



The European Organisation for Civil Aviation Equipment
L'Organisation Européenne pour l'Équipement de l'Aviation Civile

INTEROPERABILITY STANDARDS FOR VOIP ATM COMPONENTS

VOLUME 5: SUPERVISION

This document is the exclusive intellectual and commercial property of EUROCAE.

It is presently commercialised by EUROCAE.

This electronic copy is delivered to your company/organisation for internal use exclusively.

In no case it may be re-sold, or hired, lent or exchanged outside your company.

ED-137/5C

March 2019

Supersedes ED-137/5B

INTEROPERABILITY STANDARDS FOR VOIP ATM COMPONENTS

VOLUME 5: SUPERVISION

This document is the exclusive intellectual and commercial property of EUROCAE.

It is presently commercialised by EUROCAE.

This electronic copy is delivered to your company/organisation for internal use exclusively.

In no case it may be re-sold, or hired, lent or exchanged outside your company.

ED-137/5C

March 2019

Supersedes ED-137/5B

FOREWORD

1. This document “Interoperability Standards for VoIP ATM Components – Volume 5: Supervision” was prepared by EUROCAE Working Group 67 and was approved by the Council of EUROCAE on 23 March 2019.
2. EUROCAE is an international non-profit making organisation. Membership is open to manufacturers and users in Europe of equipment for aeronautics, trade associations, national civil aviation administrations and non-European organisations. Its work programme is principally directed to the preparation of performance specifications and guidance documents for civil aviation equipment, for adoption and use at European and world-wide levels.
3. The findings of EUROCAE are resolved after discussion among its members and, where appropriate, in collaboration with RTCA Inc, Washington D.C. USA and/or the Society of Automotive Engineers (SAE), Warrendale, PA, USA through their appropriate committee.
4. This document supersedes ED-137/5B. This version of the document represents “the minimum specification required to Manufacturers and Users to assure Interoperability between VoIP ATM Supervision Components”. EUROCAE WG-67 has updated the previous version of ED-137B and created ED-137C Volume 5 to improve information management provided by VoIP equipment to Supervision system through standardised MIB (Management Information Base).
5. This version is taking into account the EUROCONTROL VoIP in ATM Test Case Specification.
6. EUROCAE performance specifications are recommendations only. EUROCAE is not an official body of the European governments; its recommendations are valid statements of official policy only when adopted by a particular government or conference of governments.
7. Copies of this document may be obtained from:

EUROCAE
9 – 23 rue Paul Lafargue
93200 Saint-Denis
France

Telephone: +33 1 49 46 19 65
Email: eurocae@eurocae.net
Website: www.eurocae.net

TABLE OF CONTENTS

FOREWORD	I
CHAPTER 1 INTRODUCTION.....	1
1.1 BACKGROUND	1
1.2 VIENNA AGREEMENT	2
1.3 ED-137 VOLUME 5 PRESENTATION.....	3
1.4 TERMINOLOGY FOR REQUIREMENTS, RECOMMENTATIONS, OPTIONS	3
CHAPTER 2 SUPERVISION MODEL	4
2.1 NETWORK SUPERVISION.....	4
2.2 ARCHITECTURE	4
2.3 NSS REQUIREMENTS	4
2.4 OBJECTS MODEL	5
CHAPTER 3 GENERAL REQUIREMENTS.....	6
3.1 SUPERVISION PROTOCOL.....	6
3.2 GENERAL INFORMATION MODEL.....	6
3.3 MIB TREE	7
3.4 MIB-2 STRUCTURE	7
3.4.1 OBJECT GROUPS.....	7
3.4.2 OBJECT GROUPS USED BY ED-137-5	8
3.5 SCOPE AND DEFINITIONS	8
3.6 MIB STRUCTURE	8
3.7 RFC1213 PARAMETERS	8
3.8 OPERATIONAL STATUS.....	9
CHAPTER 4 VCS SUPERVISION REQUIREMENTS	10
4.1 VCS SUPERVISION STRUCTURE.....	10
4.2 MIB-2 OBJECT GROUPS	10
CHAPTER 5 RADIO MONITORING AND CONTROL	11
5.1 RADIO SUPERVISION STRUCTURE.....	11
5.2 MIB-2 OBJECT GROUPS	11
5.3 RADIO SPECIFIC MIB.....	11
5.4 MIBs COMPARISON.....	11
5.5 SCOPE AND DEFINITIONS	12
CHAPTER 6 RECORDER SUPERVISION REQUIREMENTS	14
6.1 RECORDER SUPERVISION STRUCTURE	14
6.2 MIB-2 OBJECT GROUPS	14
CHAPTER 7 GATEWAY SUPERVISION REQUIREMENTS.....	15

