

# ETSI TS 102 675-2 V1.1.1 (2009-11)

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*Technical Specification*

## **Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Part 2: Performance Management Information Base**

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## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

The present document is part 2 of a multi-part deliverable covering Performance Management aspects in "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM)", as identified below:

Part 1: "Performance Management at the SI-SAP";

Part 2: "**Performance Management Information Base**".

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## Introduction

The ETSI BSM Technical Reports [i.1], [i.2] and [i.3] outlined the general requirements for performance. Technical Specifications [1], [2] and [3] have subsequently defined the BSM Management Functional Architecture, the BSM Performance Parameters and Performance Management respectively.

As a result of these documents, the focus of the present document is on the definition of a set of performance-related managed objects that can be used to manage a BSM sub-network.

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# 1 Scope

The present document defines the requirements for management interfaces relating to Performance Management in BSM networks, by providing an overview and guidelines for deriving a formal set of parameters (or managed objects) for one or more databases or MIB modules. These requirements are based on the concepts defined in [3].

These parameters may be applied to one or more SNMP MIBs, for example.

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## 2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI TS 102 672: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Management Functional Architecture".
- [2] ETSI TS 102 673: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Performance Parameters".
- [3] ETSI TS 102 675-1: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Performance Management at the SI-SAP".
- [4] IETF RFC 2578: "Structure of Management Information Version 2 (SMIPv2)".
- [5] IETF RFC 2579: "Textual Conventions for SMIPv2".
- [6] IETF RFC 2213: "Integrated Services Management Information Base using SMIPv2".

## 2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI TR 101 984: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Services and architectures".
  - [i.2] ETSI TR 101 985: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia; IP over Satellite".
  - [i.3] ETSI TR 102 157: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia; IP Interworking over satellite; Performance, Availability and Quality of Service".
  - [i.4] ITU-T Recommendation M.3400: "TMN management functions".
  - [i.5] IETF RFC 4181: "Guidelines for Authors and Reviewers of MIB Documents".
  - [i.6] SatLabs System Recommendations Part 3 - Management & Control Planes Specifications v2.
  - [i.7] ITU-T Recommendation Y.1540: "Internet protocol data communication service - IP Packet Transfer and Availability Performance Parameters", November 2007.
- NOTE: Former ITU-T Recommendation I.380.
- [i.8] IETF RFC 3444: "On the Difference between Information Models and Data Models".

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**control plane:** the control plane has a layered structure and performs the call control and connection control functions; it deals with the signalling necessary to set up, supervise and release calls and connections

**data model:** description of a specific data structure, with the way the data elements (in the structure) are defined and the relationship to each other

NOTE: It is normally used in software engineering to describe how data is represented and accessed (see also RFC 3444 [i.8]).

**information model:** formal representation of real-world objects and concepts, with associated relationships, constraints, rules, and operations, used to specify semantics in a given domain

NOTE: It includes things of interest (entities), relationships between these entities (associations), and details/characteristics of these entities (attributes). An information model provides formalism to the description of a problem domain without constraining how that description is mapped to an actual implementation in software. The possible mappings of the information model are the data models (see also RFC 3444 [i.8]).

**management plane:** this provides two types of functions, namely layer management and plane management functions:

- **plane Management functions:** performs management functions related to a system as a whole and provides co-ordination between all the planes

NOTE: Plane management has no layered structure.

- **layer Management functions:** performs management functions (e.g. meta-signalling) relating to resources and parameters residing in its protocol entities

NOTE: Layer Management handles the Operation And Maintenance (OAM) of information flows specific to the layer concerned.

**Management Information Base (MIB):** virtual information store containing managed objects

NOTE: Objects in the MIB (identified by their OIDs) are essentially variables, and are defined using the mechanisms defined in the SMI [4], typically using Abstract Syntax Notation One format (ASN.1).

