

Smart LNB

IST- Interactive Satellite Terminal

Emulsion Terminal

Technical Documentation

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Technical Documentation

Interactive Satellite Terminal.
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CHAPTER 1. INTERACTIVE SATELLITE TERMINAL. SMART LNB.

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1. INTERACTIVE SATELLITE TERMINAL. SMART LNB.

1.1. FCC Compliance

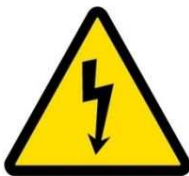
This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This device works in combination with an off-set horn-fed dish antenna with a maximum gain of 39.4 dB

This device has been granted with the following **FCC ID: 2AGKM820003-02**



Danger: FCC Radio Frequency Exposure Information

In order to comply with the FCC RF exposure requirements, it is required to maintain a separation distance between the user and the antenna of 11.76m (antenna main beam) and 27cm (horizontal: -10 degrees off-axis).

NOTE: This equipment has been tested and found to comply with the limits for class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1.2. Technical Features

General

Composition.....	Outdoor Unit. ODU. Indoor Unit. IDU.
ODU Dimensions (without LNB).....	127 x 144 x 77 mm. (L x W x D)
IDU Dimensions.....	30 x 150 x 110 mm. (L x W x D)

Outdoor Unit. ODU

Connectors	F (F), 75Ω: External LNB Connection. F (F), 75Ω: IDU Connection.
Control and Management.....	Web GUI. <i>Via IDU.</i>

Reception

Frequency band.....	Ku Band. Low Band: 10,7 – 11,7 GHz High Band: 11,7 - 12,75 GHz.
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Transmission

Frequency band.....	Ku Band. 13,75 GHz - 14,50 GHz.
Maximum output Power.....	31,5 dBm.

Indoor Unit. IDU

Connectors.....	F (F), 75 Ω: ODU Connection. F (F), 75 Ω: STB Connection. RJ45: Ethernet. LAN Connection. DC IN. (+30Vdc)
Control and Management.....	Web GUI.

1.3. General Description.

The **Smart LNB** is an electronic device that opens the door to a new wide range of satellite services.

It features the most advanced technology in satellite transmission and it makes use of a high spectrum efficiency modulation for the uplink.

This technology allows satellite operators to offer their services in either unconnected or connected areas, at a low cost at the equipment and service level.

Its objective is to provide high added value services to traditional satellite broadcasting.

- Interactive services: HbbTV, VoD, FB, Twitter, telemetry
- High added-value M2M services/ domotics: Home control automation, e-health, connected TV...)

The Smart LNB is based on the following devices, all of them provided by Egatel:

- | **Antenna System.** Satellite dish and other devices needed for its attachment and pointing.
- | **ODU:** Outdoor unit. Installed at the antenna's arm.
- | **IDU:** Indoor unit. Located inside the building.

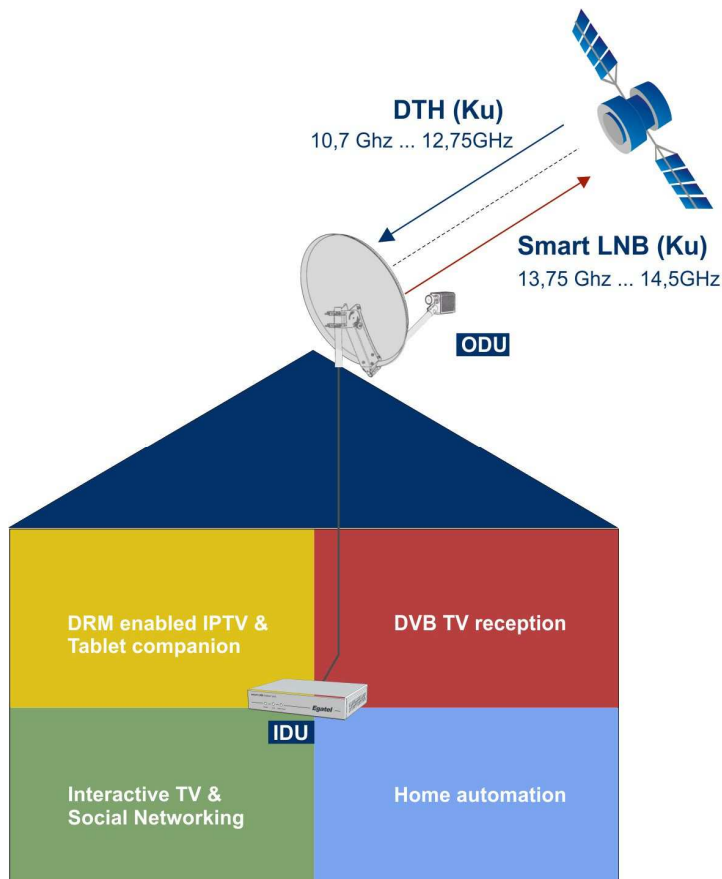


Fig. 1. General Scheme.

1.4. Outdoor Unit. ODU.

The ODU, **Outdoor Unit**, is housed in a waterproof case located at the antenna's arm. It can be connected to an external LNB and it is powered by the IDU.

| Interfaces:

- F-type connector facing the Indoor Unit.
- F-type connector facing the External LNB.



Fig. 2. Outdoor Unit. ODU interfaces.

| ODU – IDU communication:

- Modem Ethernet over coaxial.
- Signals:
 - Power supply (Vdc).
 - Bidirectional IP traffic.
 - TV signal. (DVB-S2).
 - DiseqC signalling.

| Architecture: The Outdoor Unit consists of three cards:

- Down Converter.
- Digital process.
- Up Converter. (F-SIM Modulation) .

1.5. Indoor Unit. IDU.

The IDU, Indoor Unit, is located inside the building.

Its design is based on a compact and easy-to-use terminal that features the latest Home Plug-AV (HPAV) technology.



Fig. 3. Indoor Unit. IDU.

| Signalling leds:

Led	Colour	Description
Power	Green	Power supply presence.
Link	Green	Communication between IDU & ODU.
Data Coax	Yellow	Data transfer activity between IDU & ODU.

| **Interfaces.** The Indoor Unit has four ports to interface with the external world:

- RJ-45 port to connect the IDU to the user's LAN. (Web GUI).
- F-type connector facing the Outdoor Unit.
- F-type connector facing the user's Set-Top-Box.
- DC port for external 30V power supply. (30V / 2A Desktop AC/DC adapter).



Fig. 4. Indoor Unit's rear panel.

| **Architecture:** The Indoor Unit consists of a single card that connects the ODU and the Set-top-box (STB). Its main features are:

- It process broadcast and M2M services.
- Maintain communication with the ODU through coaxial cable following the HomePlug-AV protocol.
- Processes the IP data and route it according to its destination: ODU or user's LAN. Two-way path: ODU to user's LAN and user's LAN to ODU.
- Web GUI interface to manage the ODU and IDU. The system is password-protected so only the authorized users can access to it.