7.1	GATEWAY SUPERVISION STRUCTURE	15
CHAPTER 8	ALARMS AND EVENTS.....	16
8.1	DEFINITIONS.....	16
8.2	REMOTE MONITORING – RMON	16
8.3	NETWORK COMPONENTS MONITORING	17
8.4	ALARM SEVERITY.....	17
8.5	EXAMPLE.....	17
CHAPTER 9	PERFORMANCE MONITORING.....	19
9.1	PERFORMANCE MONITORING	19
9.1.1	INTERFACE ERRORS.....	19
9.1.2	INTERFACE UTILISATION.....	19
9.1.3	INTERFACE PROBLEMS	19
9.1.4	TCP AND UDP PERFORMANCE	19
ANNEX A 1	EUROCAE-COMMON-MIB DEFINITIONS.....	21
ANNEX A 2	EUROCAE-COMMON-MIB ATC RADIO (DEPRECATED)	22
ANNEX A 3	EUROCAE-COMMON-MIB ATC GRS	28
ANNEX B	REFERENCES	45
ANNEX C	ACRONYMS.....	46
ANNEX D	LIST OF EUROCAE WG-67 MEMBERS	47
	IMPROVEMENT SUGGESTION FORM.....	50

LIST OF FIGURES

FIGURE 1.1: VIENNA AGREEMENT.....	2
FIGURE 3.1: MIB TREE	7
FIGURE 5.1: RADIO MIB TREE.....	11
FIGURE 8.1: RMON MIB SUBTREE.....	16

LIST OF TABLES

TABLE 3.1: EXAMPLE OF A SUBSET OF VCS PARAMETERS.....	9
TABLE 5.1: COMPARISON BETWEEN ANNEXES A2 AND A3.....	12
TABLE 8.1 – EXAMPLE OF RMON OBJECTS	16

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Components of Ground - Ground ATM voice systems have used digital (TDM/PCM - Time Division Multiplexing / Pulse-Code Modulation) or analogue technology for a long time.

Convergence of voice and data into one multimedia network is observed on the market. As a consequence, the ATM communication network is evolving into a common infrastructure for voice and data services.

As a result of the above described technological trends, the capability of Voice over IP Technology (VoIP) may fulfil and improve operational and technical ATM communication requirements, including voice / data convergence, specific Quality of Service (QoS), security and safety requirements. After analysing the situation regarding:

- Operational and Technical Air-Ground (A/G) and Ground-Ground (G/G) ATM Voice system requirements
- Existing IP Voice protocols and signaling standards
- IP network capabilities for Voice services
- Security, QoS, Convergence (infrastructure, protocol, applications)
- Existing IP Voice ATM systems and their service interfaces

the following tasks were achieved for ground-ground ATM communications and ground-ground segment of air-ground ATM communications:

- Definition of IP Voice ATM Systems and identification of their components (Voice Communication System / VCS, Ground based Radio Station / GRS...)
- Determination of possible additional operational and technical ATM requirements for new IP Voice ATM systems, also taking into consideration A/G communications
- Accordingly, recommendations to upgrade current standardization documents
- Development of a Technical Specification for an IP Voice ATM System including:
 - Minimum performance and safety/security requirements for the system and, if appropriate, for components
 - Interoperability requirements between IP components of the IP Voice ATM systems
 - Interoperability requirements between IP components of the IP Voice ATM systems and current non-IP voice ATM systems
 - Minimum performance requirements of an IP Network aimed to support Voice in ATM
 - Consequently, the following EDs were delivered:
 - ED-136 - VoIP ATM System Operational and Technical Requirements
 - ED-137 - Interoperability Standards for VoIP ATM Components
 - ED-138 - Network Requirements and Performances for VoIP ATM Systems

1.2

VIENNA AGREEMENT

The above mentioned documents use the so-called “**Vienna Agreement**” (FIGURE 1.1) as a common reference for the definition of the different components of a VoIP ATM system and their mutual interfaces.

