is identified by an XY-CmdConfirm.No of ASN.1 type INTEGER (0..65535), pointing to the payload XY-CmdConfirm.Value; , see [6.2.1](#).
- The payload contained in the XY-REQUEST.request service primitives is identified by an XY-Request.No of ASN.1 type INTEGER (0..65535), pointing to the payload XY-Request.Value; see [6.3.1](#).
- The payload contained in the XY-REQUEST.confirm service primitives is identified by an XY-ReqConfirm.No of ASN.1 type INTEGER (0..65535), pointing to the payload XY-ReqConfirm.Value; see [6.3.2](#).

The service primitives FA-REQUEST and FA-COMMAND of the FA-SAP specified in [14.1](#) and in [14.6](#) similarly carry service primitive functions, i.e. the payload.

- The payload contained in these service primitive functions is identified by a command reference of ASN.1 type INTEGER (0..65535). This command reference points to the respective payload.

In what follows, these pointers of ASN.1 type INTEGER (0..65535), identifying payload in a SAP service primitive, are referred to as RefSAP, and the payload referenced by RefSAP is referred to as SAPfunction.

For SAPfunctions that appear in more than one SAP, the design goal is to use the same value of RefSAP in all SAPs where the respective SAPfunction is used.

Privately defined SAPfunctions shall use RefSAP values in the number range from 64000 through 65535 (0xfa00 through 0xffff).

[Annex C](#) presents a snap-shot of already identified SAPfunctions in tabular form.

## 16 Conformance

Service access points may be not observable and not testable. Thus no conformance tests are specified.

NOTE Service access points can become observable and thus testable in PDUs for ITS station-internal management communications specified in ISO 24102-4[Z].

## Annex A (normative)

### ASN.1 modules

#### A.1 Overview

The following ASN.1 modules are specified in this annex:

- ITSSapBasics { iso (1) standard (0) calm-management (24102) msap (3) basics (2) version0 (0)}:
- ITSSapCmdMs { iso (1) standard (0) calm-management (24102) msap (3) commands (3) ms (0) version0 (0)}
- ITSSapCmdMa { iso (1) standard (0) calm-management (24102) msap (3) commands (3) ma (1) version0 (0)}
- ITSSapCmdMf { iso (1) standard (0) calm-management (24102) msap (3) commands (3) mf (2) version0 (0)}
- ITSSapCmdMn { iso (1) standard (0) calm-management (24102) msap (3) commands (3) mn (3) version0 (0)}
- ITSSapCmdMi { iso (1) standard (0) calm-management (24102) msap (3) commands (3) mi (4) version0 (0)}
- ITSSapReqMs { iso (1) standard (0) calm-management (24102) msap (3) requests (4) ms (0) version0 (0)}
- ITSSapReqMa { iso (1) standard (0) calm-management (24102) msap (3) requests (4) ma (1) version0 (0)}
- ITSSapReqMf { iso (1) standard (0) calm-management (24102) msap (3) requests (4) mf (2) version0 (0)}
- ITSSapReqMn { iso (1) standard (0) calm-management (24102) msap (3) requests (4) mn (3) version0 (0)}
- ITSSapReqMi { iso (1) standard (0) calm-management (24102) msap (3) requests (4) mi (4) version0 (0)}
- ITSSapCmdSa { iso (1) standard (0) calm-management (24102) msap (3) commands (3) sa (5) version0 (0)}
- ITSSapCmdSf { iso (1) standard (0) calm-management (24102) msap (3) commands (3) sf (6) version0 (0)}
- ITSSapCmdSn { iso (1) standard (0) calm-management (24102) msap (3) commands (3) sn (7) version0 (0)}
- ITSSapCmdSi { iso (1) standard (0) calm-management (24102) msap (3) commands (3) si (8) version0 (0)}
- ITSSapReqSa { iso (1) standard (0) calm-management (24102) msap (3) requests (4) sa (5) version0 (0)}
- ITSSapReqSf { iso (1) standard (0) calm-management (24102) msap (3) requests (4) sf (6) version0 (0)}

- ITSSapReqSn { iso (1) standard (0) calm-management (24102) msap (3) requests (4) sn (7) version0 (0)}
- ITSSapReqSi { iso (1) standard (0) calm-management (24102) msap (3) requests (4) si (8) version0 (0)}
- ITSfasapfunctions { iso (1) standard (0) calm-management (24102) msap (3) fasap (5) version0 (0)}  
Service primitives for FA-SAP, and service primitive functions specified in other standards.

The default encoding rules for applicable for these ASN.1 modules shall be unaligned packed encoding rules (UPER) specified in ISO/IEC 8825-2, if other standards using definitions from these modules do not require different encoding rules.

In order to achieve octet alignment and enabling cheap implementations, "fill" bits were defined. All fill bits shall be set to the value '0'b. In case fill bits precede a CHOICE type, the CHOICE tag shall be evaluated only in case all fill bits show the value '0'b in order to identify a conflict with newer versions of the specification providing more choices.

## A.2 Module ITSSapCmdMs

```

ITSSapCmdMs { iso (1) standard (0) calm-management (24102) msap (3)
  commands (3) ms (0) version0 (0)}
DEFINITIONS AUTOMATIC TAGS ::= BEGIN

IMPORTS
-- From ISO 24102-3
EchoTest, ErrStatus, CommandRef, sap-testEcho FROM ITSSapBasics
{ iso (1) standard (0) calm-management (24102) msap (3) basics (2)
  version0 (0)}

-- C-ITS Data Dictionary (still in ISO 17419)
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}
;

/*
  Start of the static part
*/
-- MS-Command.request
MSSAP-CR ::= CLASS {
  &mxref RefMSSAP-C UNIQUE,
  &MXParam
}

MS-Command-request ::= SEQUENCE {
  commandRef      CommandRef,
  command         MScommand
}

MScommand ::= SEQUENCE {
  ref              MSSAP-CR.&mxref({MS-Command}),
  command-param   MSSAP-CR.&MXParam({MS-Command}){@ref}
}

-- MS-Command.confirm --
MSSAP-CC ::= CLASS {
  &mxref RefMSSAP-C UNIQUE,
  &MXParam
}

MS-Command-confirm ::= SEQUENCE {
  commandRef      CommandRef,
  commandCnf     MScommandCnf,
  errStatus       ErrStatus
}

MScommandCnf ::= SEQUENCE {
  ref              MSSAP-CC.&mxref({MS-CmdConfirm}),

```

```

cmdConfirm-param    MSSAP-CC.&MXParam({MS-CmdConfirm}{@ref})
}

/*
  End of the static part
*/

/*
  Start of semi-dynamic part
  Select what is needed for an implementation
*/
-- Reference identifier used in MSSAP-CR and MSSAP-CC
RefMSSAP-C ::= INTEGER {
-- In support of conformance testing ISO 20026
  c-testMS      (sap-testEcho)
} (0..65535)

-- Supported Commands
MS-Command MSSAP-CR::={testMS, ...}

MS-CmdConfirm MSSAP-CC::={testMSConf, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- MS-SAP Command.request
-- In support of conformance testing
testMS      MSSAP-CR::={&mxref c-testMS, &MXParam EchoTest}

-- MS-SAP Command.confirm
-- In support of conformance testing
testMSConf  MSSAP-CC::={&mxref 255, &MXParam NullType}
/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

### A.3 Module ITsSapCmdMa

```

ITsSapCmdMa { iso (1) standard (0) calm-management (24102) msap (3)
commands (3) ma (1) version0 (0) }

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS
-- From ISO 24102-3
EchoTest, ErrStatus, CommandRef, sap-testEcho FROM ITsSapBasics
{ iso (1) standard (0) calm-management (24102) msap (3) basics (2)
version0 (0) }

-- C-ITS Data Dictionary (still in ISO 17419 )
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}

-- From ISO 24102-6
;

/*
  Start of the dynamic parts
*/
--MA-Command.request

```

```

MASAP-CR::=CLASS {
    &mxref RefMASAP-C UNIQUE,
    &MXParam
}

MA-Command-request::=SEQUENCE{
    commandRef      CommandRef,
    command         MAcCommand
}

MAcCommand::=SEQUENCE{
    ref             MASAP-CR.&mxref({MA-Command}),
    command-param  MASAP-CR.&MXParam({MA-Command}{@ref})
}

-- MA-Command.confirm
MASAP-CC::=CLASS {
    &mxref RefMASAP-C UNIQUE,
    &MXParam
}

MA-Command-confirm::=SEQUENCE{
    commandRef      CommandRef,
    commandCnf     MAcCommandCnf,
    errStatus       ErrStatus
}

MAcCommandCnf::=SEQUENCE{
    ref             MASAP-CC.&mxref({MA-CmdConfirm}),
    cmdConfirm-param MASAP-CC.&MXParam({MA-CmdConfirm}{@ref})
}

/*
End of the static part of ISO 24102-3
*/

/*
Start of semi-dynamic part
Select what is needed for an implementation
*/
-- Reference identifier used in MASAP-CR and MASAP-CC
RefMASAP-C ::= INTEGER {
-- In support of conformance testing ISO 20026
c-testMA      (sap-testEcho)
-- In support of ISO 24102-6
} (0..65535)

-- Supported Commands
MA-Command MASAP-CR::={ testMA, ...}

MA-CmdConfirm MASAP-CC::={ testMAConf, ...}

/*
End of semi-dynamic part
Select what is needed for an implementation
*/

/*
Start of dynamic part
Select what is needed for an implementation
*/
-- MA-SAP Command.request
-- In support of conformance testing ISO 20026
testMA      MASAP-CR::={&mxref c-testMA, &MXParam EchoTest}
-- In support of ISO 24102-6

-- MA-SAP Command.confirm
-- In support of conformance testing
testMAConf  MASAP-CC::={&mxref 255, &MXParam NullType}
-- In support of ISO 24102-6

```

```

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/
END

```

## A.4 Module ITSSapCmdMf

```

ITSSapCmdMf { iso (1) standard (0) calm-management (24102) msap (3)
  commands (3) mf (2) version0 (0) }

```

DEFINITIONS AUTOMATIC TAGS ::= BEGIN

IMPORTS

-- ISO 24102-3

```

EchoTest, ErrStatus, CommandRef, sap-simUT, sap-simLT, sap-testEcho,
sap-ldmRegister, sap-ldmDeregister, sap-ldmAdd, sap-ldmUpdate,
sap-ldmDelete, sap-ldmSubscribe, sap-ldmUnsubscribe, sap-ldmQuery
FROM ITSSapBasics { iso (1) standard (0) calm-management (24102)
  msap (3) basics (2) version0 (0) }

```