1.6. Interconnection.

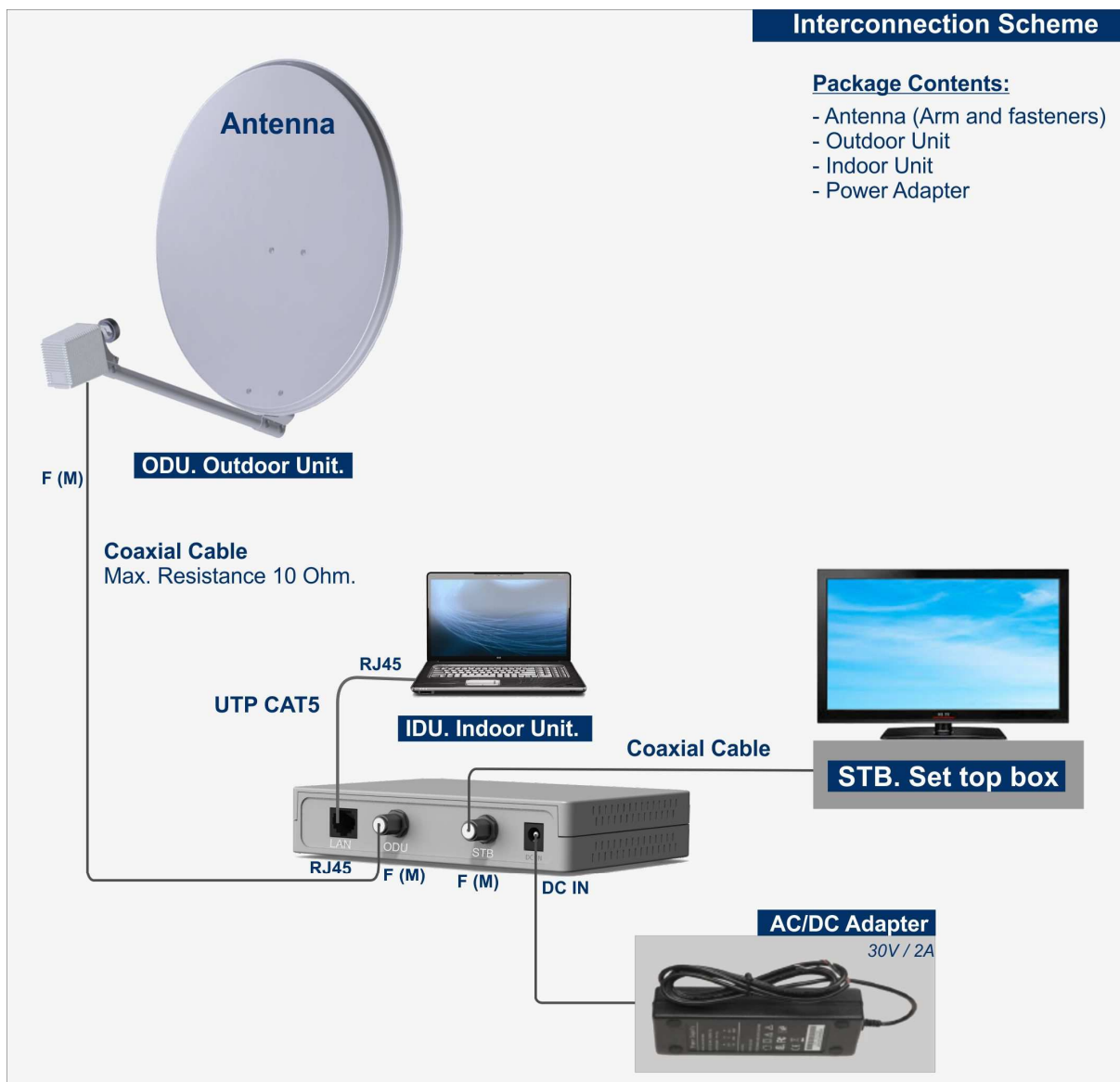


Fig.5. Interconnection general scheme.

* The set top box (STB) is not provided by Egatel.

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2. WEB GUI

2.1. Introduction

Egatel has developed a powerful and friendly Web GUI to manage and configure the Smart LNB. It also serves as diagnosis and maintenance tool.

The focus has been placed on the ease of use while providing the maximum performance.

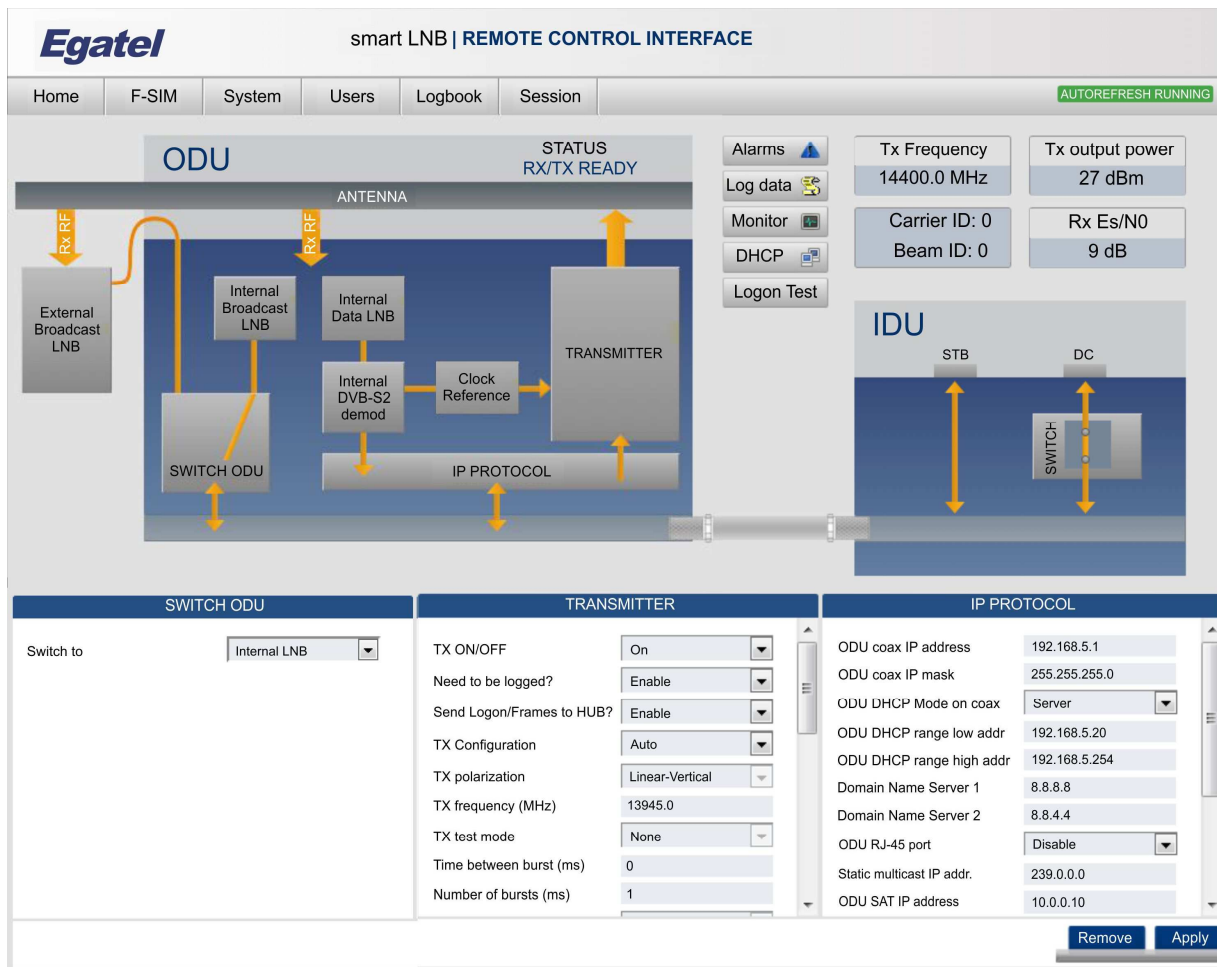


Fig. 1. Example. Main Menu.

- | The system is password-protected so only authorized users can access to it.
- | Main screen shows a diagram displaying the major blocks that form the receiving/transmitting chain. It can be used as a tool for browsing through the different parameters and navigation menus.
- | The Web Server shows the parameters of ODU and IDU units on the same screen.
- | The ODU is set to be the gateway of the in-home network and it is configured as DHCP server. In this scenario the IDU acts as a simple IP bridge.

Example of configuration:

- ODU IP: 192.168.5.1
- IP Mask: 255.255.255.0
- ODU Sat IP Address: 10.102.0.2
- ODU SAT. IP Mask: 255.0.0.0
- ODU SAT. Gateway: 10.0.0.1

However, default configuration can be modified through the WEB GUI. See *ODU / IP Protocol* section.