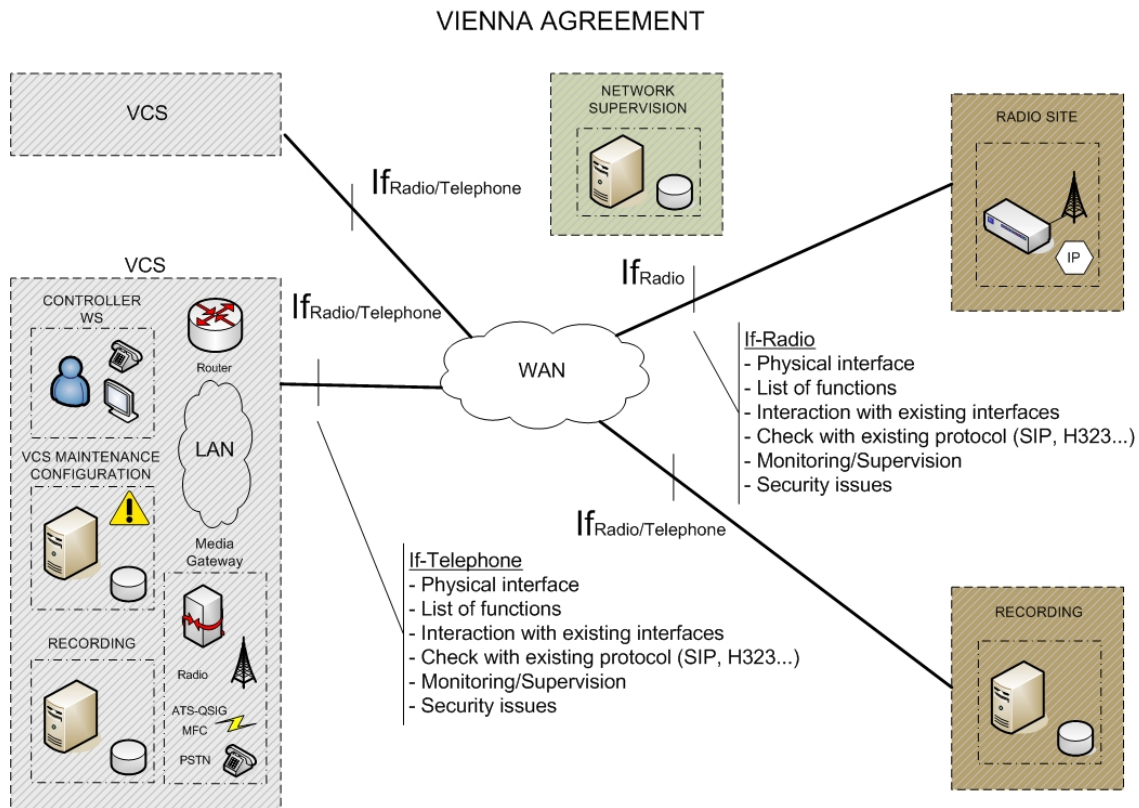


FIGURE 1.1: VIENNA AGREEMENT

VoIP components are interconnected through an IP network and suppliers are free to define their internal architecture (IP/Ethernet, TDM/PCM - Time Division Multiplexing/Pulsed Code Modulation, etc.). Between VoIP components, required interfaces are defined to guarantee their functional and technical interoperability. Therefore, VoIP ATM Systems are composed of:

- **VoIP VCS Components** performing Radio and/or Telephone functions, including:
 1. Controller Working Positions (CWP), assuring Human Machine Interface (HMI), including voice devices (microphone and loudspeaker)
 2. Possible local VCS Maintenance and Configuration stations
 3. Possible local Recording devices
 4. Possible LAN for local interconnection
 5. Possible Media Gateways to legacy systems (ATS-QSIG, ATS-R2, ATS-No.5, PSTN, Radio analogue lines, etc.)
- **VoIP Ground Radio Station Components** performing A/G voice communications using VHF and UHF Radio functions
- **VoIP Recording Components** performing recording functions
- **VoIP Network Supervision Components** performing monitoring and control functions
- **IP WAN Components** performing interconnection services between two or more different physical components

1.3 ED-137 VOLUME 5 PRESENTATION

The scope of the ED-137 standard is to define the rules for VoIP implementations to support ATM communications and their interoperability. The present document (ED-137 Volume 5), proposes a common view of the network components defined in the *Vienna Agreement* from the supervision point of view.

The objective of the present document is to provide the Network Supervision Component with a common informative description of the supervised objects, so as to allow its users to understand how the overall VoIP ATM Network is performing, to identify faulty elements, and to possibly propose/implement corrective actions.