**network control centre:** equipment at OSI Layer 2 that controls the access of terminals to a satellite network, including element management and resource management functionality

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

BNMS	BSM Network Management System
B-NMS	BSM Network Management System
BSM	Broadband Satellite Multimedia
IP	Internet Protocol
IPFIX	IP Flow Information Export
ITU	International Telecommunications Union
MIB	Management Information Base
NMC	Network Management Centre
OAM	Operation And Maintenance
OID	Object Identification
OSI	Open Standards Institute
QID	Queue Identifier
QoS	Quality of Service
RFC	Request For Comments
RMON	Remote Network Monitoring
SI-SAP	Satellite Independent-Service Access Point
SLA	Service Level Agreement
SMIv2	Structure of Management Information version 2
SNMP	Simple Network Management Protocol
ST	Satellite Terminal

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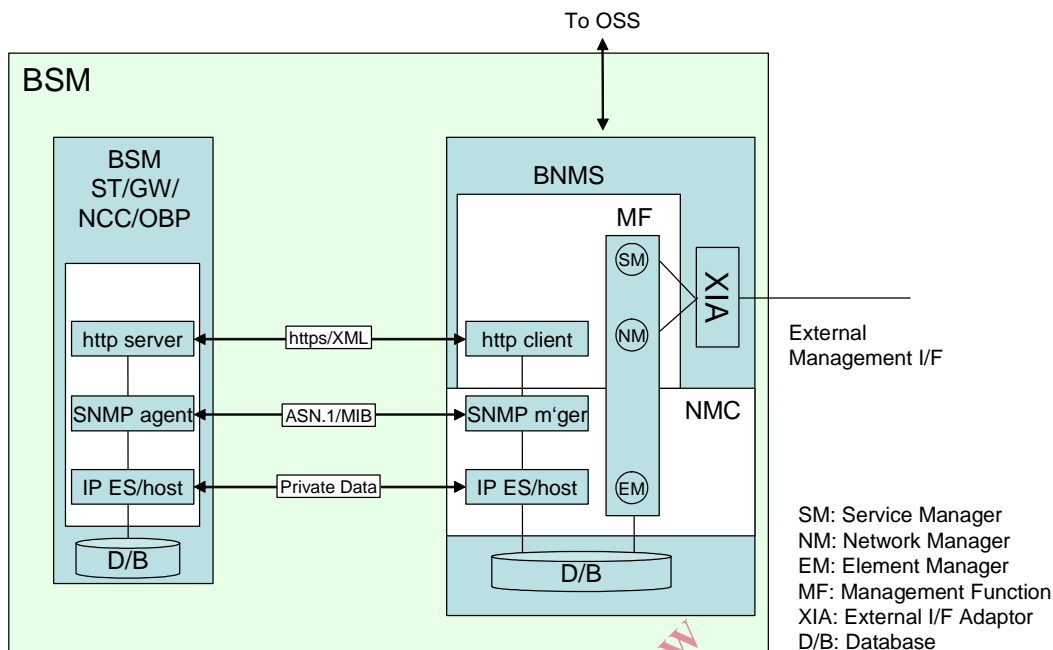
## 4 Background

BSM performance parameters have been defined in [2] and these are used as the basis for the database objects defined in the present document. The performance parameters identified in [2] need to be calculated, in some cases, from QID elementary attributes, as it was described in [3].

The location of BSM databases and the way in which they may be accessed is described in [1] and [3]. Figure 1 shows the overall management architecture.

A database (MIB) in the ST stores parameter values as objects. Typically the BNMS would use SNMPv2c commands to obtain the parameter values from the ST MIB. An SNMP agent in the ST responds to commands from an SNMP client in the BNMS.

The ST MIB should support local management (through typically a user Ethernet interface) and remote management via the satellite.



**Figure 1: BSM Management Functional Architecture**

A BSM Performance database (e.g. one or more MIBs) will allow:

- 1) Performance of individual STs to be monitored by accessing their MIBs.
- 2) Performance of the BSM from end-to-end to be monitored by accessing MIB parameters available in a central location such as the B-NMS (BSM Network Management System), and for these BSM performance MIB objects to be made available to other systems.

The QID elementary attributes and the BSM performance parameters are further described below.

## 4.1 QID elementary attributes

These are very basic QID attributes (such as packet counters and queue lengths) which can be used in practice to compute the QID-level and SI-SAP-level parameters, as described in [3].

## 4.2 QID-level Parameters (at an ST)

These are the basic parameters which are related to the virtual queues at an SI-SAP, and can be extracted directly from measurements thereon or used to control them. Some of these parameters can be measured directly, some of them can be derived from more elementary QID attributes (described above).

## 4.3 SI-SAP-level Performance parameters (at an ST)

These are parameters referring to the complete interface. Some of them need to be extracted from local measurements, some of them may be derived locally or remotely from the QID-level parameters.