2.2. Establishing a connection

- | Connect a computer directly to the RJ-45 port of the IDU or
- | Connect the computer to a Router / Switch that is in turn connected to the RJ-45 port of the IDU.



Fig. 2. PC – IDU connection.

In both cases, ODU / IP Protocol / ODU RJ-45 port must be set “Disabled”.

2.3. Welcome Screen

Once the physical connection has been done:

- | Open a Web browser.
- | Type the ODU's IP address. (192.168.5.1 by default).

If the connection is successfully, a welcome screen comes up.



Fig. 3. Welcome screen.

There are three types of users, with different level of access.

- Administrator
- Manager
- Operator

Inside the Web GUI, users with different level of access can be configured. See [chapter Tool bar / User](#).

To access the Web GUI, each user must have a User name and Password.

Example: Super user. Type: Administrator.

- User: root.
- Password: roota.

After entering the User and Password, users must press the "Login" button or "Enter".

If the introduced pair of User and Password is correct, the main screen of the Web GUI will be displayed.

2.4. Main Screen

Fig. 4. View of the Home Menu. (Main Screen).

The main screen is divided into the following areas:

- Title and toolbar.
 - Block diagram.
 - Control panel.
- Under the title and toolbar, relevant values for transmission and reception are displayed: Tx frequency, Tx output power, Carrier ID, Beam ID and Rx quality. Also, the Alarms, Log data, Monitor, DHCP and Logon blocks can be found besides to those values.
 - The bottom of the screen is divided in three columns, so the parameters of up to three blocks can be visualized at the same time.

To access the parameters of any block, just click on the desired block and drag it to one of the three columns of the bottom screen. Then, the parameters of that block will be displayed.

- Buttons: [Remove](#) and [Apply](#).

Remove **Apply**

- **Remove:** Press this button to remove the changes made.
- **Apply:** Press it to save the value of a parameter that has been modified.

2.5. Tool bar



Fig. 5. Tool bar.

The toolbar is in the upper part of the screen and includes six buttons: **Home**, **F-SIM**, **System**, **Users**, **Logbook** and **Session**.

- Hovering the pointer over any of the buttons, the pointer shape changes into a hand and the button background changes colour.
- When clicking on any of the buttons, the corresponding control panel will be opened in the lower part of the screen.

AUTOREFRESH Button:

The “**AUTOREFRESH**” option is located at the most right part of the navigation bar.

- By default, it is activated so the displayed values will be periodically updated. [Autorefresh running](#).
- To disable this option, just press the Autorefresh button: [Autorefresh stopped](#).

2.5.1. Home.

Clicking on the **Home** button in any screen of the Web Server, leads to the main screen. It shows the equipment status through a block diagram and the control panels.

2.5.2. F-SIM.

If the ODU is receiving the F-SIM signalling, the F-SIM tables containing the values read from the incoming stream will be displayed in this menu. The bottom of the screen contains two tabs: "Server Configuration" and "Carrier Configuration".

If user clicks on the "Server Configuration" tab, a list showing the server IDs, IPs, ports, and service class will be displayed.

The screenshot displays the 'smart LNB | REMOTE CONTROL INTERFACE' with the 'F-SIM' tab selected. The top navigation bar includes 'Home', 'F-SIM', 'System', 'Users', 'Logbook', and 'Session'. A status bar on the right indicates 'AUTOREFRESH RUNNING'. The main area features a block diagram of the ODU system, showing components like 'External Broadcast LNB', 'Internal Broadcast LNB', 'Internal Data LNB', 'Internal DVB-S2 demod', 'Clock Reference', 'IP PROTOCOL', and 'TRANSMITTER'. To the right, there are control buttons for 'Alarms', 'Log data', 'Monitor', 'DHCP', and 'Logon Test', along with status indicators for 'Tx Frequency' (14400.0 MHz), 'Tx output power' (25 dBm), 'Carrier ID: 0', and 'Rx Es/N0' (9 dB). Below the diagram, the 'F-SIM Tables' section is visible, with two tabs: 'SERVER CONFIGURATION' and 'CARRIER CONFIGURATION'. The 'SERVER CONFIGURATION' tab is active, showing a table with the following data:

Server ID	IP version	IP address	Address Mask	ICMP	First port	Last port	Service Class
0	ipv4	192.168.1.1	32	Yes	27	27	0
1	ipv4	192.168.1.2	32	Yes	2500	2500	1
2	ipv4	85.23.1.2	30	No	80	80	1
3	ipv4	135.226.103.0	24	No	2500	3000	9
					80	80	
					10000	10000	
					22000	22000	
4	ipv4	136.240.0.0	20	Yes	27	27	10

Fig. 6. F-SIM / Server Configuration.

If user selects the "Carrier Configuration" tab, all the configured carriers will be listed by ID. For each of them, the general parameters will be shown on the left hand and all the available Service Class for such Carrier ID containing its configuration parameters will be displayed on the right side.

Please note that for the Service Class parameters to be displayed, the user must first press on the desired "Serv. Class ID:x" tab.

The screenshot displays the 'smart LNB | REMOTE CONTROL INTERFACE' with the 'F-SIM' tab selected. The main area shows a block diagram of the ODU (On-Unit Processor) and IDU (In-Unit Processor) components. The ODU includes an ANTENNA, External Broadcast LNB, Internal Broadcast LNB, Internal Data LNB, Internal DVB-S2 demod, Clock Reference, IP PROTOCOL, and TRANSMITTER. The IDU includes STB, DC, and SWITCH components. A status panel on the right shows 'STATUS RX/TX READY' and various parameters: Tx Frequency (14400.0 MHz), Tx output power (27 dBm), Carrier ID: 0, Beam ID: 0, and Rx Es/N0 (9 dB). Below the diagram, the 'F-SIM Tables' section is visible, showing 'SERVER CONFIGURATION' and 'CARRIER CONFIGURATION' tabs. The 'Carrier ID:0' configuration is expanded, showing parameters like Beam ID (0), Frequency (14400000 KHz), Polarization (Linear - vertical), Chip rate (7.68 Mchips/s), and Rain attenuation threshold (0.00 dB). A table of 'Serv. Class ID' configurations is also shown, with columns for Format ID, Profile ID, Back Off Time, InterFragment Time, Persistence Index, Ack Timeout, Max. Retransmission, Strategy, and Es/N0 Prob.

Carrier ID:2	Carrier ID:0
Beam ID:	0
Frequency:	14400000 KHz
Polarization:	Linear - vertical
Chip rate:	7.68 Mchips/s
Rain attenuation threshold:	0.00 dB
Rain attenuation offset:	0.00 dB
Rain attenuation scale tune:	0.000000 dB

Serv. Class ID:0	Serv. Class ID:1	Serv. Class ID:2
Allowed datasiza (bytes)		
Format ID	Profile ID	Back Off Time (ms)
4	1	0
(SF256, Beta 0.12667, Spread_id,0)		
Link-Layer Ack:No		
InterFragment Time (ms)	Persistence Index (%)	Ack Timeout(ms)
0	100.00	1000
IPv6 Header Compression: No		
Max. Retransmission	Strategy	Es/N0 Prob (
3	Strategy 3	

Fig. 7. F-SIM / Carrier Configuration.

2.5.3. System.

This menu provides information about the **System** configuration.