- Chapter 2 defines the supervision framework the present document applies to
- Chapter 3 introduces general supervision, monitoring and control requirements
- Chapter 4 describes VoIP Voice Communication Systems components (VCS)
- Chapter 5 describes VoIP Ground Radio Station components (GRS)
- Chapter 6 describes VoIP Recording components (REC)
- Chapter 7 describes VoIP Gateway components (GTW)
- Chapter 8 defines alarms and events
- Chapter 9 provides hints for calculating interface performance values
- The annexes to the present document provide SNMP MIB definitions for use in this context

1.4 TERMINOLOGY FOR REQUIREMENTS, RECOMMENDATIONS, OPTIONS

The terminology for requirements, recommendations and options used in the present document is based on RFC 2119 [7], which specifies Best Current Practice regarding the use of Key Words for the Internet Community. As such, the following terminology is applied:

- The word **SHALL** denotes a mandatory requirement.
- The word **SHOULD** denotes a recommendation.
- The word **MAY** denotes an option.

To avoid confusion with their natural meanings in the English language, the words **SHALL**, **SHOULD** and **MAY** take on the meaning stated above only where printed in boldface. When printed in normal typeface, the natural English meaning is meant. Detailed description of terminology follows:

- **SHALL** This word has the same meaning as the phrase "REQUIRED" and means that the definition is an absolute requirement of the specification.
- **SHALL NOT** This phrase means that the definition is an absolute prohibition of the specification.
- **SHOULD** This word (or the adjective "RECOMMENDED") means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- **SHOULD NOT** This phrase (or the phrase "NOT RECOMMENDED") means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
- **MAY** This word (or the adjective "OPTIONAL") means a truly optional item.

CHAPTER 2

SUPERVISION MODEL

2.1 NETWORK SUPERVISION

According to the *Vienna Agreement*, the network supervision function **SHALL** be performed by a network component that can be meant as a centralized system, capable of performing supervision and monitoring tasks of all components in the VoIP ATM system.

In order to avoid any confusion in the terminology and not to set any limitation on how the network supervision is performed, the term “*centralised supervision system*” **SHOULD NOT** be used, while “*network supervision system*” **SHOULD** be used instead.

The supervision function of a VoIP ATM system is hereafter referenced to as **Network Supervision System (NSS)**. The NSS system is to be considered as a network tool, thus not interfering nor superseding other systems that vendors may have been introducing for the management, configuration, supervision of their equipment.

The present document defines the minimum requirements that **SHALL** be satisfied by the components of a VoIP ATM system when they are supposed to be supervised by NSS. This does not prevent NSS to possibly implement additional functions or services, provided they do not hinder or reduce the functionalities described herein.

2.2 ARCHITECTURE

According to the *Vienna Agreement*, the following set of elements **SHOULD** be supervised:

STANDARD ELEMENTS, i.e. elements complying with ED-137

- VoIP Voice Communication Systems
- VoIP Radios
- VoIP Recorders

GATEWAYS, i.e. elements that allow connection of non ED-137 standard equipment

- Radio Gateways
- VCS Gateways
- Recorder Gateways
- Telephone Gateways

NETWORK DEVICES

- Servers / Proxies
- Network Links
- Switches / Routers

Network devices are out of the scope of the present standard and will therefore not further analysed hereafter. They are here mentioned for completeness only and may be the subject of future standard evolutions.

As for the purpose of the present document, the terms “*network element*” and “*network component*” shall be deemed as synonyms, unless explicitly stated. According to what above, a network element/component is any standard element or gateway.

2.3 NSS REQUIREMENTS

The following requirements are set on the NSS system:

- Functions and performance of the network components **SHALL NOT** be influenced by the presence or absence of NSS.
- The introduction and use of NSS **SHALL NOT** interfere with other possible management, configuration and supervision systems that vendors may have introduced in support of their equipment.
- NSS **SHALL** have enough capacity to guarantee data exchange and storage.

- NSS **SHOULD** provide redundancy, in order to guarantee a high level of availability and avoid any data loss.

2.4

OBJECTS MODEL

The objects being supervised by NSS are modelled according to the SNMP paradigm, as better explained in the next chapters. As a general rule, all objects listed in the previous sections will be described and managed in accordance to a set of RFCs, to the maximum applicable extent. Without sake for completeness, the following RFCs **SHALL** be used:

- RFC 1213 - MIB for Network Management of TCP/IP-based internets: MIB-II
- RFC 2819 - Remote Network Monitoring Management Information Base
- RFC 3411 - Simple Network Management Protocol (SNMP) Management Frameworks

CHAPTER 3

GENERAL REQUIREMENTS

3.1 SUPERVISION PROTOCOL

The protocol used for supervision purposes among ALL components supervised by the Network Supervisor System (NSS) **SHALL** be the standard protocol SNMPv3, as defined by RFC 3411 [11].

