



SAF Tehnika's radio systems are equipped with embedded Element Management System (EMS) comprising WEB & Telnet servers, command interface interpreter engine and SNMP agent. Using this integrated quality toolset, SAF equipment can be easily configured and monitored locally and remotely in convenient and user-friendly manner.

To enhance management functionality further, SAF Tehnika is offering SNMP and TCP/IP based Network Management System (NMS). SAF NMS provides the following functionality:

- Configuration and management of SAF network elements – Indoor and Outdoor Units;
- Actual network status;
- Real-time updates on moves, adds and changes;
- Online events and fault notification (customizable log file);
- Easy-to-use graphical user interface (GUI).

LCD display and the keypad located on the front panel of the IDU are providing ideal tools for quick local configuration of the system. The monitoring of all the essential radio/system parameters can be done from LCD display in order to evaluate the operation of the system, whenever no other management tools are available. Capability of switching on/off loopbacks from LCD/keypad interface provides a great tool for troubleshooting any system in case such need arises.

To learn more about SAF Network Management System and to download a demo version, please visit SAF NMS web page at <http://management.saftehnika.com>

**System Architecture**

SAF NMS system involves the following mandatory components:

• **Database Server (default MySQL)**

The database stores information about SAF equipment configuration, alarms, events, actual network status, network topology users and other gathered values.

• **SAF Management Server**

The server directly manages SAF equipment, performs status polls, checks network topology alterations, carries out SNMP trap Manager functions, sends requests to and receives respond packets directly from SAF equipment, stores the collected data in the database.

In addition, SAF NMS functionality can be enhanced by optional components:

• **Web Server (default Apache)**

Web Server provides remote access to the Database Server by the means of any web browser (i.e. MS Internet Explorer);

• **SAF NMS remote console(s)**

Remote console(s) offers client connection to Database Server and limited management of any SAF equipment (software is included in NMS package);

• **Web Browser**

Web Browser provides a read-only access to network map and represents actual system status;

• **Backup Agent**

To backup NMS database server (not included in NMS package).

**SAF NMS Essential Features**

- Maps out network for you, detects and displays network topology in user-friendly graphical form. Each symbol in the map represents specific unit. Changing colors indicate faults that are sorted by severity;
- Collects information about any SAF network elements within the network and creates log of alarms and events;
- Maintains a relational database from which data can be exported for historical analysis;
- Provides access to customizable report generation based on statistical information gathered within user-defined period of time;
- Provides the possibility to archive outdated events. The user can set time and frequency of archiving procedure, and define event expiration settings;
- Offers a user-friendly graphical interface for management of SAF equipment.

SAF NMS periodically polls network elements, gathering data regarding the current status of radiolink equipment representing data in a table or other graphical form:

- Unit status (for example, - up, down, or marginal);
- Unit configuration changes;
- Equipment parameters (e.g., Rx level, IDU or ODU temperature, etc.).

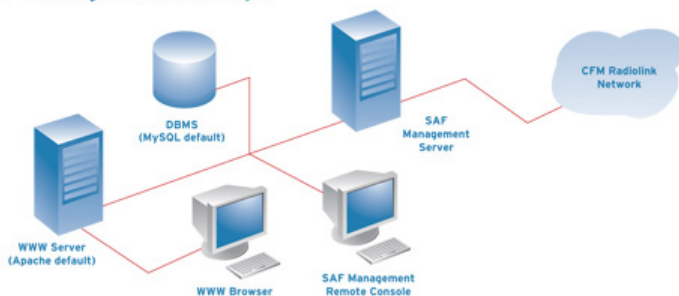
It is possible to configure thresholds for network elements' parameters (for example, IDU temperature, Rx level, ODU temperature). SAF NMS generates alarms and notifies you in case one or more parameters reach critical level. Screenshots of the management windows

**System requirements**

Recommended minimum system requirements for SAF NMS server/client application and Database Server are as follows:

- PC
- Pentium III or higher
- 256 Mb RAM
- Network card (100 Mbit recommended)

**SAF Management Concept**



**Technical Specifications**

SPECIFICATIONS	
Protocol used	web (HTTP)/Telnet/SNMP
Interface, electrical	10Base-T Ethernet* and RS-232
Interface, physical	RJ-45** and DB-9
Performance monitoring	According to ITU-T Rec.G.826 (M-MUX and MP-MUX only)
Element management	web server, Telnet server, SNMP agent CLI, IDU LCD
Network management	SAF network management system (NMS)

\* 2-port 10/100Base-T Ethernet for M-MUX and MP-MUX  
 \*\* 2-port RJ-45 for M-MUX and MP-MUX

All equipment specifications are subject to change without prior notice

1 GB free hard disk space  
 Color monitor, min resolution 1024x768  
 Sound card (for sound alarms)  
 • Windows XP or Windows 2000 Operating System

#### EMS/NMS Features

FEATURES	ETHERNET			TERMINAL	LCD display and keypad
	SNMP	Telnet	Web		
Data port monitoring	+	+	+	+	-
Data port configuration	-	+	+	+	+
Radio monitoring	+	+	+	+	+
Radio configuration	-	+	+	+	+
Interface loopbacks	+	+	+	+	+
Baseband modem loopbacks	+	+	-	+	+
Radio Loopbacks	+	+	-	+	+
Traps	+	-	-	-	-