The screenshot displays the 'System' configuration page in the Egatel smart LNB interface. At the top, there is a navigation bar with 'System' selected. Below it, a status bar shows 'ANTENNA' and 'STATUS RX/TX READY'. The main area features a block diagram of the system components, including an ODU (On-Unit Diode) and an IDU (In-Unit Diode). The ODU section contains an External Broadcast LNB, Internal Broadcast LNB, Internal Data LNB, Internal DVB-S2 demod, and a TRANSMITTER. The IDU section contains an STB, DC, and a SWITCH. A 'System Settings' window is open at the bottom, showing a 'CONFIGURATION' tab with the following parameters:

CONFIGURATION	
Language:	English <input type="button" value="Set"/>
Active time:	6 min
CPU temperature (°C)	63,24
Average load	0.73, 0.62, 0.36
RAM available (KB)	119704
RAM free (KB)	35376
RAM cache (KB)	8656
RAM buffer (KB)	608

Below the configuration table, there is a 'Port Forwarding (DNAT)' table with the following structure:

Ext. Port	Proto	IP address	Int. Port	Action
	TCP			<input type="button" value="Add"/>

Fig. 8. System Settings.

CONFIGURATION	
Language	Language selection: English (default) / Spanish.
Active time (min)	Time lasted since the power on of the ODU.
CPU temperature (°C)	Temperature of the CPU.
Average load	It shows the average load in 1, 5 and 15 minutes
RAM available (KB)	It shows the total RAM space (updated every 30s)
RAM free (KB)	It shows the free or remaining RAM space (updated every 30s)
RAM cache (KB)	It shows the RAM cache (updated every 30s)
RAM buffer	It shows the RAM buffer (updated every 30s)

On the bottom right of the screen, there are the following parameters.

| Port Forwarding (DNAT).

Port Forwarding (DNAT)

Transfer the Ext. Port of a packet to a new destination (IP address and Internal Port) according to the protocols TCP or/ UDP.

Ext. Port	Proto	IP address	Int. Port	Action	Add / Del

* User Type Operator is not allowed to read or modify these parameters.

| Routing Table.

The screenshot displays the 'System Settings' window of the Egatel smart LNB interface. It is divided into two main sections: 'CONFIGURATION' and 'Port Forwarding (DNAT)'. The 'CONFIGURATION' section lists various system parameters such as language, active time, CPU temperature, and RAM usage. The 'Port Forwarding (DNAT)' section shows a routing table with columns for Destination, Netmask, Gateway, Interface, Metric, and Action. A single entry is visible in the table with a netmask of 192.168.5.1 and a metric of 0. The interface also includes a block diagram of the LNB hardware components and various status indicators.

Routing Table

Destination	Netmask	Gateway	Interface	Metric	Action	Add / Del

* User Type Operator is not allowed to read or modify these parameters.

| System Version / Update.

The screenshot displays the 'smart LNB | REMOTE CONTROL INTERFACE' with a navigation menu (Home, F-SIM, System, Users, Logbook, Session) and a 'System' tab selected. The main area shows a block diagram of the ODU (On-Unit Demodulator) and IDU (In-Unit Demodulator) components. The ODU diagram includes an ANTENNA, External Broadcast LNB, Internal Broadcast LNB, Internal Data LNB, Internal DVB-S2 demod, Clock Reference, IP PROTOCOL, and TRANSMITTER. The IDU diagram includes STB, DC, and SWITCH components. On the right, there are status indicators like 'Alarms', 'Log data', 'Monitor', 'DHCP', and 'Logon Test', along with technical data: Tx Frequency (14400.0 MHz), Tx output power (27 dBm), Carrier ID (0), Beam ID (0), and Rx Es/N0 (9 dB). The 'System Settings' window is open, showing a 'CONFIGURATION' table with system metrics and a 'System Versions/Update' section with a table of current versions and control options.

CONFIGURATION	
Language:	English Set
Active time:	6 min
CPU temperature (°C)	63,24
Average load	0.73, 0.62, 0.36
RAM available (KB)	119704
RAM free (KB)	35376
RAM cache (KB)	8656
RAM buffer (KB)	608

CURRENT VERSIONS	
FPGA, system version	v0.81
CONTROL, system version	v1.4
INTERFACE, system version	v3.6
WEBSERVER, system version	v2.9
CONFIGURATION FILE	Save
SAVE CONF. AS DEFAULT	Set
RESTORE CONF. AS DEFAULT	Set
RESTART processes	Set
REBOOT system	Set
RESTORE from backup	Set
REFLASH from boot loader	Set

Fig. 9. System Version / Update.

System version / Update	
CURRENT VERSIONS	
FPGA, system version	It shows the version of the FPGA FW.
CONTROL, system version	It shows the version of the Control FW. This is a watch-dog process that re-lunches the system in case of a "fault segmentation" error.
INTERFACE, system version	It shows the version of the Interface FW. This is the FW of the ODU.
WEBSERVER, system version	It shows the version of the Webserver FW. This is the FW of the WEB GUI.
CONFIGURATION FILE	Save . It allows downloading the ODU's configuration file.

CURRENT VERSIONS (Continuation)	
SAVE CONF. AS DEFAULT	Set. It saves the device's current configuration as default.
RESTORE CONF. AS DEFAULT	Set. It loads the device's default configuration.
RESTART processes	Set. It restarts the processes.
REBOOT system	Set. It reboots the system.
RESTORE from backup	Set. It loads the device's backup configuration.
REFLASH from boot loader	Set. It reboots the system and prepares it to upload a new firmware.

System Versions / Update

This menu lets to load a FILE containing the necessary information to [Upgrade software version](#).

- | Click on "[Select File](#)". Browse through the file system and select the appropriate file containing the update information.
- | Click on "[Send](#)". The system sends the update request and, once the installed version is checked, it starts the software update process.
Do not modify any parameter during the software update.
Please, wait until the software update is complete and do not switch the equipment off.
- | Once the process is complete, the system will show the message "[Uploading system software successful](#)". The new versions will be shown in CURRENT VERSION menu.

2.5.4. Users

There are three types of users in the system: "Administrator", "Manager" and "Operator". Each one has different level of access.

- | **Administrator:** This type of user can read and modify any parameter. Moreover, it can create new users, modify their password and delete users from the system.
- | **Manager:** This type of user can read any parameter but is only allowed to modify some of them.
 - He can add new users (Manager and Operator).
 - He can delete user type operator.
 - He cannot change the password of other users, but only his own.
- | **Operator:** This type of user can read any parameter but is only allowed to modify some of them. He cannot change the password of other users, but only his own.

The screenshot displays the Egatel smart LNB REMOTE CONTROL INTERFACE. At the top, there is a navigation menu with options: Home, F-SIM, System, **Users**, Logbook, and Session. A green indicator shows 'AUTOREFRESH RUNNING'. Below the menu, the main interface is divided into several sections:

- ODU (On-Unit Processor):** A central block diagram showing components like ANTENNA, External Broadcast LNB, Internal Broadcast LNB, Internal Data LNB, Internal DVB-S2 demod, Clock Reference, TRANSMITTER, SWITCH ODU, and IP PROTOCOL.
- IDU (In-Unit Processor):** A block diagram showing STB, DC, and SWITCH components.
- System Parameters:** Tx Frequency (14400.0 MHz), Tx output power (27 dBm), Carrier ID (0), Beam ID (0), and Rx Es/N0 (9 dB).
- Alarms and Monitoring:** Buttons for Alarms, Log data, Monitor, DHCP, and Logon Test.
- Users Management Window:** A pop-up window titled 'Users' containing:
 - CURRENT USER:** Fields for Name (root), Type (Administrator), Password, New password, and Confirm new password. A 'Modify' button is present.
 - NEW USER:** Fields for Name (root), Type (Administrator), and Password. An 'Add' button is present.
 - USER LIST:** A table with columns 'Name' and 'Type'.

Fig. 10. Users. (Type: Administrator)

Users	
CURRENT USER	It allows changing the configuration of the current user.
Name	It displays user's name.
Type	Select the type of user. Administrator / Manager / Operator
Password	Introduce user's current password
New password	Introduce user's new password
Confirm New Password	Confirm user's new password
To apply the changes for the modification of configuration of the current user, just press the "Modify" button.	
NEW USER	To apply the changes for adding a new user, just press the "Add" button.
Name	Sets the user's name.
Type	Select the type of the new user. Administrator / Manager / Operator.
Password	Introduce new user's password
USER LIST	
On the bottom right of the screen, it is displayed a list containing all the users registered in the system, showing information of their names and type of user.	
If the current user is an "Administrator" it will be allowed to delete any user of the list simply by pressing the "Delete User" .	