3.2 GENERAL INFORMATION MODEL

The SNMP protocol allows information exchange based on a manager/agent paradigm where supervised objects are defined by a proper MIB (*Management Information Base*) describing all elements that are deemed to be of interest from a supervision point of view. It is out of the scope of the present document to describe how such information elements are presented to the operator utilizing NSS.

According to that above, the Network Supervisor System (NSS) **SHALL** act as the SNMP manager, while the SNMP agents **SHALL** provide the interface between the manager and the network component(s) being managed.

The MIB **SHALL** use ASN.1 [12] (*Abstract Syntax Notation*) and it **SHALL** be organized in a tree structure with individual variables being represented as leaves on the branches. A unique numeric tag (*object identifier*, OID) **SHALL** be used to uniquely and unambiguously distinguish each variable in the MIB and in SNMP messages, in accordance with RFC 1213 [5] and RFC 2819 [6]. Unless explicitly stated, should any discrepancy be found between the present document and the mentioned RFCs, these latter prevail.

3.3 MIB TREE

The following picture shows a graphical representation of the MIB tree for use with the current standard.

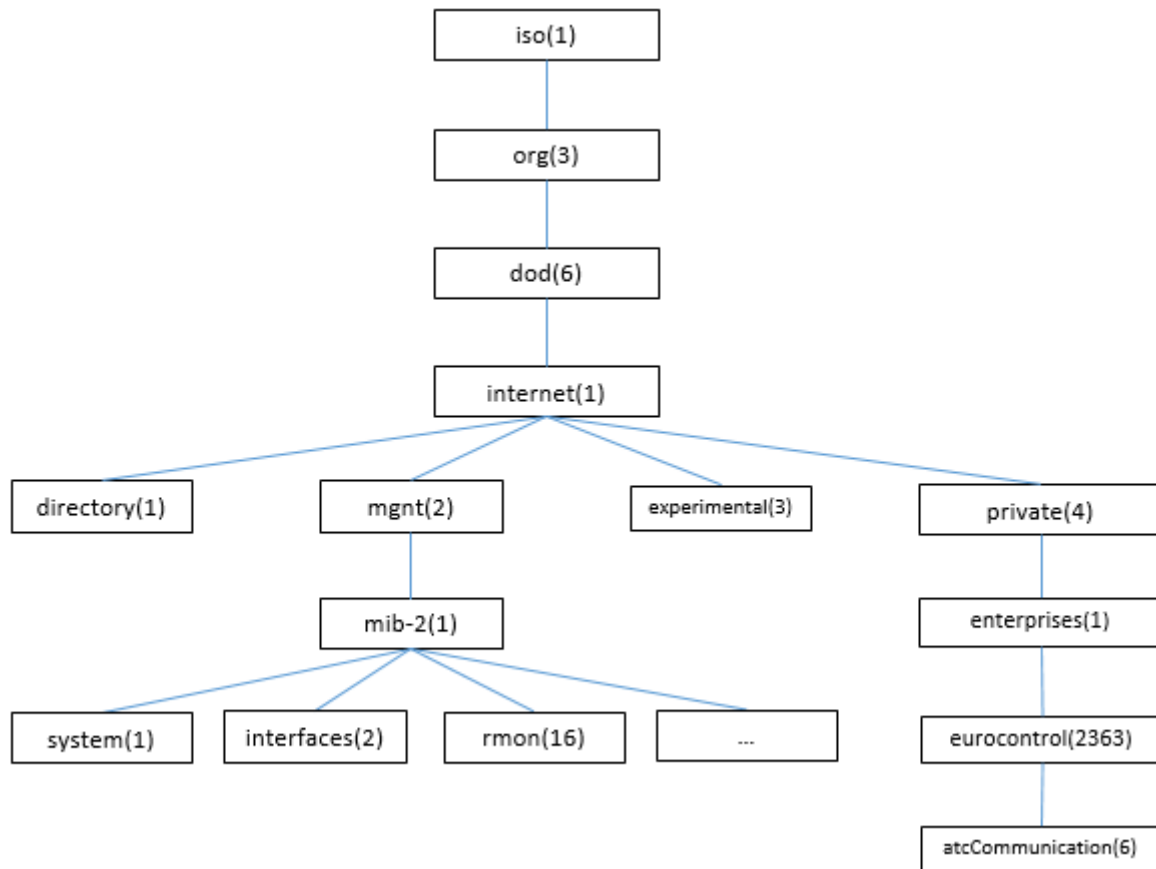


FIGURE 3.1: MIB TREE

3.4 MIB-2 STRUCTURE

RFC 1213 [5] defines the second version of the *Management Information Base* (MIB-2) for use with network management protocols in IP-based internets. It **SHALL** be implemented on all components making up the network described by the *Vienna Agreement*.