```

FAsapRequest FROM ITSfasapfunctions { iso (1) standard (0)
  calm-management (24102) msap (3) fasap (5) version0 (0) }

```

-- C-ITS Data Dictionary (still in ISO 17419 )

```

NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-appMgmt
  (17419) dataDictionary (1) version1 (1) }

```

-- EN ISO 18750

```

LDMregisterRequest, LDMderegisterRequest, LDMaddRequest,
LDMupdateRequest, LDMdeleteRequest, LDMSubscribeRequest,
LDMunsubscribeRequest, LDMqueryRequest, LDMregisterConfirm,
LDMderegisterConfirm, LDMaddConfirm, LDMupdateConfirm,
LDMdeleteConfirm, LDMSubscribeConfirm, LDMunsubscribeConfirm,
LDMqueryConfirm FROM CITSldm2 {iso(1) standard(0) cits-ldm (18750)
  asnm-1(1) version2 (2) }

```

-- ISO 24102-2

```

RSMPmessageTX, RSMPmessageTXconf FROM ITSSremoteMgmt2 { iso (1)
  standard (0) calm-management (24102) remote (2) asnm-1 (1) version2 (2) }

```

-- ISO 24102-4

```

IICrequestTX, IICresponseTX, IICrequestRX, IICresponseRX FROM ITSiitsscu
{ iso (1) standard (0) calm-management (24102) iitsscu (4) asnm-1 (1)
  version2 (2) }

```

-- ISO 24102-6

-- ISO 29281-1

```

NFSapIndication FROM ITSfntp { iso (1) standard (0) calm-nonip(29281)
  fntp(1) asnm-1 (1) version2 (2) }

```

;

```

/*
  Start of the static part
*/

```

-- MF-COMMAND.request

```

MFSAP-CR ::= CLASS {
  &mxref RefMFSAP-C UNIQUE,
  &MXParam
}

```

```

MF-Command-request ::= SEQUENCE {
  commandRef      CommandRef,
  command         MFcommand
}

```

```

MFcommand ::= SEQUENCE {
  ref              MFSAP-CR.&mxref({MF-Command}),
  command-param   MFSAP-CR.&MXParam({MF-Command}){@ref}
}

```

```

-- MF-COMMAND.confirm
MFSAP-CC ::= CLASS {
    &mxref RefMFSAP-C UNIQUE,
    &MXParam
}

MF-Command-confirm ::= SEQUENCE {
    commandRef      CommandRef,
    commandCnf      MFcommandCnf,
    errStatus       ErrStatus
}

MFcommandCnf ::= SEQUENCE {
    ref              MFSAP-CC.&mxref({MF-CmdConfirm}),
    cmdConfirm-param MFSAP-CC.&MXParam({MF-CmdConfirm}{@ref})
}

/*
End of the static part
*/

/*
Start of semi-dynamic part
Select what is needed for an implementation
*/
-- Reference identifier used in MFSAP-CR and MFSAP-CC
RefMFSAP-C ::= INTEGER {
-- In support of conformance testing ISO 20026
    c-simFUTcmd      (sap-simUT), -- 253
    c-simFLTcmd      (sap-simLT), -- 254
    c-testMF         (sap-testEcho), -- 255
-- In support of ISO 24102-4
    c-iICrequestTX   (11),
    c-iICresponseTX  (12),
    c-rsmpMessageTX  (13),

-- In support of ISO 24102-6
-- In support of EN ISO 18750
    c-ldmRegisterMF  (sap-ldmRegister), -- 100
    c-ldmDeregisterMF (sap-ldmDeregister), -- 101
    c-ldmAddMF        (sap-ldmAdd), -- 102
    c-ldmUpdateMF     (sap-ldmUpdate), -- 103
    c-ldmDeleteMF     (sap-ldmDelete), -- 104
    c-ldmSubscribeMF  (sap-ldmSubscribe), -- 105
    c-ldmUnsubscribeMF (sap-ldmUnsubscribe), -- 106
    c-ldmQueryMF      (sap-ldmQuery) -- 107
} (0..65535)

-- Available Commands
MF-Command MFSAP-CR ::= {simFUTcmd | simFLTcmd | testMF | iICrequestTX |
iICresponseTX | rsmpMessageTX | ldmRegister | ldmDeregister | ldmAdd |
ldmUpdate | ldmDelete | ldmSubscribe | ldmUnsubscribe | ldmQuery, ...}

MF-CmdConfirm MFSAP-CC ::= {simFUTcmdConf | simFLTcmdConf | testMFConf |
iICrequestTXConf | iICresponseTXConf | ldmRegisterConf |
ldmDeregisterConf | ldmAddConf | ldmUpdateConf | ldmDeleteConf |
ldmSubscribeConf | ldmUnsubscribeConf | ldmQueryConf, ...}

/*
End of semi-dynamic part
Select what is needed for an implementation
*/

/*
Start of dynamic part
Select what is needed for an implementation
*/
-- MF-SAP Command.request --
-- In support of conformance testing ISO 20026
simFUTcmd      MFSAP-CR ::= {&mxref c-simFUTcmd, &MXParam SimFUTcmd}
simFLTcmd      MFSAP-CR ::= {&mxref c-simFLTcmd, &MXParam SimFLTcmd}

```

```

testMF                MFSAP-CR::={&mxref c-testMF, &MXParam EchoTest}
-- In support of CEN ISO 20026
SimFUTcmd:=FAsapRequest
-- From ISO 29281-1
SimFLTcmd:=NFsapIndication

-- In support of ISO 24102-2
rsmpMessageTX        MFSAP-CR::={&mxref c-rsmpMessageTX, &MXParam
                        RSMPmessageTX}

-- In support of ISO 24102-4
iICrequestTX         MFSAP-CR::={&mxref c-iICrequestTX, &MXParam
                        IICrequestTX}
iICresponseTX        MFSAP-CR::={&mxref c-iICresponseTX, &MXParam
                        IICresponseTX}

-- In support of ISO 24102-6

-- In support of EN ISO 18750
ldmRegister          MFSAP-CR::={&mxref c-ldmRegisterMF, &MXParam
                        LDMregisterRequest}
ldmDeregister        MFSAP-CR::={&mxref c-ldmDeregisterMF, &MXParam
                        LDMderegisterRequest}
ldmAdd               MFSAP-CR::={&mxref c-ldmAddMF, &MXParam
                        LDMaddRequest}
ldmUpdate            MFSAP-CR::={&mxref c-ldmUpdateMF, &MXParam
                        LDMupdateRequest}
ldmDelete            MFSAP-CR::={&mxref c-ldmDeleteMF, &MXParam
                        LDMdeleteRequest}
ldmSubscribe         MFSAP-CR::={&mxref c-ldmSubscribeMF, &MXParam
                        LDMsubscribeRequest}
ldmUnsubscribe       MFSAP-CR::={&mxref c-ldmUnsubscribeMF, &MXParam
                        LDMunsubscribeRequest}
ldmQuery             MFSAP-CR::={&mxref c-ldmQueryMF, &MXParam
                        LDMqueryRequest}

-- MF-SAP Command.confirm --
-- In support of conformance testing ISO 20026
simFUTcmdConf        MFSAP-CC::={&mxref c-simFUTcmd, &MXParam NullType}
simFLTcmdConf        MFSAP-CC::={&mxref c-simFLTcmd, &MXParam NullType}
testMFConf           MFSAP-CC::={&mxref c-testMF, &MXParam NullType}

-- In support of ISO 24102-2
rsmpMessageTXConf    MFSAP-CC::={&mxref c-rsmpMessageTX, &MXParam
                        RSMPmessageTXconf}

-- In support of ISO 24102-4
iICrequestTXConf     MFSAP-CC::={&mxref c-iICrequestTX, &MXParam
                        NullType}
iICresponseTXConf    MFSAP-CC::={&mxref c-iICresponseTX, &MXParam
                        NullType}

-- In support of ISO 24102-6

-- In support of EN ISO 18750
ldmRegisterConf      MFSAP-CC::={&mxref c-ldmRegisterMF, &MXParam
                        LDMregisterConfirm}
ldmDeregisterConf    MFSAP-CC::={&mxref c-ldmDeregisterMF, &MXParam
                        LDMderegisterConfirm}
ldmAddConf           MFSAP-CC::={&mxref c-ldmAddMF, &MXParam
                        LDMaddConfirm}
ldmUpdateConf        MFSAP-CC::={&mxref c-ldmUpdateMF, &MXParam
                        LDMupdateConfirm}
ldmDeleteConf        MFSAP-CC::={&mxref c-ldmDeleteMF, &MXParam
                        LDMdeleteConfirm}
ldmSubscribeConf     MFSAP-CC::={&mxref c-ldmSubscribeMF, &MXParam
                        LDMsubscribeConfirm}
ldmUnsubscribeConf   MFSAP-CC::={&mxref c-ldmUnsubscribeMF, &MXParam
                        LDMunsubscribeConfirm}
ldmQueryConf         MFSAP-CC::={&mxref c-ldmQueryMF, &MXParam
                        LDMqueryConfirm}

```

```

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.5 Module ITsSapCmdMn

```

ITsSapCmdMn { iso (1) standard (0) calm-management (24102) msap (3)
  commands (3) mn (3) version0 (0) }

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS
-- ISO 24102-3
EchoTest, ErrStatus, CommandRef, sap-simUT, sap-simLT, sap-testEcho
FROM ITsSapBasics { iso (1) standard (0) calm-management (24102)
  msap (3) basics (2) version0 (0) }

-- C-ITS Data Dictionary (still in ISO 17419 )
NullType FROM CITSdataDictionary1 { iso(1) standard(0) cits-applMgmt
  (17419) dataDictionary (1) version1 (1) }

-- ISO 24102-6

-- ISO 29281-1
NFsapRequest FROM ITSfntp { iso (1) standard (0) calm-nonip(29281)
  fntp(1) asnm-1 (1) version2 (2) }

-- ISO 21218
INSapIndication FROM ITSllsap { iso(1) standard(0) calm-ll-sap(21218)
  asnm-1 (1) version2 (2) }

-- ISO 24102-1
RefFWT, FWT, FWTcommand, FwtCommands, FWTcommandConf, FwtCommandsConf
FROM ITsManagement { iso (1) standard (0) calm-management (24102)
  local (1) asnm-1 (1) version2 (2) }
;
/*
  Start of the static part
*/
-- MN-Command.request --
MNSAP-CR::=CLASS {
  &mxref RefMNSAP-C UNIQUE,
  &MXParam
}

MN-Command-request::=SEQUENCE{
  commandRef      CommandRef,
  command         MNcommand
}

MNcommand::=SEQUENCE{
  ref             MNSAP-CR.&mxref({MN-Command}),
  command-param  MNSAP-CR.&MXParam({MN-Command}{@ref})
}

-- MN-Command.confirm --
MNSAP-CC::=CLASS {
  &mxref RefMNSAP-C UNIQUE,
  &MXParam
}

MN-Command-confirm::=SEQUENCE{
  commandRef      CommandRef,
  commandCnf     MNcommandCnf,
  errStatus      ErrStatus
}

MNcommandCnf::=SEQUENCE{