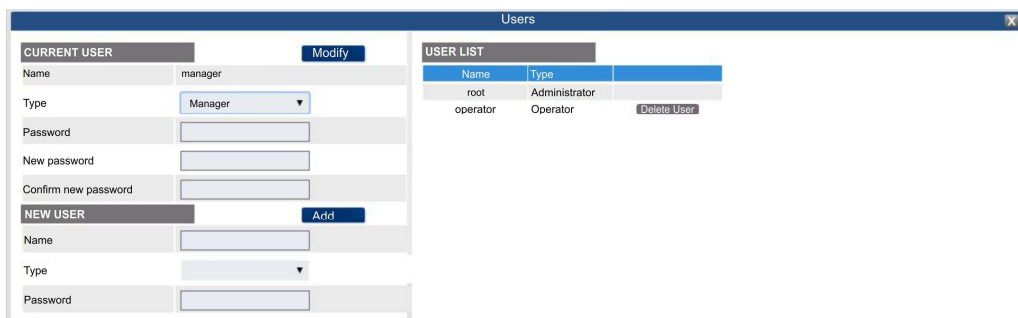


Fig. 11. Users / Manager.

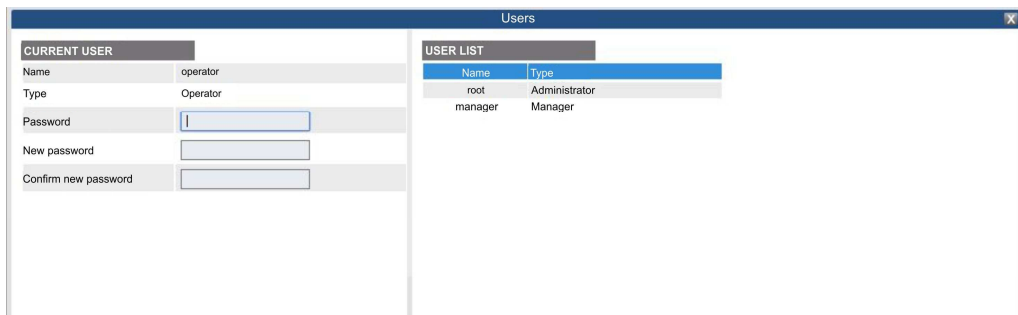


Fig. 12. Users / Operator.

2.5.5. Logbook

Logbook control pane contains the events occurred in the device. Up to 500 events can be stored.

Each event shows: Time, Module, PID, level and message.

** User Type Operator or Manager can read these parameters but they cannot modify them.*

The screenshot displays the 'smart LNB | REMOTE CONTROL INTERFACE'. The 'Logbook' tab is selected in the navigation menu. The main area shows a block diagram of the LNB hardware, including the ODU (Orbit Data Unit) and IDU (Intermediate Data Unit). The ODU section contains an ANTENNA, External Broadcast LNB, Internal Broadcast LNB, Internal Data LNB, Internal DVB-S2 demod, Clock Reference, IP PROTOCOL, and TRANSMITTER. The IDU section contains STB, DC, and SWITCH. A 'Logbook' window is open at the bottom, showing a table of events.

Time	Module	PID	Level	Message
Sun Mar 18 00:48:07 1973	ODU	9855	3	PSI extractor stopping
Sun Mar 18 03:40:52 1973	ODU	9855	3	SM [TX READY] Fri 2 Jan 1970 04:07:54 UTC
Sun Mar 18 11:30:33 1973	ODU	9857	3	CHECKING: DNS[OK]; SSH[OK]; WEBserver[OK]; IGMP [OK]; DHCP[OK]
Sun Mar 18 14:30:25 1973	ODU	9858	3	SM [TX READY] Fri, 2 Jan 1970 04:08:33 UTC
Sun Mar 18 14:30:25 1973	ODU	9859	3	PSI extractor running
Sun Mar 18 15:47:54 1973	ODU	9860	3	PSI extractor stopping
Sun Mar 18 23:27:33 1973	ODU	9861	3	CHECKING: DNS[OK]; SSH[OK]; WEBserver[OK]; IGMP [OK]; DHCP[OK]
Mon Mar 19 02:27:02 1973	ODU	9862	3	SM [TX READY] Fri 2 Jan 1970 04:09:16 UTC
Mon Mar 19 05:30:33 1973	ODU	9863	3	PSI extractor running
Mon Mar 19 06:41:07 1973	ODU	9864	3	PSI extractor stopping
Mon Mar 19 11:28:03 1973	ODU	9865	3	CHECKING: DNS[OK]; SSH[OK]; WEBserver[OK]; IGMP [OK]; DHCP[OK]
Mon Mar 19 14:23:25 1973	ODU	9866	3	SM [TX READY] Fri, 2 Jan 1970 04:09:59 UTC
Mon Mar 19 22:15:52 1973	ODU	9867	3	CHECKING: DNS[OK]; SSH[OK]; WEBserver[OK]; IGMP [OK]; DHCP[OK]
Mon Mar 19 23:45:05 1973	ODU	9868	3	PSI extractor running
Mon Mar 19 23:45:05 1973	ODU	9869	3	PSI extractor stopping
Tue Mar 20 02:37:23 1973	ODU	9870	3	SM [TX READY] Fri 2 Jan 1970 04:10:46 UTC
Tue Mar 20 10:27:23 1973	ODU	9871	3	CHECKING: DNS[OK]; SSH[OK]; WEBserver[OK]; IGMP [OK]; DHCP[OK]
Tue Mar 20 13:27:26 1973	ODU	9872	3	SM [TX READY] Fri, 2 Jan 1970 04:11:22 UTC
Tue Mar 20 13:27:27 1973	ODU	9873	3	PSI extractor running
Tue Mar 20 14:58:07 1973	ODU	9874	3	PSI extractor stopping
Tue Mar 20 20:22:45 1973	ODU	9875	3	CHECKING: DNS[OK]; SSH[OK]; WEBserver[OK]; IGMP [OK]; DHCP[OK]

Fig. 13. Logbook.

2.5.6. Session

This menu serves to logout from the current session. When user enters into this menu, the session automatically expires.

Press “OK” button to go back to the welcome and authentication screen.