In this chapter, the words “object” and “parameter” are used as synonyms, because they are “objects” from a SNMP perspective, but “parameters” from the user’s point of view.

3.4.1 OBJECT GROUPS

The MIB-2 tree structure defined by RFC 1213 [5] defines the following standard object groups:

MANDATORY – The following object groups are mandatory for all systems:

- System object group { mib-2 1 }
- Interfaces object group { mib-2 2 }
- IP object group { mib-2 4 }
- ICMP object group { mib-2 5 }

POSSIBLY MANDATORY – The following object groups are mandatory for all systems implementing the corresponding features:

- TCP object group { mib-2 6 }
- UDP object group { mib-2 7 }
- EGP object group { mib-2 8 }

- Transmission object group { mib-2 10 }
- SNMP object group { mib-2 11 }

DEPRECATED – The following object groups are deprecated:

- Address translation object group { mib-2 3 }

3.4.2 OBJECT GROUPS USED BY ED-137-5

For the purpose of this document, and in consideration of the features provided by the network components, as described in other parts of this standard, at least the following object groups **SHALL** be implemented on all network components:

- System object group
- Interfaces object group
- IP object group
- TCP object group
- UDP object group
- SNMP object group

Although RFC1213 [5] considers them as mandatory, the following object groups are not necessary for the purpose of the current standard; therefore they **MAY** be implemented, but they are not mandatory:

- ICMP object group

3.5 SCOPE AND DEFINITIONS

The purpose of the present document is not to describe the content of RFC 1213 [5], rather to define how some of the parameters defined therein **SHALL** be used in the context of Network Supervision. Not all defined parameters are of interest at this level, but those referenced hereafter **SHALL** assume the meaning and values described in this document, so as to provide uniformity and give NSS users a common view of the systems managed. Unless otherwise stated, the meaning and definitions found in such RFC apply (MIB-2).

As a general rule, all RFC 1213 [5] configuration parameters describing a network component **SHALL** be accessible in read-only mode. This means that a supervised component **SHALL** put at disposal of the network (and particularly to NSS) the relevant pieces of information for reading operations. This however does not in principle prohibit some of parameters from being possibly accessible in read-write mode, if this is feasible and/or requested by the customer (e.g. ANSP).

Said differently, what above does not prevent network component manufacturers from providing read-write access to some parameters, according to their implementation policy and/or the end user (e.g. ANSP) system or network requirements. However, compliance to ED-137 is achieved by just having them in read-only mode.

3.6 MIB STRUCTURE

The *Management Information Base* (MIB-2) in RFC 1213 [5] states that some descriptive fields are expected to contain a textual string with information like manufacturer, product name, hardware version, etc. Manufacturers **MAY** use their own defined strings; customers **MAY** however impose their naming rules and conventions in the frame of specific customer-manufacturer agreements. Their content **MAY** therefore be subject to agreement between Vendor and End User.

3.7 RFC1213 PARAMETERS

This section aims at specifying how some parameters defined by RFC 1213 [5] **SHALL** be used when interfacing a network component to a standard ED-137 network. This will allow the Network Supervision System (NSS) to show its users a comprehensive and coherent view of the devices making up the supervised network.

The *system* object group (as defined in the RFC) provides information about the network component as a whole, while each *ifTable* entry therein describes one of the *ifNumber* interfaces making up the component from a network perspective. An “interface” is a

physical or logical entity that is managed by the network component and monitored by NSS, e.g. a plurality of boards managing different channels.

Please note that a network component is not required to expose all of its interfaces: exposed interfaces are those that the component allows to be supervised by NSS. Parameters are mandatory or optional according to what stated by RFC 1213 [5]. It is out of the scope of WG-67 to define "who" will be filling them in. Should a parameter be mandatory, but not available or not applicable to a given interface, it will be present, although empty.

The value of the *ifIndex* field in the *ifTable* structure is e.g. used for the *ipAdEntIfIndex* field in the *ipAddrTable* object. This allows proper reference to the related interface and allows management of several interfaces at the same time. For a description of the above mentioned parameters and data structures, please refer to RFC1213 [5].