```

```

ref                MNSAP-CC.&mxref({MN-CmdConfirm}),
cmdConfirm-param  MNSAP-CC.&MXParam({MN-CmdConfirm}{@ref})
}

/*
  End of the static part
*/

/*
  Start of semi-dynamic part
  Select what is needed for an implementation
*/
-- Reference identifier used in MNSAP-CR and MNSAP-CC
RefMNSAP-C ::= INTEGER {
-- General
  c-simNUTcmd      (sap-simUT), -- 253
  c-simNLTCmd     (sap-simLT), -- 254
  c-testMN        (sap-testEcho), -- 255
-- In support of ISO 24102-1
  c-fWTcommand    (2)
-- In support of ISO 24102-6
} (0..65535)

MN-Command MNSAP-CR:={simNUTcmd | simNLTCmd | testMN | fWTcommand, ...}

MN-CmdConfirm MNSAP-CC:={simNUTcmdConf | simNLTCmdConf | testMNConf |
fWTcommandConf, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- MN-SAP Command.request
-- In support of conformance testing ISO 20026
simNUTcmd      MNSAP-CR:={&mxref c-simNUTcmd, &MXParam SimNUTcmd}
simNLTCmd     MNSAP-CR:={&mxref c-simNLTCmd, &MXParam SimNLTCmd}
testMN        MNSAP-CR:={&mxref c-testMN, &MXParam EchoTest}
-- From ISO 29281-1
SimNUTcmd:=NfsapRequest
-- From ISO 21218
SimNLTCmd:=INSapIndication

-- In support of ISO 24102-1
fWTcommand    MNSAP-CR:={&mxref c-fWTcommand, &MXParam FWTcommand}

-- In support of ISO 24102-6

-- MN-SAP Command.confirm --
-- In support of conformance testing ISO 20026
simNUTcmdConf MNSAP-CC:={&mxref c-simNUTcmd, &MXParam NullType}
simNLTCmdConf MNSAP-CC:={&mxref c-simNLTCmd, &MXParam NullType}
testMNConf    MNSAP-CC:={&mxref c-testMN, &MXParam NullType}

-- In support of ISO 24102-1
fWTcommandConf MNSAP-CC:={&mxref c-fWTcommand, &MXParam FWTcommandConf}

-- In support of ISO 24102-6

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/
END

```

## A.6 Module ITsSapCmdMi

```

ITsSapCmdMi { iso (1) standard (0) calm-management (24102) msap (3)
commands (3) mi (4) version0 (0)}

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS
-- ISO 24102-3
EchoTest, ErrStatus, CommandRef, sap-simUT, sap-testEcho FROM
ITsSapBasics { iso (1) standard (0) calm-management (24102) msap (3)
basics (2) version0 (0)}

-- C-ITS Data Dictionary (still in ISO 17419 )
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}

-- ISO 24102-6

-- ISO 21218
CIstateChange, CnConnect, MacManagementFrameTX,
ManufacturerSpecificCiAccess, MonitorIparameter, PrioritizedRTS,
Riprovisioning, VciCmd, WakeUp, CIstateChangeConf, CnConnectConf,
MacManagementFrameTXConf, ManufacturerSpecificCiAccessConf,
MonitorIparameterConf, PrioritizedRTSConf, RiprovisioningConf,
VciCmdConf, WakeUpConf, INsapIndication, I-Param, I-ParamNo, Link-ID
FROM ITSllsap {iso(1) standard(0) calm-ll-sap(21218) asnm-1 (1)
version2 (2)}
;
/*
Start of static part
*/
-- MI-Command.request
MISAP-CR::=CLASS {
    &mxref RefMISAP-C UNIQUE,
    &MXParam
}

MI-Command-request::=SEQUENCE{
    linkID          Link-ID,
    commandRef      CommandRef,
    command         MIcommand
}

MIcommand::=SEQUENCE{
    ref             MISAP-CR.&mxref({MI-Command}),
    command-param  MISAP-CR.&MXParam({MI-Command}{@ref})
}

-- MI-Command.confirm
MISAP-CC::=CLASS {
    &mxref RefMISAP-C UNIQUE,
    &MXParam
}

MI-Command-confirm::=SEQUENCE{
    linkID          Link-ID,
    commandRef      CommandRef,
    commandCnf     MIcommandCnf,
    errStatus       ErrStatus
}

MIcommandCnf::=SEQUENCE{
    ref             MISAP-CC.&mxref({MI-CmdConfirm}),
    cmdConfirm-param MISAP-CC.&MXParam({MI-CmdConfirm}{@ref})
}

-- MI-Set.request --
MI-Set-request::=SEQUENCE{
    linkID          Link-ID,
    commandRef      CommandRef,

```

```

    set-params          IParamList
  }

IParamList ::= SEQUENCE OF I-Param

-- MI-Set.confirm --
MI-Set-confirm ::= SEQUENCE {
    linkID              Link-ID,
    commandRef          CommandRef,
    errors              I-ParamsNOK,
    errStatus           ErrStatus
}

I-ParamsNOK ::= SEQUENCE OF I-ParamNOK
I-ParamNOK ::= SEQUENCE {
    paramNo             I-ParamNo,
    error               ErrStatus
}

-- MI-Get.request --
MI-Get-request ::= SEQUENCE {
    linkID              Link-ID,
    commandRef          CommandRef,
    get-param-no        IParamNoList
}

IParamNoList ::= SEQUENCE OF I-ParamNo

-- MI-Get.confirm --
MI-Get-confirm ::= SEQUENCE {
    linkID              Link-ID,
    commandRef          CommandRef,
    get-param           IParamReturnList,
    errStatus           ErrStatus
}

IParamReturnList ::= SEQUENCE {
    paramOK             I-ParamsOK,
    paramNOK            I-ParamsNOK
}

I-ParamsOK ::= SEQUENCE OF I-Param

/*
  End of the static part of ISO 24102-3
*/

/*
  Start of semi-dynamic part
  Select what is needed for an implementation
*/
-- Reference identifier used in MISAP-CR and MISAP-CC
RefMISAP-C ::= INTEGER {
-- General
    c-simIUTcmd          (sap-simUT), -- 253
    c-testMI             (sap-testEcho), -- 255
-- In support of ISO 21218
    c-cIstateChange     (1),
    c-cNconnect          (2),
    c-macManagementFrameTX (3),
    c-manufacturerSpecificCiAccess (4),
    c-monitorIparameter (5),
    c-prioritizedRTS     (6),
    c-rIprovisioning     (7),
    c-vciCmd             (8),
    c-wakeUp             (9)
-- In support of ISO 24102-6

} (0..65535)

MI-Command MISAP-CR ::= {simIUTcmd | testMI | cIstateChange | cNconnect |
macManagementFrameTX | manufacturerSpecificCiAccess | monitorIparameter

```

```

| prioritizedRTS | rIprovisioning | vciCmd | wakeUp, ...}

MI-CmdConfirm MISAP-CC::={simIUTcmdConf | cIstateChangeConf |
cNconnectConf | macManagementFrameTXConf |
manufacturerSpecificCiAccessConf | monitorIparameterConf |
prioritizedRTSConf | rIprovisioningConf | vciCmdConf | wakeUpConf, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- MI-SAP Command.request
-- In support of conformance testing ISO 20026
simIUTcmd          MISAP-CR::={&mxref c-simIUTcmd, &MXParam
                        SimIUTcmd}
testMI            MISAP-CR::={&mxref c-testMI, &MXParam EchoTest}
-- From ISO 21218
SimIUTcmd::=INSapIndication

-- In support of ISO 21218
cIstateChange MISAP-CR::={&mxref c-cIstateChange, &MXParam CIstateChange}
cNconnect      MISAP-CR::={&mxref c-cNconnect, &MXParam
                        CnConnect}
macManagementFrameTX MISAP-CR::={&mxref c-macManagementFrameTX,
                        &MXParam MacManagementFrameTX}
manufacturerSpecificCiAccess MISAP-CR::={&mxref
c-manufacturerSpecificCiAccess, &MXParam
ManufacturerSpecificCiAccess}
monitorIparameter MISAP-CR::={&mxref c-monitorIparameter,
                        &MXParam MonitorIparameter}
prioritizedRTS   MISAP-CR::={&mxref c-prioritizedRTS, &MXParam
PrioritizedRTS}
rIprovisioning   MISAP-CR::={&mxref c-rIprovisioning, &MXParam
RIprovisioning}
vciCmd           MISAP-CR::={&mxref c-vciCmd, &MXParam VciCmd}
wakeUp          MISAP-CR::={&mxref c-wakeUp, &MXParam WakeUp}

-- In support of ISO 24102-6

-- MI-SAP Command.confirm
-- In support of conformance testing ISO 21218
simIUTcmdConf    MISAP-CC::={&mxref c-simIUTcmd, &MXParam
                        NullType}

-- In support of ISO 21218
cIstateChangeConf MISAP-CC::={&mxref c-cIstateChange, &MXParam
CIstateChangeConf}
cNconnectConf     MISAP-CC::={&mxref c-cNconnect, &MXParam
CnConnectConf}
macManagementFrameTXConf MISAP-CC::={&mxref c-macManagementFrameTX,
                        &MXParam MacManagementFrameTXConf}
manufacturerSpecificCiAccessConf MISAP-CC::={&mxref
c-manufacturerSpecificCiAccess, &MXParam
ManufacturerSpecificCiAccessConf}
monitorIparameterConf MISAP-CC::={&mxref c-monitorIparameter,
                        &MXParam MonitorIparameterConf}
prioritizedRTSConf MISAP-CC::={&mxref c-prioritizedRTS, &MXParam
PrioritizedRTSConf}
rIprovisioningConf MISAP-CC::={&mxref c-rIprovisioning, &MXParam
RIprovisioningConf}
vciCmdConf       MISAP-CC::={&mxref c-vciCmd, &MXParam
VciCmdConf}
wakeUpConf       MISAP-CC::={&mxref c-wakeUp, &MXParam
WakeUpConf}

-- In support of ISO 24102-6