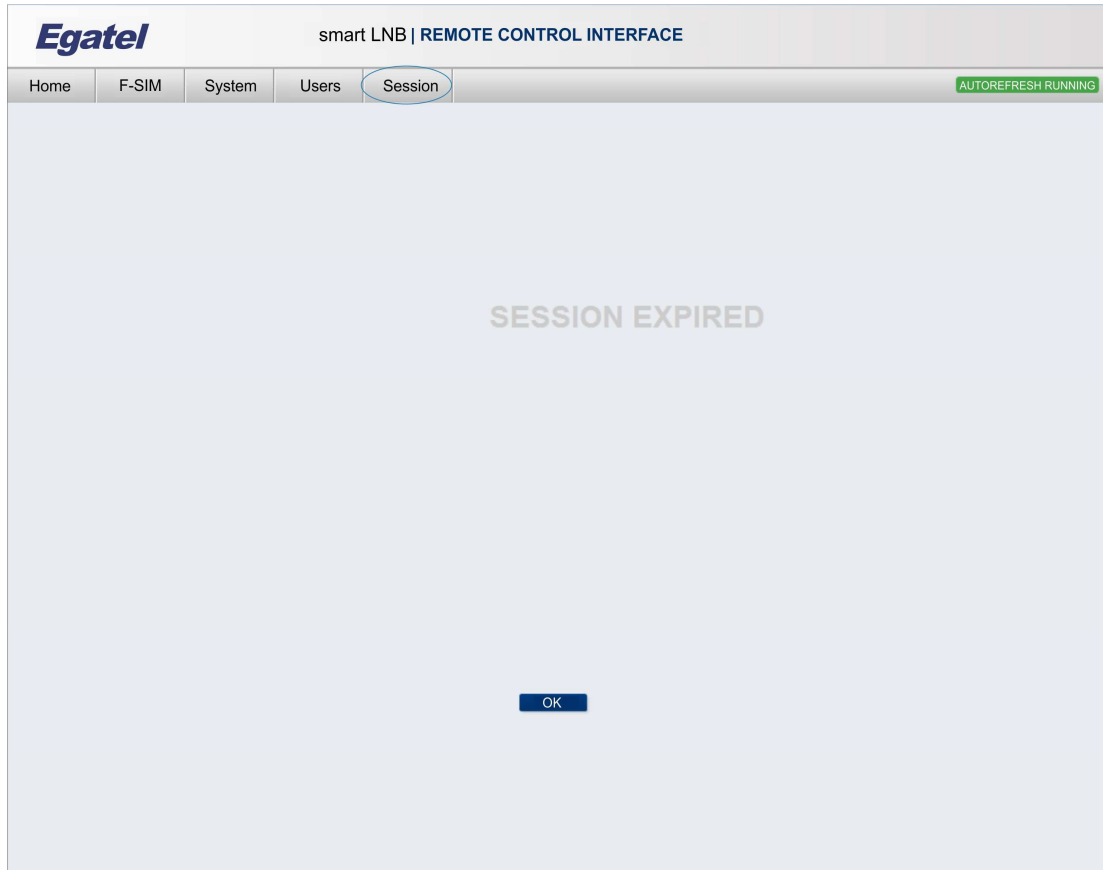


Fig. 14. Session.

2.6. Block diagram

2.6.1. Description.

The central part of the screen is occupied by a graphical representation of the ODU-IDU pair, so that it is easy to recognize the major constituent blocks. Every block contains its own list of parameters and they can be read or modified to configure the system as desired.

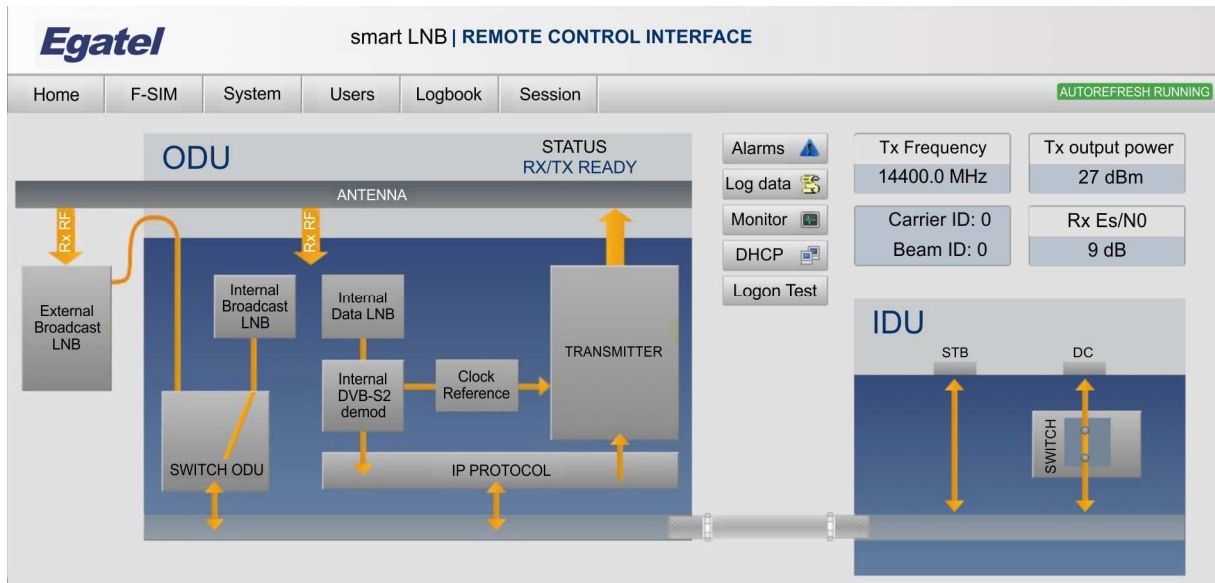


Fig. 15. Block diagram.

To access the parameters of any block, just click on the desired block and drag it to the bottom of the screen. Then, the parameters of that block will be displayed.

The bottom of the screen is divided in three columns, so the parameters of up to three blocks can be visualized at the same time.

- | Place the pointer on the desired block.
- | Click and hold the left button of your mouse, dragging the block into the lower part of the window. The block can be dropped into any socket within the lower part of the window (left, middle or right).
- | Once the block is in the desired position, release the mouse button. The control panel associated to the selected block will now be shown in the socket to which it was dragged.

There are parameters that are "read only" (measures, for instance) and others that can be modified. To modify the value of a certain parameter, just set the new one and press the "Apply" button on the lower right of the screen.

If for some reason the connection is lost, a "Server Offline" message will be displayed in the central part of the screen.

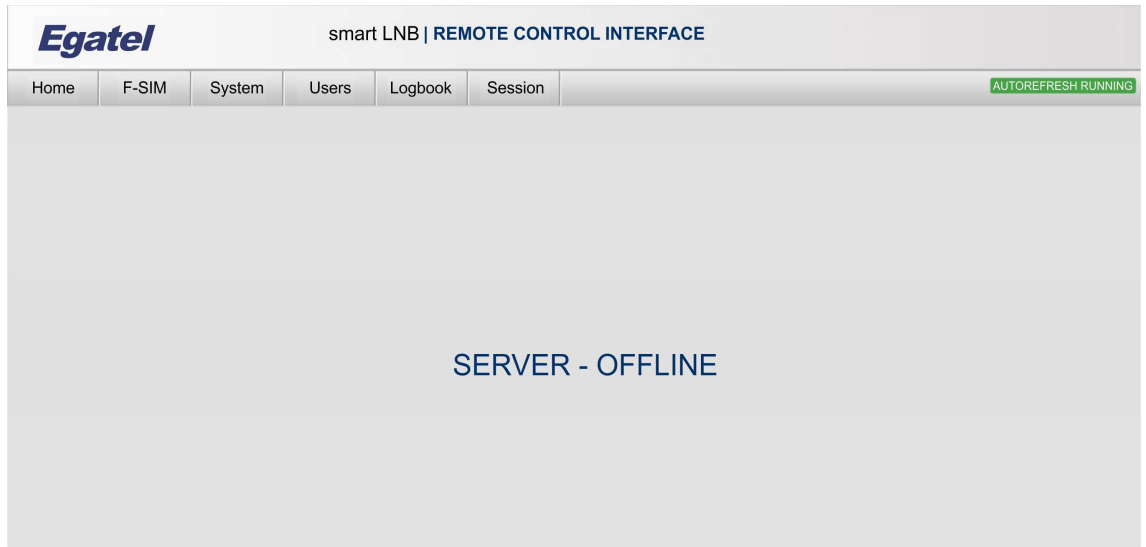


Fig. 16. Connection lost message.

2.6.2. Connection's general information.

On the central right hand of the screen, relevant values for TX and RX are displayed: Tx frequency, Tx output power, Carrier ID, Beam ID and RX quality.

Also, the Alarms, Log data, Monitor, DHCP and Logon Test blocks can be found beside to those values.

Relevant values:

Tx Frequency:	Transmitter frequency (MHz). Range: 13750.0MHz to 14500.0 Mhz.
Tx output power:	Transmitter output power.
Carrier ID:	Carrier identification.
Beam ID:	Beam Identification.
Rx Es/N0:	Reception quality. Range: 30 ... -30 dBm.