TABLE 3.1: EXAMPLE OF A SUBSET OF VCS PARAMETERS

Parameter	Description	Example / Remarks
Object Group: SYSTEM		
sysDescr	Full name and version of the VCS	"M800IP 2.61"
sysObjectID	System identification in the enterprise subtree	1.3.6.1.4.1.2363.8.3.4
sysName	Administrative name of the VCS	"Rome ACC"
sysLocation	Physical location of the VCS	"Rome Ciampino 3 rd Floor"
Object Group: INTERFACES		
ifNumber	Number of network interfaces provided by the VCS	32
ifTable	List of records describing the interfaces	One per interface
ifEntry	Record describing an interface	One per interface

3.8 OPERATIONAL STATUS

The NSS supervision system **SHALL** be capable of monitoring the operational status of the supervised network elements in near real time. The definition of the maximum allowed delay between operational status change and its presentation to the NSS operator is left to the end user (e.g. ANSP), as an operational requirement.

The *ifOperStatus* object defined in the *interfaces* object group of RFC 1213 [5] **SHALL** be used to provide the operational status of a network element interface, with the following meaning:

- Operational – The unit is fully operational. In case of redundancy, all redundant units are operational. This is encoded as "*up(1)*".
- Non-Operational – The unit is not operational. In case of redundancy, none of the redundant units is operational. This is encoded as "*down(2)*".
- Degraded – The unit is not fully operational. In case of redundancy, not all redundant units are operational. This is encoded as "*testing(3)*".

CHAPTER 4

VCS SUPERVISION REQUIREMENTS

4.1 VCS SUPERVISION STRUCTURE

This chapter introduces the SNMP MIB for the management of Voice Communication Systems (VCS) conformant to ED-137. Such systems are modeled according to the provisions made by RFC 1213 [5], as explained in [CHAPTER 3](#). Therefore, an ED-137 standard compliant supervised VCS **SHALL** make use of the model defined by the MIB-2 subtree.

Legacy, non-ED-137 Voice Communication Systems can be interfaced to an ED-137 network through gateways that will make them appear as standard ones. The same model **SHALL** also be used for modeling the so-called *VCS Gateways*, i.e. those logical or physical devices that allow non-standard equipment to be interfaced to a standard ED-137 network. This means that from the Network Supervision System (NSS) point of view, a non-standard VCS system is seen and managed through a *VCS Gateway* as if it were a standard one.

4.2 MIB-2 OBJECT GROUPS

The *Management Information Base* (MIB-2) defined by RFC 1213 [5] states that an object group therein is mandatory whenever the relevant function is implemented by the system or network element being described. Therefore, the complete description of a VCS **SHALL** include all object groups listed in section [3.3](#).

CHAPTER 5

RADIO MONITORING AND CONTROL

5.1 RADIO SUPERVISION STRUCTURE

This chapter introduces the SNMP MIB for the management of ATC Radios (RAD) conformant to ED-137. Such devices are modeled according to the provisions made by RFC 1213 [5], as explained in [CHAPTER 3](#). Therefore, an ED-137 standard compliant supervised Radios **SHALL** make use of the model defined by the MIB-2 subtree.

Legacy, non-ED-137 Radios can be interfaced to an ED-137 network through gateways that will make them appear as standard ones. The same model **SHALL** also be used for modeling the so-called *Radio Gateways*, i.e. those logical or physical devices that allow non-standard equipment to be interfaced to a standard ED-137 network. This means that (as for the provisions of RFC 1213 [5]) from the *Network Supervision System* point of view, a non-standard Radio is seen and managed through a *Radio Gateway* as if it were a standard one.

5.2 MIB-2 OBJECT GROUPS

The *Management Information Base* (MIB-2) defined by RFC 1213 [5] states that an object group therein is mandatory whenever the relevant function is implemented by the system or network component being described. Therefore, the complete description of a Radio **SHALL** include all object groups listed in section [3.3](#).

5.3 RADIO SPECIFIC MIB

Just like all other network components, Radios are described by means RFC 1213 [5], as described above. However, due to the specific features provided by Radios, the present standard defines an additional MIB structure describing them, further extended to support generic GRS (*Ground Radio Stations*) to allow addressing of non-ED-137 capable radios through gateways.

In addition to the provisions of RFC 1213 [5], two MIBs have been developed, for full ED-137-compliant radios and generic GRS radios ([ANNEXES A2](#) and [A3](#)). When interfacing a radio complying with the specifications of the present document, the MIB defined in [ANNEX A3](#) **SHALL** be used.