```

```
/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/
```

END

## A.7 Module ITSSapReqMs

```
ITSSapReqMs { iso (1) standard (0) calm-management (24102) msap (3)
requests (4) ms (0) version0 (0)}
```

DEFINITIONS AUTOMATIC TAGS ::= BEGIN

IMPORTS

-- ISO 24102-3

```
ErrStatus, CommandRef, sap-testEcho, EchoTest FROM ITSSapBasics
{ iso (1) standard (0) calm-management (24102) msap (3) basics (2)
version0 (0)}
```

-- C-ITS Data Dictionary (still in ISO 17419 )

```
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}
```

-- ISO 17423

```
ITS-S-Appl-Reg, ITS-S-Appl-RegConf, ITS-S-Appl-RegFinal,
ITS-S-Appl-RegFinalConf FROM CITSapplReq {iso(1) standard(0)
cits-applReq (17423) asnm-1 (1) version2 (2)}
```

;

```
/*
  Start of the static part
*/
```

-- MS-Request.request

```
MSSAP-RR ::= CLASS {
  &mxref RefMSSAP-R UNIQUE,
  &MXParam
}
```

```
MS-Request-request ::= SEQUENCE {
  commandRef      CommandRef,
  command         MSrequest
}
```

```
MSrequest ::= SEQUENCE {
  ref              MSSAP-RR.&mxref({MS-Request}),
  request-param   MSSAP-RR.&MXParam({MS-Request}{@ref})
}
```

-- MS-Request.confirm

```
MSSAP-RC ::= CLASS {
  &mxref RefMSSAP-R UNIQUE,
  &MXParam
}
```

```
MS-Request-confirm ::= SEQUENCE {
  commandRef      CommandRef,
  errStatus       ErrStatus,
  commandCnf     MSrequestCnf
}
```

```
MSrequestCnf ::= SEQUENCE {
  ref              MSSAP-RC.&mxref({MS-RegConfirm}),
  reqConfirm-param MSSAP-RC.&MXParam({MS-RegConfirm}{@ref})
}
```

```
/*
  End of the static part
*/
```

```

/*
  Start of semi-dynamic part
  Select what is needed for an implementation
*/
-- Reference identifier used in MSSAP-RR and MSSAP-RC
RefMSSAP-R ::= INTEGER {
-- General
  c-testMSecho          (sap-testEcho),
-- In support of EN ISO 17423
  c-iTS-S-Appl-RegMS    (1),
  c-iTS-S-Appl-RegFinalMS (13)
} (0..65535)

MS-Request MSSAP-RR::={testMSecho | iTS-S-Appl-RegMS |
iTS-S-Appl-Proc-RegFinalMS, ...}

MS-RegConfirm MSSAP-RC::={ testMSechoConf | iTS-S-Appl-RegConfMS |
iTS-S-Appl-RegFinalConfMS, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- MS-SAP Request.request
-- In support of EN ISO 17423
iTS-S-Appl-RegMS          MSSAP-RR::={&mxref c-iTS-S-Appl-RegMS,
&MXParam ITS-S-Appl-Reg}
iTS-S-Appl-Proc-RegFinalMS MSSAP-RR::={&mxref c-iTS-S-Appl-RegFinalMS,
&MXParam ITS-S-Appl-RegFinal}

-- In support of conformance testing ISO 20026
testMSecho                MSSAP-RR::={&mxref c-testMSecho, &MXParam
TestMSecho}
TestMSecho::=SEQUENCE{
  sap                      INTEGER{S.(83)} (0..255), -- indicating MS-SAP
  info                    EchoTest
}

-- MS-SAP Request.confirm
-- In support of EN ISO 17423
iTS-S-Appl-RegConfMS     MSSAP-RC::={&mxref c-iTS-S-Appl-RegMS,
&MXParam ITS-S-Appl-RegConf}
iTS-S-Appl-RegFinalConfMS MSSAP-RC::={&mxref c-iTS-S-Appl-RegFinalMS,
&MXParam ITS-S-Appl-RegFinalConf}

-- In support of conformance testing ISO 20026
testMSechoConf          MSSAP-RC::={&mxref c-testMSecho, &MXParam
NullType}

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/
END

```

## A.8 Module ITSSapReqMa

```
ITSSapReqMa { iso (1) standard (0) calm-management (24102) msap (3)
requests (4) ma (1) version0 (0) }
```

```
DEFINITIONS AUTOMATIC TAGS::=BEGIN
```

```
IMPORTS
```

```
-- ISO 24102-3
```

## ISO 24102-3:2018(E)

```
ErrStatus, CommandRef, sap-testEcho, sap-17423iITS-S-Appl-Reg,
sap-17423iITS-S-Appl-RegFinal FROM ITSSapBasics { iso (1) standard (0)
calm-management (24102) msap (3) basics (2) version0 (0)}

-- C-ITS Data Dictionary (still in ISO 17419 )
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}

-- EN ISO 17423
ITS-S-Appl-Reg, ITS-S-Appl-RegConf, ITS-S-Appl-RegFinal,
ITS-S-Appl-RegFinalConf FROM CITSapplReq {iso(1) standard(0)
cits-applReq (17423) asnm-1 (1) version2 (2)}

-- ISO 24102-6

;
/*
  Start of the static part
*/
-- MA-Request.request
MASAP-RR::=CLASS {
  &mxref RefMASAP-R UNIQUE,
  &MXParam
}

MA-Request-request::=SEQUENCE{
  commandRef      CommandRef,
  command         MArequest
}

MArequest::=SEQUENCE{
  ref              MASAP-RR.&mxref({MA-Request}),
  request-param   MASAP-RR.&MXParam({MA-Request}){@ref}
}

-- MA-Request.confirm
MASAP-RC::=CLASS {
  &mxref RefMASAP-R UNIQUE,
  &MXParam
}

MA-Request-confirm::=SEQUENCE{
  commandRef      CommandRef,
  commandCnf     MArequestCnf,
  errStatus      ErrStatus
}

MArequestCnf::=SEQUENCE{
  ref              MASAP-RC.&mxref({MA-ReqConfirm}),
  reqConfirm-param MASAP-RC.&MXParam({MA-ReqConfirm}){@ref}
}

/*
  End of the static part
*/

/*
  Start of semi-dynamic part
  Select what is needed for an implementation
*/
-- Reference identifier used in MASAP-RR and MASAP-RC
RefMASAP-R ::= INTEGER {
-- General
  c-testMAecho          (sap-testEcho),
-- In support of EN ISO 17423
  c-iTS-S-Appl-Reg      (sap-17423iITS-S-Appl-Reg), -- 1
  c-iTS-S-Appl-RegFinal (sap-17423iITS-S-Appl-RegFinal) -- 13
-- In support of ISO 24102-6
} (0..65535)

MA-Request MASAP-RR::={testMAecho | iTS-S-Appl-Reg | iTS-S-Appl-RegFinal, ...}
```

```

MA-ReqConfirm MASAP-RC::={ testMAEchoConf | iTS-S-Appl-RegConf | iTS-S-Appl-ReqFinalConf,
...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- MA-SAP Request.request --
-- In support of conformance testing
testMAEcho          MASAP-RR:={&mxref c-testMAEcho, &MXParam
                    TestMAEcho}
TestMAEcho::=SEQUENCE{
  sap              INTEGER{a (65)} (0..255), -- indicating MA-SAP
  info            EchoTest
}

-- In support of EN ISO 17423
iTS-S-Appl-RegMASAP-RR:={&mxref c-iTS-S-Appl-Reg, &MXParam
ITS-S-Appl-Reg}
iTS-S-Appl-ReqFinal MASAP-RR:={&mxref c-iTS-S-Appl-ReqFinal, &MXParam
ITS-S-Appl-ReqFinal}
-- In support of ISO 24102-6

-- MA-SAP Request.confirm --
-- In support of conformance testing
testMAEchoConf     MASAP-RC:={&mxref c-testMAEcho, &MXParam
                    NullType}
-- In support of EN ISO 17423
iTS-S-Appl-RegConf MASAP-RC:={&mxref c-iTS-S-Appl-Reg, &MXParam
ITS-S-Appl-RegConf}
iTS-S-Appl-ReqFinalConf MASAP-RC:={&mxref c-iTS-S-Appl-ReqFinal,
&MXParam ITS-S-Appl-ReqFinalConf}
-- In support of ISO 24102-6

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/
END

```

## A.9 Module ITsSapReqMf

```

ITsSapReqMf { iso (1) standard (0) calm-management (24102) msap (3)
requests (4) mf (2) version0 (0)}

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS
-- ISO 24102-3
ErrStatus, CommandRef, sap-simUT, sap-simLT, sap-testEcho,
sap-ldmRevokeAppNotify, sap-ldmNotify, sap-ldmRegisterManagement,
EchoTest FROM ITsSapBasics { iso (1) standard (0) calm-management
(24102) msap (3) basics (2) version0 (0)}

FAsapIndication FROM ITsFasapfunctions { iso (1) standard (0)
calm-management (24102) msap (3) fasap (5) version0 (0)}

-- C-ITS Data Dictionary (still in ISO 17419 )
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}

-- EN ISO 17423
ITS-S-Appl-Reg, ITS-S-Appl-RegConf, ITS-S-Appl-ReqFinal,
ITS-S-Appl-ReqFinalConf FROM CITSapplReq {iso(1) standard(0)
cits-applReq (17423) asnm-1 (1) version2 (2)}