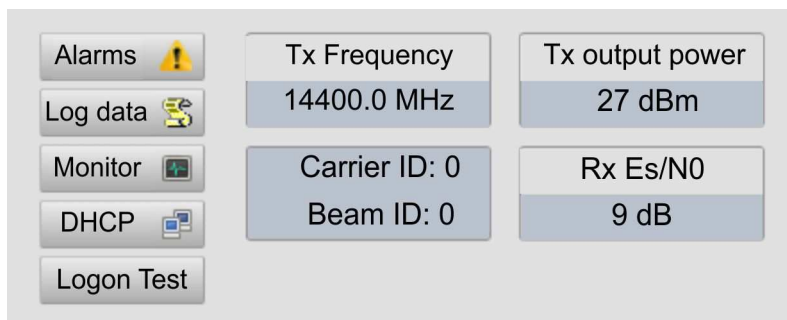


Fig. 17. Connection's information.

Alarms: The colour of this button changes according with the connection's state: **Blue**, **Yellow**, **Red**.

Alarm possibilities:

- | RF output.
- | External LNB.
- | Internal Broadcast LNB.
- | Internal Data LNB.
- | NCR lock.
- | F-SIM signalling.
- | Alarm ACK retransmissions.

Log data: When Log data button is dragged to the bottom of the screen, a control panel shows the following parameters.

- | Send to Trace Server: On / Off. (User Type: Administrator).
- | Tracer IP address.
- | Tracer port.

Monitor: State of the reception and transmission.

- | Coaxial link quality: MEASURING / **BAD** / **AVERAGE** / **GOOD**
- 0 < Coaxial link quality ≤ 97. **BAD** *Red.*
- 97 < Coaxial link quality ≤ 120. **AVERAGE** *Orange.*
- Coaxial link quality > 120. **GOOD** *Green.*
- | Coaxial Tx rate mbps
- | Coaxial Rx rate mbps
- | Coaxial link SNR dB
- | Monitor process On / Off
- | SAT Bytes received bytes/s
- | SAT Packets received Pkts/s
- | SAT Rx packets with errors
- | SAT Rx packets dropped
- | SAT Bytes transmitted bytes/s
- | SAT Packets transmittes Pkts/s
- | SAT Tx packets with errors
- | SAT Tx packets dropped.
- | ODU Bytes received bytes/s
- | ODU Packets received Pkts/s
- | ODU Rx packets with errors.
- | ODU Rx packets dropped.
- | ODU Bytes transmitted bytes/s
- | ODU Packets transmittes Pkts/s
- | ODU Tx packets with errors.
- | ODU Tx packets dropped.

Alarms	Log data	Monitor
RF output ●	Send to Trace Server <input type="checkbox"/> On	Coaxial link quality <input type="button" value="Set"/> Good
External LNB ●	Tracer IP address <input type="text" value="192.168.5.10"/>	Coaxial TX rate (mbps) 195
Internal Broadcast LNB ●	Tracer port <input type="text" value="4321"/>	Coaxial RX rate (mbps) 195
Internal Data LNB ●		Coaxial link SNR (dB) 26.3
NCR lock ●		Monitor process <input type="checkbox"/> On
F-SIM signalling ●		SAT Bytes received (bytes/s) 460
Alarm ACK retransmissions ●		SAT Packets received (Pkts/s) 6
		SAT Rx packets with errors 4603
		SAT Rx packets dropped 772555
		SAT Bytes transmitted (bytes/s) 36
		SAT Packets transmitted (Pkts/s) 1
		<input type="button" value="Remove"/> <input type="button" value="Apply"/>

Fig. 18. Alarms, Log data and Monitor.

DHCP: Dynamic Host configuration Protocol. *(Read only parameters).*

- | Mac Address.
- | IP Address.

Logon Test:

- | Logon Test Enable / Disable
- | RL Carrier ID valid
- | RL Beam ID valid
- | Link Budget estimation Valid
- | Send Logoff to server SET

** User Type Operator is not allowed to read these parameters.*

DHCP	Logon Test	Monitor
MAC address <input type="text" value="bc:ae:c5:2c:a7:1b"/>	Logon Test <input type="checkbox"/> Disable	SAT Packets transmitted (Pkts/s) 0
IP address <input type="text" value="192.168.5.15"/>	RL Carrier ID valid <input type="text" value="0"/>	SAT Tx packets with errors 25
	RL Beam ID valid <input type="text" value="0"/>	SAT Tx packets dropped 9828
	Link Budget estimation <input type="checkbox"/> Valid	ODU Bytes received (bytes/s) 21872
	Send Logoff to server <input type="button" value="Set"/>	ODU Packets received (Pkts/s) 34
		ODU Rx packets with errors 0
		ODU Rx packets dropped 0
		ODU Bytes transmitted (bytes/s) 10036
		ODU Packets transmitted (Pkts/s) 43
		ODU Tx packets with errors 0
		ODU Tx packets dropped 0
		<input type="button" value="Remove"/> <input type="button" value="Apply"/>

Fig. 19. DHCP, Logon Test, Monitor.

2.7. Description of the ODU's parameters by block.

2.7.1. External Broadcast LNB

All the parameters belonging to this block are "Read Only". They cannot be modified through the Web GUI since the configuration of this LNB is done in the user's STB.

Measures	Explanation
Rx Polarization	It shows the current polarization for the External Broadcast LNB. Linear - Horizontal Linear - Vertical Circular - Left (Available in Ku/Ka teminal). Circular - Right (Available in Ku/Ka teminal).
Rx band	It shows the used band: Low. LO 9,75 GHz. High. LO 10,6 GHz.

2.7.2. Internal Broadcast LNB

Parameter	Explanation
LNB Configuration	It shows/sets the current configuration for the internal LNB. Set top box. User.
Rx polarization <i>* If LNB Configuration: Set top box, this is a "Read only parameter".</i>	It shows/sets the current polarization for the Internal Broadcast LNB. Linear - Horizontal Linear - Vertical Circular - Left (Available in Ku/Ka teminal). Circular Right (Available in Ku/Ka teminal). <i>If LNB Configuration: Set top box, this is a "read only" parameter.</i>
Rx band <i>* If LNB Configuration: Set top box, this is a "Read only parameter".</i>	It shows / sets which band is in use: Low. LO 9,75 GHz. High. LO 10,6 GHz. <i>If LNB Configuration: Set top box, this is a "read only" parameter.</i>

2.7.3. Switch ODU

Parameter	Explanation
Switch to	It sets which LNB will be used for receiving the broadcast services: External LNB. Internal LNB.

2.7.4. Internal Data LNB

Parameter	Explanation
Rx polarization	It shows/sets the current polarization for receiving the interactive services. Linear - Horizontal Linear - Vertical Circular - Left (Available in Ku/Ka terminal). Circular Right (Available in Ku/Ka terminal).
Rx frequency (MHz)	It shows/sets the input frequency for receiving the Interactive services. User must enter the frequency in MHz. Range: 10700.0 ... 12750.0 MHz.
PIDs extraction	It Shows/sets the PIDs extraction. Auto: PIDs (1...8) and NCR PID (Clock reference) are extracted from the tables of the received TS. Manual: PIDs must be set manually. Range 0 ...8191 User type Operator is no allowed to modify this parameter.
Service Name	It shows / sets a list of Service names received in NiT table.
MPE PIDx (x =1 ...8)	It shows / sets the PID of the desired MPE packets. Range: 0 ... 8191
Measures <i>Read only parameters.</i>	
Rx band	It shows which band is in use: Low. LO 9,75 GHz. High. LO 10,6 GHz.
Number of services	Number or Service names received in NiT table

2.7.5. Internal DVB-S2 demod

The following parameters are "Read Only" and they are provided by the DVB-S2 demodulator.