## 4.4 IP-level Performance parameters (BSM-wide)

The BNMS may also create a database for access by other or higher level systems. This database contains end-to-end performance parameters derived from ST measurement parameters. These are termed IP performance parameters below.

The way in which these end-to-end BSM parameters may be measured and calculated is described in [3] and for example, could use IPFIX or RMON protocols.



## 5 BSM MIB Definition

### 5.1 MIB Structure and groups

The MIB-II [3] definition is taken as the basis for a BSM MIB.

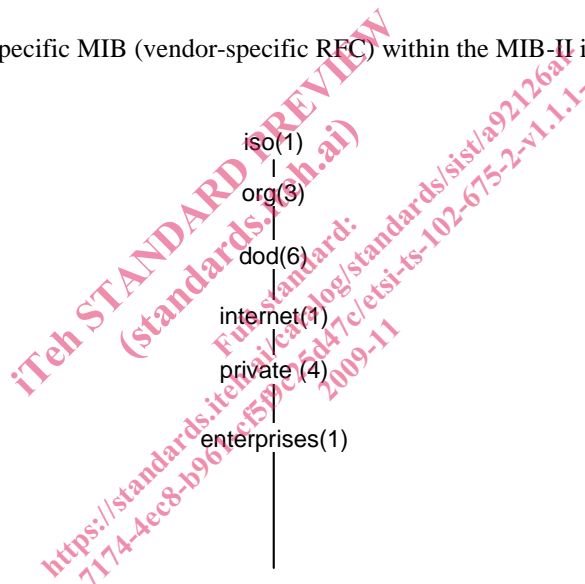
For BSM, two different MIB modules could be considered for location of the OIDs:

- A private MIB module (under iso.org.dod.internet.private.enterprises branch).
- MIB-II standard "interfaces" module (under iso.org.dod.internet.mgmt.mib-2.interfaces branch).

In MIB-II the 'interfaces' group defines a generic set of managed objects such that any lower-layer network interface to IP can be managed in an interface-independent manner through these managed objects. The 'interfaces' group provides the means for additional managed objects specific to particular types of network interface (e.g. the BSM SISAP) to be defined as extensions to the 'interfaces' group for media-specific management.

At this stage in the BSM specification, a private MIB only is considered, but it should be capable of compatibility with an interface MIB module.

The location of the BSM vendor-specific MIB (vendor-specific RFC) within the MIB-II is shown diagrammatically as follows.



**Figure 2: Private MIB location (OIDs in brackets)**

Four sub-groups, system, interfaces and ifMIB, will be used to identify the BSM interface objects. New ifType labels will be defined for BSM interface.

The first sub-group is represented by the following QID elementary attributes (as explained in [3]):

- QID octets counter [*QidOctetsCounter*] (counter).
- QID packets counter [*QidPktsCounter*] (counter).
- QID queue length in packets [*QidQPktsLen*] (32 bit integer).
- QID queue length in bytes [*QidQOctetsLen*] (32 bit integer).
- Minimum-size IP packet transmitted [*QidMinPktSize*] (32 bit integer), measured as gauge in bytes of IP packet including header, this is needed to estimate the parameter *m* of the Traffic Pattern.
- Maximum-size IP packet transmitted [*QidMaxPktSize*] (32 bit integer), measured in bytes of IP packet including header, this is needed to estimate the parameter *M* of the Traffic Pattern.

The second and third sub-group relationships for BSM objects are shown diagrammatically in figure 3. The Entity Relationship Diagram below summarizes the BSM SI-SAP performance parameters both at SI-SAP and at QID level.