```

```

-- EN ISO 18750
LDMrevokeAppNotifyRequest, LDMregisterManagementRequest,
LDMnotifyRequest, LDMrevokeAppNotifyConfirm,
LDMregisterManagementConfirm, LDMnotifyConfirm FROM CITSldm2 {iso(1)
standard(0) cits-ldm (18750) asnm-1(1) version2 (2)}

-- ISO 24102-2
RSMPmessageRX FROM ITSSremoteMgmt { iso (1) standard (0)
calm-management (24102) remote (2) asnm-1 (1) version2 (2)}

-- ISO 24102-4
IICrequestRX, IICresponseRX FROM ITSiitsscu { iso (1) standard (0)
calm-management (24102) iitsscu (4) asnm-1 (1) version2 (2)}

-- ISO 24102-6

-- ISO 29281-1
NFSapRequest FROM ITSfntp { iso (1) standard (0) calm-nonip(29281)
fntp(1) asnm-1 (1) version2 (2)}
;
/*
Start of the static part
*/
-- MF-REQUEST.request
MFSAP-RR:=CLASS {
    &mxref RefMFSAP-R UNIQUE,
    &MXParam
}

MF-Request-request:=SEQUENCE{
    commandRef      CommandRef,
    command          MRequest
}

MRequest:=SEQUENCE{
    ref              MFSAP-RR.&mxref({MF-Request}),
    request-param    MFSAP-RR.&MXParam({MF-Request}{@ref})
}

-- MF-REQUEST.confirm
MFSAP-RC:=CLASS {
    &mxref RefMFSAP-R UNIQUE,
    &MXParam
}

MF-Request-confirm:=SEQUENCE{
    commandRef      CommandRef,
    commandCnf      MRequestCnf,
    errStatus        ErrStatus
}

MRequestCnf:=SEQUENCE{
    ref              MFSAP-RC.&mxref({MF-ReqConfirm}),
    reqConfirm-param MFSAP-RC.&MXParam({MF-ReqConfirm}{@ref})
}

/*
End of the static part
*/

/*
Start of semi-dynamic part
Select what is needed for an implementation
*/
-- Reference identifier used in MFSAP-RR and MFSAP-RC
RefMFSAP-R ::= INTEGER {
-- General
    c-simFUTreq      (sap-simUT), -- 253
    c-simFLTreq      (sap-simLT), -- 254
    c-testMFecho     (sap-testEcho), -- 255

```

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```

-- In support of EN ISO 17423
c-iTS-S-Appl-RegMF      (sap-17423iTS-S-Appl-Reg), -- 1
c-iTS-S-Appl-ReqFinalMF (sap-17423iTS-S-Appl-ReqFinal), -- 14
-- In support of ISO 24102-2
c-rsmpMessageRX        (13),
-- In support of ISO 24102-4
c-iICrequestRX          (11),
c-iICresponseRX         (12),
-- In support of ISO 24102-6

-- In support of EN ISO 18750
c-ldmRevokeAppNotify   (sap-ldmRevokeAppNotify), -- 108
c-ldmNotify              (sap-ldmNotify), -- 109
c-ldmRegisterManagement (sap-ldmRegisterManagement) -- 110
} (0..65535)

MF-Request MFSAP-RR::={simFUTreq | simFLTreq | testMFecho |
iTS-S-Appl-Reg | iTS-S-Appl-ReqFinal | rsmpMessageRX | iICrequestRX |
iICresponseRX | ldmRevokeAppNotify | ldmNotify | ldmRegisterManagement,
...}

MF-ReqConfirm MFSAP-RC::={simFUTreqConf | simFLTreqConf |
testMFechoConf | iTS-S-Appl-RegConf | iTS-S-Appl-ReqFinalConf |
iICrequestRXConf | iICresponseRXConf | rsmpMessageRXconf |
ldmRevokeAppNotifyConf | ldmNotifyConf | ldmRegisterManagementConf, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- MF-REQUEST
-- MF-SAP Request.request --
-- In support of conformance testing ISO 20026
simFUTreq          MFSAP-RR::={&mxref c-simFUTreq, &MXParam
                        SimFUTreq}
simFLTreq          MFSAP-RR::={&mxref c-simFLTreq, &MXParam
                        SimFLTreq}
testMFecho         MFSAP-RR::={&mxref c-testMFecho, &MXParam
                        TestMFecho}

-- From ISO 24102-3 - Modul 3
SimFUTreq::=FAsapIndication
-- From ISO 29281-1
SimFLTreq::=NFsapRequest

TestMFecho::=SEQUENCE{
  sap          INTEGER{f (70)} (0..255), -- indicating MF-SAP
  info         EchoTest
}

-- In support of EN ISO 17423
iTS-S-Appl-Reg      MFSAP-RR::={&mxref c-iTS-S-Appl-RegMF, &MXParam
                        ITS-S-Appl-Reg}
iTS-S-Appl-ReqFinal MFSAP-RR::={&mxref c-iTS-S-Appl-ReqFinalMF,
                        &MXParam ITS-S-Appl-ReqFinal}
-- In support of ISO 24102-2
rsmpMessageRX      MFSAP-RR::={&mxref c-rsmpMessageRX, &MXParam
                        RSMFmessageRX}
-- In support of ISO 24102-4
iICrequestRX       MFSAP-RR::={&mxref c-iICrequestRX, &MXParam
                        ICrequestRX}
iICresponseRX      MFSAP-RR::={&mxref c-iICresponseRX, &MXParam
                        ICresponseRX}
-- In support of ISO 24102-6

-- In support of EN ISO 18750

```

```

ldmRevokeAppNotify      MFSAP-RR::={&mxref c-ldmRevokeAppNotify,
                        &MXParam LDMrevokeAppNotifyRequest}
ldmNotify                MFSAP-RR::={&mxref c-ldmNotify, &MXParam
                        LDMnotifyRequest}
ldmRegisterManagement   MFSAP-RR::={&mxref c-ldmRegisterManagement,
                        &MXParam LDMregisterManagementRequest}

-- MF Request.confirm --
-- In support of conformance testing ISO 20026
simFUTreqConf           MFSAP-RC::={&mxref c-simFUTreq, &MXParam
                        NullType}
simFLTreqConf           MFSAP-RC::={&mxref c-simFLTreq, &MXParam
                        NullType}
testMFechoConf          MFSAP-RC::={&mxref c-testMFecho, &MXParam
                        NullType}
-- In support of EN ISO 17423
iTS-S-Appl-RegConf      MFSAP-RC::={&mxref c-iTS-S-Appl-RegMF,
                        &MXParam ITS-S-Appl-RegConf}
iTS-S-Appl-ReqFinalConf MFSAP-RC::={&mxref c-iTS-S-Appl-ReqFinalMF,
                        &MXParam ITS-S-Appl-ReqFinalConf}
-- ISO 24102-4
iICrequestRXConf        MFSAP-RC::={&mxref c-iICrequestRX, &MXParam
                        NullType}
iICresponseRXConf       MFSAP-RC::={&mxref c-iICresponseRX, &MXParam
                        NullType}
rsmpMessageRXconf       MFSAP-RC::={&mxref c-rsmpMessageRX,
                        &MXParam NullType}
-- ISO 24102-6
-- In support of EN ISO 18750
ldmRevokeAppNotifyConf MFSAP-RC::={&mxref c-ldmRevokeAppNotify,
                        &MXParam LDMrevokeAppNotifyConfirm} -- not
                        used
ldmNotifyConf           MFSAP-RC::={&mxref c-ldmNotify, &MXParam
                        LDMnotifyConfirm} -- not used
ldmRegisterManagementConf MFSAP-RC::={&mxref c-ldmRegisterManagement,
                        &MXParam LDMregisterManagementConfirm} --
                        not used

/*
The ASN.1 specification has been checked for conformance to the ASN.1
standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.10 Module ITSSapReqMn

```

ITSSapReqMn { iso (1) standard (0) calm-management (24102) msap (3)
requests (4) mn (3) version0 (0)}

```

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS

```

-- ISO 24102-3
ErrStatus, CommandRef, sap-simUT, sap-simLT, sap-testEcho, EchoTest FROM
ITSSapBasics { iso (1) standard (0) calm-management (24102) msap (3)
basics (2) version0 (0)}

```

```

-- C-ITS Data Dictionary (still in ISO 17419 )
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}

```

```

-- ISO 21218
INsapRequest, Link-ID FROM ITSllsap {iso(1) standard(0)
calm-ll-sap(21218) asnm-1 (1) version2 (2)}

```

-- ISO 24102-6

```

-- ISO 29281-1
NFsapIndication FROM ITSfntp { iso (1) standard (0) calm-nonip(29281)
fntp(1) asnm-1 (1) version2 (2)}

```

```

-- ISO 24102-1
RefFWT, FWT, FWTnotify, FwtNotifys, FWTnotifyConf FROM ITSmanagement
{ iso (1) standard (0) calm-management (24102) local (1) asnm-1 (1)
version2 (2)}
;
/*
Start of the static part
*/
-- MN-Request.request --
MNSAP-RR::=CLASS {
    &mxref RefMNSAP-R UNIQUE,
    &MXParam
}

MN-Request-request::=SEQUENCE{
    commandRef      CommandRef,
    command          MNrequest
}

MNrequest::=SEQUENCE{
    ref              MNSAP-RR.&mxref({MN-Request}),
    request-param    MNSAP-RR.&MXParam({MN-Request}{@ref})
}

-- MN-Request.confirm --
MNSAP-RC::=CLASS {
    &mxref RefMNSAP-R UNIQUE,
    &MXParam
}

MN-Request-confirm::=SEQUENCE{
    commandRef      CommandRef,
    commandCnf      MNrequestCnf,
    errStatus        ErrStatus
}

MNrequestCnf::=SEQUENCE{
    ref              MNSAP-RC.&mxref({MN-ReqConfirm}),
    reqConfirm-param MNSAP-RC.&MXParam({MN-ReqConfirm}{@ref})
}

/*
End of the static part
*/

/*
Start of semi-dynamic part
Select what is needed for an implementation
*/
-- Reference identifier used in MNSAP-RR and MNSAP-RC
RefMNSAP-R ::= INTEGER {
-- General
    c-simNUTreq      (sap-simUT), -- 253
    c-simNLTreq      (sap-simLT), -- 254
    c-testMNecho     (sap-testEcho), -- 255
-- In support of ISO 24102-1
    c-fWTnotify      (2)
-- In support of ISO 24102-6
} (0..65535)

MN-Request MNSAP-RR::={simNUTreq | simNLTreq | testMNecho | fWTnotify,
...}

MN-ReqConfirm MNSAP-RC::={simNUTreqConf | simNLTreqConf |
testMNechoConf | fWTnotifyConf, ...}

/*
End of semi-dynamic part
Select what is needed for an implementation
*/