Measures	
Status	It shows whether the DVB-S2 demodulator is locked or not to the RF input signal. Locked or Unlocked.
Frequency (KHz)	Frequency of the signal the DVB-S2 demodulator is locked to.
Input power (dBm)	Estimation of the input level, calculated by the DVB-S2 demodulator. Range: 0 ... -100 dBm.
Es/N0 (dB)	Estimation of the Es/N0 level, calculated by the DVB-S2 demodulator. Range: 30 ... -30 dB.
PER (E-7)	Estimation of the PER value calculated by the DVB-S2 demodulator.
Symbol rate (Bds)	It shows the symbol rate of the DVB-S2 stream.
ModCode	It shows the modulation and code rate of the DVB-S2 stream. Range: All possible combinations of modulation/code rate supported by the DVB-S2 demodulator.
Pilots	It shows whether the pilots are being used or not. ON or OFF.
Frame	Type of frame that is being used: Normal or Short
Roll-Off (%)	It shows the Roll-off factor in use. 20, 25 or 35.
TS Status	It indicates the status of the Transport Stream. OK or Fail.
FSIM signalling	It indicates whether F-SIM signalling has been detected or not. Presence or Absence.

2.7.6. Clock reference

Parameter	Explanation
NCR PID	It sets/shows the PID number of the NCR. Range: 0 ... 8197
Measures <i>Read only parameters.</i>	
NCR presence	It shows whether the presence of the NCR has been detected or not. OK or Fail
Tx Lock to NCR	It informs whether the transmitter clock is locked to the NCR (ie. ready for transmission) or not. Locked or Unlocked

2.7.7. Transmitter

Note: [Manager](#) and [Operator](#) can read these parameters but they cannot modify them. They only can be varied by the [Administrator](#).

Parameter	Explanation
TX ON / OFF	It sets the state of the transmitter: On Off Remark: If Tx. Test Mode: None → Tx On/Off works automatically.
Need to be logged?	Enable (Normal operation). The smart LNB must perform the logon procedure before start transmitting data packets. Disable: This option allows the user to transmit RLE packets without executing the logon procedure.
Send Logon/Frames to HUB?	Enable: This option allows the user to carry out the logon procedure with the satellite HUB. Disable: The user can perform the logon procedure with the FSIM HUB simulator.

Parameter	Explanation
TX Configuration	<p> Manual: User must set the following modulation parameters:</p> <ul style="list-style-type: none"> – Tx. Polarization. – Tx. Test mode. – FSIM configure. – Preamble S2. <p> Auto: The modulation parameters are set automatically.</p>
TX Polarization	<p>If TX Configuration: Manual TX Polarization can be:</p> <ul style="list-style-type: none"> Linear – Horizontal. Linear – Vertical. Circular - Left (Available in Ku/Ka terminal). Circular - Right (Available in Ku/Ka terminal).
TX Frequency (MHz)	<p>If TX Configuration: Manual TX Frequency can be set to: 13750.0MHz ... 14500.0 Mhz. Value is expressed in MHz.</p>
TX Test Mode	<p>If TX Configuration: Manual, TX Test Mode:</p> <ul style="list-style-type: none"> CW. FSIM continuous. FSIM single. None. In this case, the smart LNB operates in “Normal Mode”, applying the RLE to the incoming IP packets and transmitting them in a FSIM burst according to the configuration selected in the “FSIM configure” cell. <p>NOTE: If TX Test Mode: None, the smart LNB needs to be locked to the NCR before transmitting anything. Otherwise it will mute the output.</p> <p>In other modes (CW, FSIM continuous or FSIM single), it is not necessary to be locked to the NCR.</p>
Time between burst (ms)	<p>This parameter allows changing the space between bursts if the FSIM test continuous mode has been set. Range: 0 ... 1.000.000 us.</p>
Number of bursts	<p>Number of burst to be transmitted in single mode. Range: 1 ... 255.</p>

Parameter	Explanation
FSIM Configure	CRxxxxSFxxxxDSxxx. List of all the possible combination of CR, SF and DS of FSIM modes.
Control power (beta)	Selection of the control channel gain factor. Range: 0 ... 15.
OVSF code data	These values are used to internally generate either the OVSF codes or the Scrambling code.
OVSF code control	They should not be modified, unless these codes are also modified in the demodulator.
Scrambling code up	– OVSF code data: 0 (default). Range: 0 ... 512. – OVSF control mode: 1 (default). Range: 0...512
Scrambling code down	– Scrambling code up: 19988480 (default). – Scrambling code down: 33554431 (default).
Preamble S1	Index of the preamble signature sequence S1 to be used. (Indicated with "n" in clause 7.2.1 of F-SIM PHY Layer specification). Default value: 305. Range: 0 ... 65535.
Preamble S2	Index of the sequence S2 constituting the hierarchical preamble. It indicates which of the 2 complementary sequences will be used. (Defined in clause 7.2.2.1 of F-SIM PHY Layer specification). SEQ1 / SEQ2. Default value: SEQ1.
Number of pilots	Number of pilots to send within the FSIM burst. Range: 0 ... 15.
Output power attenuation (dBm)	Output power attenuation. Range: 0 ... 31. (Steps of 1 dB).
Measures	
<i>Read only parameters.</i>	
Output power (dBm)	Output power of the device. Units: dBm. This value depends on the attenuation set in the "Output power attenuation" cell.
Number of bits x burst	It shows the resulting number of bits per burst from the current configuration.
Number of frames x burst	It shows the resulting number of frames per burst from the current configuration.

2.7.8. IP Protocol

Parameter	Explanation
ODU Coax IP address	It sets/reads the ODU IP address on the coax interface. Format: Xxx.xxx.xxx.xxx Range: 0...255. 0...255. 0...255. 0...255.
ODU Coax IP mask	It sets/reads the ODU IP mask on the coax interface. Format: Xxx.xxx.xxxx.x
ODU DHCP Mode on COAX	It shows/sets the DHCP Mode on Coax. Server Client None
ODU DHCP range low addr	Low address of the DHCP server. It depends on the IP address and IP mask.
ODU DHCP range high addr	High address of the DHCP server. It depends on the IP address and IP mask.
Domain Name Server 1	DNS 1. (Ex. Google public DNS)
Domain Name Server 2	DNS 2. (Ex. Google public DNS)
ODU RJ-45 port	It enables or disables the RJ-45 port of the ODU. Disable. (Default). Enable. By default it is disabled, so the access to the Web GUI must be done via the RJ-45 port of the IDU. When this option is enabled, the IDU becomes "invisible" to the ODU.
Static Multicast IP addr.	It sets/reads the Static multicast IP address. Format: Xxx.xxx.xxx.xxx Range: 0...255. 0...255. 0...255. 0...255.
ODU SAT IP address	It sets/reads the ODU IP address on the satellite interface. Format: Xxx.xxx.xxxx
ODU SAT IP mask	It sets/reads the ODU IP mask on the satellite interface. Format: Xxx.xxx.xxxx
ODU SAT Gateway	It sets/reads the ODU gateway on the satellite interface. Format: Xxx.xxx.xxxx

Note: [User Type Operator](#), can read all the parameters listed above but cannot modify them.

User Type Manager, can read all the parameters listed but only can varied some of them:

- ODU coax. IP address.
- ODU Coax IP mask
- ODU DHCP Mode on COAX
- ODU DHCP range low addr
- ODU DHCP range high addr
- Domain Name Server 1
- Domain Name Server 2.

Measures	
<i>Read only parameters</i>	
ODU MAC address	It shows the MAC address of the ODU.
SAT MAC address	It shows the SAT MAC address.

2.8. Description of the IDU's block.

Parameter	Explanation
Psupply injection to coax.	<p>This parameter enables or disables the injection of voltage to the coaxial cable. By default, it is activated.</p> <ul style="list-style-type: none"> Enable. (Default). Disable <p>User type Operator: Psupply injection to coax: Enable.</p> <p>ATTENTION! <i>By disabling this option, the communication with the ODU will be lost.</i></p>



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