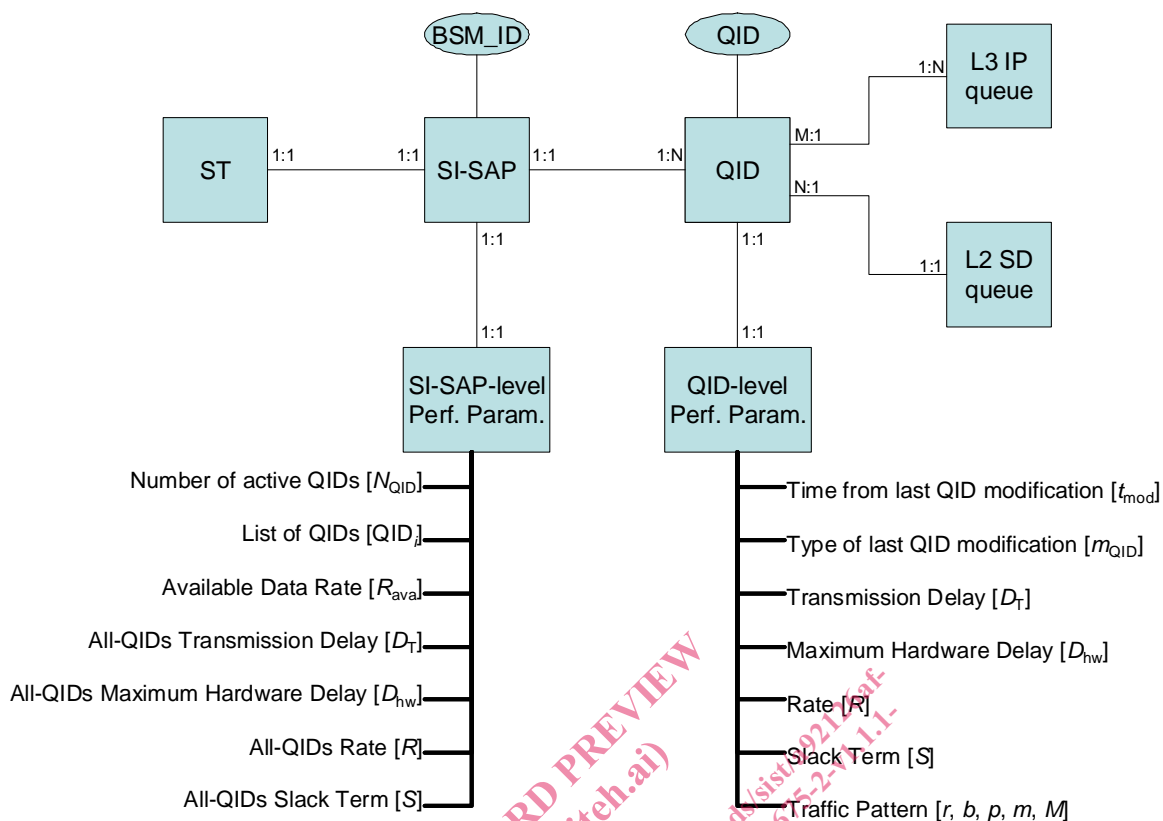


Figure 3: Entity Relationship Diagram for the BSM SI-SAP performance parameters in an ST

The last and highest-level sub-group is represented in figure 4.

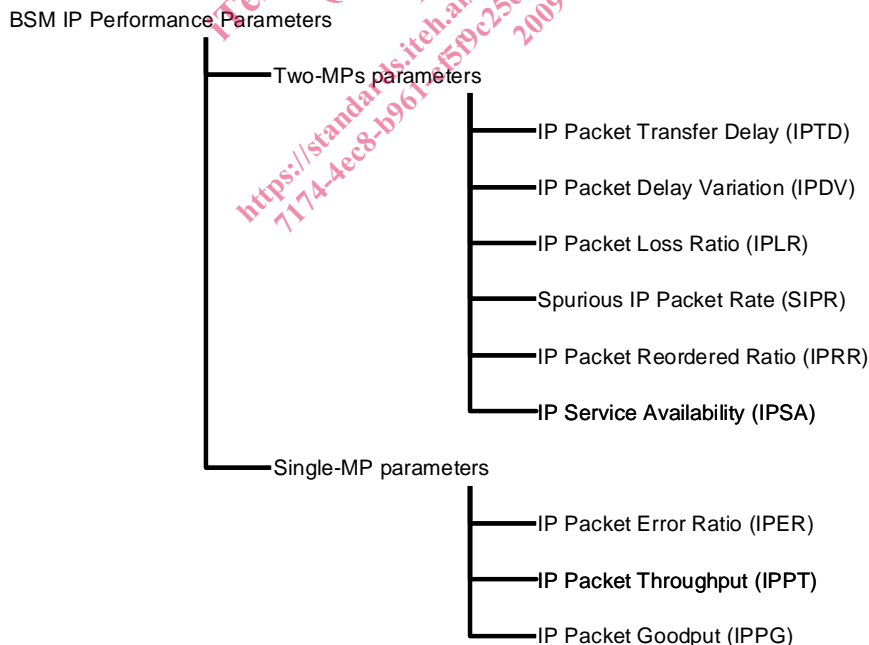


Figure 4: BSM IP performance parameters