```

```

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- MN-SAP Request.request
-- In support of conformance testing ISO 20026
simNUTreq      MNSAP-RR::={&mxref c-simNUTreq, &MXParam SimNUTreq}
simNLTre req   MNSAP-RR::={&mxref c-simNLTre req, &MXParam SimNLTre req}
testMNecho    MNSAP-RR::={&mxref c-testMNecho, &MXParam TestMNecho}

TestMNecho::=SEQUENCE{
  sap          INTEGER{n (78)} (0..255), -- indicating MN-SAP
  info         EchoTest
}

-- From ISO 29281-1
SimNUTreq::=NFsapIndication
-- From ISO 21218
SimNLTre req::=INsapRequest

-- In support of ISO 24102-1
fWTnotify     MNSAP-RR::={&mxref c-fWTnotify, &MXParam FWTnotify}

-- In support of ISO 24102-6

-- MN-SAP Request.confirm
-- In support of conformance testing ISO 20026
simNUTreqConf MNSAP-RC::={&mxref c-simNUTreq, &MXParam NullType}
simNLTre reqConf MNSAP-RC::={&mxref c-simNLTre req, &MXParam NullType}
testMNechoConf MNSAP-RC::={&mxref c-testMNecho, &MXParam NullType}

-- In support of ???
fWTnotifyConf MNSAP-RC::={&mxref c-fWTnotify, &MXParam NullType}

-- In support of ISO 24102-6

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.11 Module ITSSapReqMi

```

ITSSapReqMi { iso (1) standard (0) calm-management (24102) msap (3)
requests (4) mi (4) version0 (0)}

```

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS

```

-- ISO 24102-3
EchoTest, ErrStatus, CommandRef, sap-simUT, sap-testEcho FROM
ITSSapBasics { iso (1) standard (0) calm-management (24102) msap (3)
basics (2) version0 (0)}

```

```

-- C-ITS Data Dictionary (still in ISO 17419 )
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}

```

```

-- ISO 21218
Event21218Notification, Event21218NotificationConf,
MacManagementFrameRX, MacManagementFrameRXConf, PositionUpdateRequest,
PositionUpdateRequestConf, PrioritizationRegistration,
PrioritizationRegistrationConf, PrioritizationRequest,
PrioritizationRequestConf, RegistrationCI, RegistrationCIConf,
INsapIndication, Link-ID FROM ITSllsap {iso(1) standard(0)
calm-ll-sap(21218) asnm-1 (1) version2 (2)}

```

```

-- ISO 24102-6

```

```

;
/*
Start of the static part
*/
-- MI-Request.request
MISAP-RR ::= CLASS {
    &mxref RefMISAP-R UNIQUE,
    &MXParam
}

MI-Request-request ::= SEQUENCE {
    linkID          Link-ID,
    commandRef      CommandRef,
    command         MIrequest
}

MIrequest ::= SEQUENCE {
    ref              MISAP-RR.&mxref({MI-Request}),
    request-param    MISAP-RR.&MXParam({MI-Request}{@ref})
}

-- MI-Request.confirm --
MISAP-RC ::= CLASS {
    &mxref RefMISAP-R UNIQUE,
    &MXParam
}

MI-Request-confirm ::= SEQUENCE {
    linkID          Link-ID,
    commandRef      CommandRef,
    commandCnf      MIrequestCnf,
    errStatus       ErrStatus
}

MIrequestCnf ::= SEQUENCE {
    ref              MISAP-RC.&mxref({MI-ReqConfirm}),
    reqConfirm-param MISAP-RC.&MXParam({MI-ReqConfirm}{@ref})
}

/*
End of the static part
*/

/*
Start of semi-dynamic part
Select what is needed for an implementation
*/
-- Reference identifier used in MISAP-RR and MISAP-RC
RefMISAP-R ::= INTEGER {
-- General
    c-simIUTreq          (sap-simUT),
    c-testMIecho         (sap-testEcho),
-- In support of ISO 21218
    c-event21218Notification (1),
    c-macManagementFrameRX (3),
    c-positionUpdateRequest (2),
    c-prioritizationRegistration (4),
    c-prioritizationRequest (6),
    c-registrationCI      (5)
-- In support of ISO 24102-6
} (0..65535)

MI-Request MISAP-RR ::= {simIUTreq | testMIecho | event21218Notification |
macManagementFrameRX | positionUpdateRequest |
prioritizationRegistration | prioritizationRequest | registrationCI ,
...}

MI-ReqConfirm MISAP-RC ::= {simIUTreqConf | event21218NotificationConf |
macManagementFrameRXConf | positionUpdateRequestConf |
prioritizationRegistrationConf | prioritizationRequestConf |
registrationCIconf, ...}

```

```

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- MI-SAP Request.request
-- In support of conformance testing ISO20026
simIUTreq      MISAP-RR:={&mxref c-simIUTreq, &MXParam SimIUTreq}
testMIecho     MISAP-RR:={&mxref c-testMIecho, &MXParam TestMIecho}

SimIUTreq:=INSapIndication

TestMIecho:=SEQUENCE{
  sap INTEGER{i (73)} (0..255), -- indicating MI-SAP
  info      EchoTest
}

-- In support of ISO 21218
event21218Notification      MISAP-RR:={&mxref
c-event21218Notification, &MXParam
Event21218Notification}
macManagementFrameRX       MISAP-RR:={&mxref c-macManagementFrameRX,
&MXParam MacManagementFrameRX}
positionUpdateRequest       MISAP-RR:={&mxref c-positionUpdateRequest,
&MXParam PositionUpdateRequest}
prioritizationRegistration  MISAP-RR:={&mxref
c-prioritizationRegistration, &MXParam
PrioritizationRegistration}
prioritizationRequest       MISAP-RR:={&mxref c-prioritizationRequest,
&MXParam PrioritizationRequest}
registrationCI              MISAP-RR:={&mxref c-registrationCI,
&MXParam RegistrationCI}

-- In support of ISO 24102-6

-- MI-Request.confirm
-- In support of conformance testing ISO 20026
simIUTreqConf              MISAP-RC:={&mxref c-simIUTreq,
&MXParam NullType}

-- In support of ISO 21218
event21218NotificationConf MISAP-RC:={&mxref
c-event21218Notification, &MXParam
Event21218NotificationConf}
macManagementFrameRXConf   MISAP-RC:={&mxref
c-macManagementFrameRX,
&MXParam MacManagementFrameRXConf}
positionUpdateRequestConf   MISAP-RC:={&mxref
c-positionUpdateRequest, &MXParam
PositionUpdateRequestConf}
prioritizationRegistrationConf MISAP-RC:={&mxref
c-prioritizationRegistration, &MXParam
PrioritizationRegistrationConf}
prioritizationRequestConf   MISAP-RC:={&mxref
c-prioritizationRequest, &MXParam
PrioritizationRequestConf}
registrationCIConf          MISAP-RC:={&mxref c-registrationCI,
&MXParam RegistrationCIConf}

-- In support of ISO 24102-6

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/
END

```

## A.12 Module ITsSapCmdSa

So far no service primitive functions are specified for SA-Commands, thus this ASN.1 module cannot yet be used.

```
ITsSapCmdSa { iso (1) standard (0) calm-management (24102) msap (3)
  commands (3) sa (5) version0 (0) }
```

```
DEFINITIONS AUTOMATIC TAGS ::= BEGIN
```

```
IMPORTS
```

```
-- ISO 24102-3
```

```
ErrStatus, CommandRef FROM ITsSapBasics { iso (1) standard (0)
  calm-management (24102) msap (3) basics (2) version0 (0) }
```

```
;
```

```
/*
```

```
  Start of the static part
```

```
*/
```

```
-- SA-Command-request
```

```
SASAP-CR ::= CLASS {
  &mxref RefSASAP-C UNIQUE,
  &MXParam
}
```

```
SA-Command-request ::= SEQUENCE {
  commandRef      CommandRef,
  command         SAcCommand
}
```

```
SAcCommand ::= SEQUENCE {
  ref              SASAP-CR.&mxref({SA-Command}),
  command-param   SASAP-CR.&MXParam({SA-Command}{@ref})
}
```

```
-- SA-Command.confirm --
```

```
SASAP-CC ::= CLASS {
  &mxref RefSASAP-C UNIQUE,
  &MXParam
}
```

```
SA-Command-confirm ::= SEQUENCE {
  commandRef      CommandRef,
  commandCnf     SAcCommandCnf,
  errStatus       ErrStatus
}
```

```
SAcCommandCnf ::= SEQUENCE {
  ref              SASAP-CC.&mxref({SA-CmdConfirm}),
  cmdConfirm-param SASAP-CC.&MXParam({SA-CmdConfirm}{@ref}),
}
```

```
/*
```

```
  End of the static part
```

```
*/
```

```
/*
```

```
  Start of semi-dynamic part
  Select what is needed for an implementation
```

```
*/
```

```
-- Reference identifier used in SASAP-CR and SASAP-CC
```

```
RefSASAP-C ::= INTEGER(0..65535)
```

```
SA-Command SASAP-CR ::= {, ...}
```

```
SA-CmdConfirm SASAP-CC ::= {, ...}
```

```
/*
```

```
  End of semi-dynamic part
  Select what is needed for an implementation
```

```

*/
/*
  Start of dynamic part
  Select what is needed for an implementation
*/
/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

### A.13 Module ITsSapCmdSf

```

ITsSapCmdSf { iso (1) standard (0) calm-management (24102) msap (3)
  commands (3) sf (6) version0 (0)}

```

```

DEFINITIONS AUTOMATIC TAGS ::= BEGIN

```

```

IMPORTS

```

```

-- ISO 24102-3

```

```

ErrStatus, CommandRef FROM ITsSapBasics { iso (1) standard (0)
  calm-management (24102) msap (3) basics (2) version0 (0)}

```

```

-- EN ISO 18750

```

```

LDMrevokeAuthorizationConfirm, LDMrevokeAuthorizationRequest FROM
  CITSldm2 {iso(1) standard(0) cits-ldm (18750) asnm-1(1) version2 (2)}

```

```

;

```

```

/*
  Start of the static part
*/

```

```

-- SF-Command.request --

```

```

SFSAP-CR ::= CLASS {
  &mxref RefSFSAP-C UNIQUE,
  &MXParam
}

```

```

SF-Command-request ::= SEQUENCE {
  commandRef      CommandRef,
  command         SFcommand
}

```

```

SFcommand ::= SEQUENCE {
  ref              SFSAP-CR.&mxref({SF-Command}),
  command-param   SFSAP-CR.&MXParam({SF-Command}{@ref})
}

```

```

-- SF-SAP Command.confirm --

```

```

SFSAP-CC ::= CLASS {
  &mxref RefSFSAP-C UNIQUE,
  &MXParam
}

```

```

SF-Command-confirm ::= SEQUENCE {
  commandRef      CommandRef,
  commandCnf     SFcommandCnf,
  errStatus       ErrStatus
}