The MIB presented in [ANNEX A2](#) is the former description of a radio, prior to the generalisation provided by [ANNEX A3](#). Therefore, the usage of the MIB defined in [ANNEX A2](#) is deprecated, although it **MAY** be implemented, but it is optional (maintained for backward compatibility only).

The following figure shows further levels of the MIB tree “below” the one presented in [FIGURE 3.1](#), limited to Radio parameters, as defined in [ANNEXES A2](#) and [A3](#). The possible already existing monitoring and control MIB structures already provided by radio manufacturers are not affected and can still be used for detailed (e.g. low level) maintenance tasks.

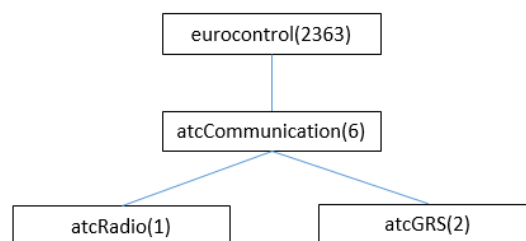


FIGURE 5.1: RADIO MIB TREE

5.4 MIBS COMPARISON

The following table lists the minimum parameters defining an ATC radio being supervised according to the present document. This list is not intended to be exhaustive nor normative: should there be any inconsistency with the MIBs in the annexes, these latter take precedence.

It is here reminded that the MIB described in ANNEX A2 is in a deprecated state (it **SHOULD NOT** be used): the generic GRS MIB described in ANNEX A3 **SHOULD** be used instead. The last columns show the correspondence between MIB parameters in the two MIBs, wherever applicable.

TABLE 5.1: COMPARISON BETWEEN ANNEXES A2 AND A3

Parameter	Monitoring	Control	Remarks	SNMP Object (Annex A2)	SNMP Object (Annex A3)
Radio type I	Get	-	Radio Type (RX, TX, TRX)	grRadioType	cmRadioType
Radio type II	Get	-	Multi/single frequency operations	ffEnDisSglCh	cmSingleChannel
Radio equipment identification	Get	-	Manufacturer, serial number	grRadioID	cmRadioEntry
Nominal frequency	Get	Set	Frequency in physical format	ffFreq	cmFrequencyOper
Frequency Spacing	Get	Set	Frequency spacing	ffChSpc	cmChannelSpacingOper
CLIMAX offset	Get	Set	n/a for RX Tx frequency offset	ffCarrOffst	txCarrierOffsetOper
Carrier SQU Threshold	Get	Set	n/a for TX Carrier strength threshold for squelch	ffSqlchThrhCarrier	rxSquThresholdCarrierOper
S/N SQU threshold	Get	Set	n/a for TX signal/noise threshold for squelch	ffSqlchThrh	rxSquThresholdOper
Status of the SQU Function	Get	Set	n/a for TX Squelch activation/deactivation	ffSqlch	rxSquOper
RF output power	Get	Set	n/a for RX Tx power level	ffTxPwrLvl	txPowerLevelOper
Operational status	Get	-	Current state of radio	grOpStat	cmStateEvent, cmStateActive
VSWR value	Get	-	VSWR value measured during transmission	rcVswrVal	txVswr
Number of SIP sessions	Get	-	Present number of active SIP sessions at a radio and related SIP URIs	voSipSessionList	cmRadioSipSessionsTable
Version of ED-137 Volume 1	Get	-	List of versions of "EUROCAE ED-137 Volume 1" standard supported by ground radio station	grWG67Ver	cmWg67Version
RF output power	Trap / Inform	-	n/a for RX TX power level	trapFftxPwrLvl	atcTxPowerLevelOper
Operational status	Trap / Inform	-	Current state of radio	trapGrOpStat	atcCmStateEventTrap
VSWR value	Trap / Inform	-	VSWR value measured during transmission	trapRcVswrVal	atcTxVswrTrap

5.5

SCOPE AND DEFINITIONS

The radio MIB is intended to enable **basic monitoring** and **basic control** of any ATC radio compliant to the present document. VCS operators can use the facilities provided by the MIBs to monitor or change remote radio functional parameters.

- **Basic monitoring** means the delivery of information that permits the engineering and technical personnel undertaking operational tasks to assess the proper overall condition of the equipment, thus contributing to the provisioning of A/G voice services. This information will permit to decide whether the device(s) can be operationally used under given circumstances.