```

```

SFcommandCnf ::= SEQUENCE {
  ref              SFSAP-CC.&mxref({SF-CmdConfirm}),
  cmdConfirm-param SFSAP-CC.&MXParam({SF-CmdConfirm}{@ref})
}

```

```

/*
  End of the static part
*/

```

```

/*

```

```

    Start of semi-dynamic part
    Select what is needed for an implementation
*/
-- Reference identifier used in SFSAP-CR and SFSAP-CC
RefSFSAP-C:=INTEGER{
-- In support of EN ISO 18750
  c-ldmRevoceAuthorizationSF (100)
  } (0..65535)

SF-Command SFSAP-CR:={ldmRevokeAuthorization, ...}

SF-CmdConfirm SFSAP-CC:={ldmRevokeAuthorizationConf, ...}

/*
    End of semi-dynamic part
    Select what is needed for an implementation
*/

/*
    Start of dynamic part
    Select what is needed for an implementation
*/
-- SF-SAP Command.request --
-- In support of EN ISO 18750
ldmRevokeAuthorization SFSAP-CR:={&mxref c-ldmRevoceAuthorizationSF,
&MXParam LDMrevokeAuthorizationRequest}

-- SF-SAP Command.confirm --
ldmRevokeAuthorizationConf SFSAP-CC:={&mxref c-ldmRevoceAuthorizationSF, &MXParam
LDMrevokeAuthorizationConfirm}

/*
    The ASN.1 specification has been checked for conformance to the ASN.1
    standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.14 Module ITsSapCmdSn

So far no service primitive functions are specified for SN-Commands, thus this ASN.1 module cannot yet be used.

```

ITsSapCmdSn { iso (1) standard (0) calm-management (24102) msap (3)
commands (3) sn (7) version0 (0)}

```

```

DEFINITIONS AUTOMATIC TAGS:=BEGIN

```

```

IMPORTS

```

```

-- ISO 24102-3

```

```

ErrStatus, CommandRef FROM ITsSapBasics { iso (1) standard (0)
calm-management (24102) msap (3) basics (2) version0 (0)}

```

```

;

```

```

/*

```

```

    Start of the static part

```

```

*/

```

```

-- SN-Command.request

```

```

SNSAP-CR:=CLASS {
  &mxref RefSNSAP-C UNIQUE,
  &MXParam
}

```

```

SN-Command-request:=SEQUENCE{
  commandRef      CommandRef,
  command         SNcommand
}

```

```

SNcommand:=SEQUENCE{
  ref             SNSAP-CR.&mxref({SN-Command}),

```

```

command-param      SNSAP-CR.&MXParam({SN-Command}{@ref})
}

-- SN-Command.confirm --
SNSAP-CC:=CLASS {
  &mxref RefSNSAP-C UNIQUE,
  &MXParam
}

SN-Command-confirm:=SEQUENCE{
  commandRef      CommandRef,
  commandCnf      SNcommandCnf,
  errStatus       ErrStatus
}

SNcommandCnf:=SEQUENCE{
  ref              SNSAP-CC.&mxref({SN-CmdConfirm}),
  cmdConfirm-param SNSAP-CC.&MXParam({SN-CmdConfirm}{@ref}),
}

/*
  End of the static part
*/
/*
  Start of semi-dynamic part
  Select what is needed for an implementation
*/
-- Reference identifier used in SNSAP-CR and SNSAP-CC
RefSNSAP-C:=INTEGER(0..65535)

SN-Command SNSAP-CR:={, ...}

SN-CmdConfirm SNSAP-CC:={, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/
/*
  Start of dynamic part
  Select what is needed for an implementation
*/
/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.15 Module ITsSapCmdSi

So far no service primitive functions are specified for SI-Commands, thus this ASN.1 module cannot yet be used.

```

ITsSapCmdSi { iso (1) standard (0) calm-management (24102) msap (3)
  commands (3) si (8) version0 (0) }

```

```

DEFINITIONS AUTOMATIC TAGS:=BEGIN

```

```

IMPORTS

```

```

-- ISO 24102-3

```

```

ErrStatus, CommandRef FROM ITsSapBasics { iso (1) standard (0)
  calm-management (24102) msap (3) basics (2) version0 (0) }

```

```

;

```

```

/*
  Start of the static part
*/

```

```

-- SI-Command.request
SISAP-CR:=CLASS {
    &mxref RefSISAP-C UNIQUE,
    &MXParam
}

SI-Command-request:=SEQUENCE{
    linkID          Link-ID,
    commandRef     CommandRef,
    command        Sicommand
}

Sicommand:=SEQUENCE{
    ref            SISAP-CR.&mxref({SI-Command}),
    command-param SISAP-CR.&MXParam({SI-Command}{@ref})
}

-- SI-Command.confirm --
SISAP-CC:=CLASS {
    &mxref RefSISAP-C UNIQUE,
    &MXParam
}

SI-Command-confirm:=SEQUENCE{
    linkID          Link-ID,
    commandRef     CommandRef,
    commandCnf    SicommandCnf,
    errStatus      ErrStatus
}

SicommandCnf:=SEQUENCE{
    ref            SISAP-CC.&mxref({SI-CmdConfirm}),
    cmdConfirm-param SISAP-CC.&MXParam({SI-CmdConfirm}{@ref}),
}

/*
  End of the static part
*/

/*
  Start of semi-dynamic part
  Select what is needed for an implementation
*/
-- Reference identifier used in SISAP-CR and SISAP-CC
RefSISAP-C:=INTEGER(0..65535)

SI-Command SISAP-CR:={, ...}

SI-CmdConfirm SISAP-CC:={, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.16 Module ITSSapReqSa

So far no service primitive functions are specified for SA-Requests, thus this ASN.1 module cannot yet be used.

```
ITSSapReqSa { iso (1) standard (0) calm-management (24102) msap (3)
requests (4) sa (5) version0 (0)}
```

```
DEFINITIONS AUTOMATIC TAGS::=BEGIN
```

```
IMPORTS
```

```
-- ISO 24102-3
```

```
ErrStatus, CommandRef FROM ITSSapBasics { iso (1) standard (0)
calm-management (24102) msap (3) basics (2) version0 (0)}
```

```
;
/*
Start of the static part
*/
SASAP-RR::=CLASS {
    &mxref RefSASAP-R UNIQUE,
    &MXParam
}

SA-Request-request::=SEQUENCE{
    commandRef      CommandRef,
    command         SArequest
}

SArequest::=SEQUENCE{
    ref             SASAP-RR.&mxref({SA-Request}),
    request-param  SASAP-RR.&MXParam({SA-Request}{@ref})
}

SASAP-RC::=CLASS {
    &mxref RefSASAP-R UNIQUE,
    &MXParam
}

SA-Request-confirm::=SEQUENCE{
    commandRef      CommandRef,
    commandCnf     SArequestCnf,
    errStatus      ErrStatus
}

SArequestCnf::=SEQUENCE{
    ref             SASAP-RC.&mxref({SA-Request-confirm}),
    reqConfirm-param SASAP-RC.&MXParam({SA-Request-confirm}{@ref}),
}

/*
End of the static part
*/

/*
Start of semi-dynamic part
Select what is needed for an implementation
*/
-- Reference identifier used in SASAP-RR and SASAP-RC
RefSASAP-R::=INTEGER(0..65535)

SA-Request MASAP-RR::={, ...}

SA-ReqConfirm SASAP-RC::={, ...}

/*
End of semi-dynamic part
Select what is needed for an implementation
*/
```

```

/*
  Start of dynamic part
  Select what is needed for an implementation
*/

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.17 Module ITsSapReqSf

```

ITsSapReqSf { iso (1) standard (0) calm-management (24102) msap (3)
  requests (4) sf (6) version0 (0)}

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS
  -- ISO 24102-3
  ErrStatus, CommandRef FROM ITsSapBasics { iso (1) standard (0)
  calm-management (24102) msap (3) basics (2) version0 (0)}

  -- EN ISO 18750
  LDMcheckAuthorizationConfirm, LDMcheckAuthorizationRequest FROM
  CITSldm2 {iso(1) standard(0) cits-ldm (18750) asnm-1 (1) version2 (2)}

  -- ISO 24102-2
  SecRSMPmessageTX, SecRMCHrX, RMCHmessage, RSMPmessage FROM
  ITSSremoteMgmt2 { iso (1) standard (0) calm-management (24102) remote
  (2) asnm-1 (1) version2 (2)}

;
/*
  Start of the static part
*/
-- SF-Request.request --
SFSAP-RR::=CLASS{
  &mxref RefSFSAP-R UNIQUE,
  &MXParam
}

SF-Request-request::=SEQUENCE{
  commandRef          CommandRef,
  command             SFrequest
}

SFrequest::=SEQUENCE{
  ref                 SFSAP-RR.&mxref({SF-Request}),
  request-param      SFSAP-RR.&MXParam({SF-Request}{@ref})
}

-- SF-Request.confirm --
SFSAP-RC::=CLASS{
  &mxref RefSFSAP-R UNIQUE,
  &MXParam
}

SF-Request-confirm::=SEQUENCE{
  commandRef          CommandRef,
  command             SFrequestCnf,
  errStatus           ErrStatus
}

SFrequestCnf::=SEQUENCE{
  ref                 SFSAP-RC.&mxref({SF-ReqConfirm}),
  reqConfirm-param   SFSAP-RC.&MXParam({SF-ReqConfirm}{@ref})
}

```

```

/*
  End of the static part
*/

/*
  Start of semi-dynamic part
  Select what is needed for an implementation
*/
-- Reference identifier used in SFSAP-RR and SFSAP-RC
RefSFSAP-R:=INTEGER{
-- In support of ISO 24102-4
  c-secRSMPmessageTX      (2),
  c-secRMChRx            (3),
-- In support of EN ISO 18750
  c-ldmCheckAuthorizationSF (100)
} (0..65535)

SF-Request SFSAP-RR:={secRSMPmessageTX | secRMChRx |
ldmCheckAuthorization, ...}

SF-ReqConfirm SFSAP-RC:={secRSMPmessageTXConf | secRMChRxConf |
ldmCheckAuthorizationConf, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/
-- SF-SAP Request.request --
-- In support of ISO 24102-4
secRSMPmessageTX      SFSAP-RR:={&mxref c-secRSMPmessageTX,
&MXParam SecRSMPmessageTX}
secRMChRx             SFSAP-RR:={&mxref c-secRMChRx,
&MXParam SecRMChRx}
-- In support of EN ISO 18750
ldmCheckAuthorization SFSAP-RR:={&mxref
c-ldmCheckAuthorizationSF, &MXParam
LDMcheckAuthorizationRequest}

-- SF-SAP Request.confirm --
secRSMPmessageTXConf SFSAP-RC:={&mxref c-secRSMPmessageTX,
&MXParam RMChmessage}
secRMChRxConf       SFSAP-RC:={&mxref c-secRMChRx, &MXParam
RSMPmessage}
ldmCheckAuthorizationConf SFSAP-RC:={&mxref
c-ldmCheckAuthorizationSF, &MXParam
LDMcheckAuthorizationConfirm}

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS
  ASN-1STEP
*/

END

```

## A.18 Module ITsSapReqSn

So far no service primitive functions are specified for SN-Requests, thus this ASN.1 module cannot yet be used.

```
ITsSapReqSn { iso (1) standard (0) calm-management (24102) msap (3)
requests (4) sn (7) version0 (0) }
```

```
DEFINITIONS AUTOMATIC TAGS:=BEGIN
```

```

IMPORTS
__ ISO 24102-3
ErrStatus, CommandRef FROM ITSSapBasics { iso (1) standard (0)
calm-management (24102) msap (3) basics (2) version0 (0) }

;
/*
Start of the static part
*/
-- SN-Request.request --
SNSAP-RR:=CLASS {
    &mxref RefSNSAP-R UNIQUE,
    &MXParam
}

SN Request-request:=SEQUENCE{
    commandRef      CommandRef,
    command         SNrequest
}

SNrequest:=SEQUENCE{
    ref             SNSAP-RR.&mxref({SN-Request}),
    request-param  SNSAP-RR.&MXParam({SN-Request}{@ref})
}

-- SN-Request.confirm --
SNSAP-RC:=CLASS {
    &mxref RefSNSAP-R UNIQUE,
    &MXParam
}

SN-Request-confirm:=SEQUENCE{
    commandRef      CommandRef,
    commandCnf     SNrequestCnf,
    errStatus      ErrStatus
}

SNrequestCnf:=SEQUENCE{
    ref             SNSAP-RC.&mxref({SN-ReqConfirm}),
    reqConfirm-param SNSAP-RC.&MXParam({SN-ReqConfirm}{@ref}),
}

/*
End of the static part
*/

/*
Start of semi-dynamic part
Select what is needed for an implementation
*/
-- Reference Identifier used in SNSAP-RR and SNSAP-RC
RefSNSAP-R:=INTEGER(0..65535)

SN-Request SNSAP-RR:={, ...}

SN-ReqConfirm SNSAP-RC:={, ...}

/*
End of semi-dynamic part
Select what is needed for an implementation
*/

/*
Start of dynamic part
Select what is needed for an implementation
*/

/*
The ASN.1 specification has been checked for conformance to the ASN.1
standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

```

END

## A.19 Module ITSSapReqSi

So far no service primitive functions are specified for SI-Requests, thus this ASN.1 module cannot yet be used.

```
ITSSapReqSi { iso (1) standard (0) calm-management (24102) msap (3)
requests (4) si (8) version0 (0)}
```

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS

-- ISO 24102-3

```
ErrStatus, CommandRef FROM ITSSapBasics { iso (1) standard (0)
calm-management (24102) msap (3) basics (2) version0 (0)}
```

;

/\*

**Start of the static part**

\*/

-- **SI-Request.request**

```
SISAP-RR::=CLASS {
  &mxref RefSISAP-R UNIQUE,
  &MXParam
}
```

```
SI-Request-request::=SEQUENCE{
  linkID          Link-ID,
  commandRef      CommandRef,
  command         Sirequest
}
```

```
Sirequest::=SEQUENCE{
  ref              SISAP-RR.&mxref({SI-Request}),
  request-param   SISAP-RR.&MXParam({SI-Request}{@ref})
}
```

-- **SI-Request.confirm** --

```
SISAP-RC::=CLASS {
  &mxref RefSISAP-R UNIQUE,
  &MXParam
}
```

```
SI-Request-confirm::=SEQUENCE{
  linkID          Link-ID,
  commandRef      CommandRef,
  commandCnf      SirequestCnf
  errStatus       ErrStatus
}
```

```
SirequestCnf::=SEQUENCE{
  ref              SISAP-RC.&mxref({SI-CmdConfirm}),
  reqConfirm-param SISAP-RC.&MXParam({SI-CmdConfirm}{@ref}),
}
```

/\*

**End of the static part**

\*/

/\*

**Start of semi-dynamic part**

**Select what is needed for an implementation**

\*/

```
-- Reference identifier used in SINSAP-RR and SISAP-RC
RefSISAP-R::=INTEGER(0..65535)
```

```
SI-Request SISAP-RR::={, ...}
```

```

SI-ReqConfirm SISAP-RC::={, ...}

/*
  End of semi-dynamic part
  Select what is needed for an implementation
*/

/*
  Start of dynamic part
  Select what is needed for an implementation
*/

/*
  The ASN.1 specification has been checked for conformance to the ASN.1
  standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.20 Module ITSmsaps

```

ITSsapBasics { iso (1) standard (0) calm-management (24102) msap (5)
basics (2) version0 (0) }

DEFINITIONS AUTOMATIC TAGS::=BEGIN

IMPORTS
-- C-ITS Data Dictionary (still in ISO 17419 )
Int2 FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt (17419)
dataDictionary (1) version1 (1)}

;
-- General
-- Values used in several SAPs for identical service functions
sap-simUT      Int2::=253
sap-simLT      Int2::=254
sap-testEcho  Int2::=255
-- In support of ISO 24102-6
-- Commands
-- Requests

sap-17423iTS-S-Appl-Reg Int2::=1
sap-17423iTS-S-Appl-RegFinal Int2::=14

-- In support of EN ISO 18750: usage of same reference ID in several SAPs
sap-ldmRegister      Int2::=100
sap-ldmDeregister    Int2::=101
sap-ldmAdd            Int2::=102
sap-ldmUpdate        Int2::=103
sap-ldmDelete        Int2::=104
sap-ldmSubscribe     Int2::=105
sap-ldmUnsubscribe   Int2::=106
sap-ldmQuery         Int2::=107
sap-ldmRevokeAppNotify Int2::=108
sap-ldmNotify        Int2::=109
sap-ldmRegisterManagement Int2::=110

-- Used in XY-COMMANDS
EchoTest::=OCTET STRING (SIZE(0..255))

-- Used in all XY-REQUESTS
ErrStatus::=INTEGER{
  success              (0),
  unspecFailure        (1), -- unspecified failure
  invalParamNo         (2), -- invalid param no.
  invalParamVal        (3), -- invalid param value
  riViolation          (4), -- RI violation
  cmdReqNo             (5), -- invalid cmd/req no.
  cmdReqVal            (6), -- invalid cmd/req value
  accessViolation      (7), -- access violation
  invalidType          (8), -- invalid cmd/req type
}

```

```

sequenceError          (9), -- cmd/req not applicable in the given
                        context
nonavailValue          (10), -- value required in cmd/req is not
                        available
notsupportedFeature    (11), -- the requested feature is not
                        supported
hardwareFailure        (255) -- unspecified hardware failure
} (0..255)

-- Used in all XY-COMMANDs and XY-REQUESTs
CommandRef ::= INTEGER (0..65535)

/*
The ASN.1 specification has been checked for conformance to the ASN.1
standards by OSS ASN.1 Syntax Checker, and by OSS ASN-1STEP
*/

END

```

## A.21 Module ITSfasapfunctions

```

ITSfasapfunctions { iso (1) standard (0) calm-management (24102)
msap (3) fasap (5) version0 (0)}

DEFINITIONS AUTOMATIC TAGS ::= BEGIN

IMPORTS
-- C-ITS Data Dictionary (still in ISO 17419 )
NullType FROM CITSdataDictionary1 {iso(1) standard(0) cits-applMgmt
(17419) dataDictionary (1) version1 (1)}

-- ISO 18750
LDMregisterRequest, LDMderegisterRequest, LDMaddRequest,
LDMupdateRequest, LDMdeleteRequest, LDMsubscribeRequest,
LDMunsubscribeRequest, LDMqueryRequest, LDMregisterManagementConfirm,
LDMregisterConfirm, LDMderegisterConfirm, LDMaddConfirm,
LDMupdateConfirm, LDMdeleteConfirm, LDMsubscribeConfirm,
LDMunsubscribeConfirm, LDMqueryConfirm, LDMrevokeAppNotifyRequest,
LDMnotifyRequest, LDMregisterManagementRequest FROM CITSldm2 {iso(1)
standard(0) cits-ldm (18750) asnm-1(1) version2 (2)}

-- ISO 24102-3
sap-ldmRegister, sap-ldmDeregister, sap-ldmAdd, sap-ldmUpdate,
sap-ldmDelete, sap-ldmSubscribe, sap-ldmUnsubscribe, sap-ldmQuery,
sap-ldmRevokeAppNotify, sap-ldmNotify, sap-ldmRegisterManagement
FROM ITSsapBasics { iso (1) standard (0) calm-management (24102)
msap (3) basics (2) version0 (0)}

;

-- End of IMPORTS
-- FA-SAP generic OBJECT CLASS
-- Reference ID for FASAPDOWN and FASAPUP
RefFASAP ::= INTEGER {
c-ldmRegisterFA          (sap-ldmRegister), -- 100
c-ldmDeregisterFA       (sap-ldmDeregister), -- 101
c-ldmAddFA              (sap-ldmAdd), -- 102
c-ldmUpdateFA          (sap-ldmUpdate), -- 103
c-ldmDeleteFA          (sap-ldmDelete), -- 104
c-ldmSubscribeFA       (sap-ldmSubscribe), -- 105
c-ldmUnsubscribeFA     (sap-ldmUnsubscribe), -- 106
c-ldmQueryFA           (sap-ldmQuery), -- 107
c-ldmRevokeAppNotifyFA (sap-ldmRevokeAppNotify), -- 108
c-ldmNotifyFA          (sap-ldmNotify), -- 109
c-ldmRegisterManagementFA (sap-ldmRegisterManagement) -- 110
} (0 .. 65535)

-- FA-SAP services
-- Down: from ITS-S application entity to ITS-S facilities layer
FASAPDOWN ::= CLASS {
&primitiveRef RefFASAP UNIQUE,

```