MDM2200 IP Satellite Modem

User Manual MDM2200 R3.2 v1.1

1   Copyright

2   About this Manual

This user manual is intended for the user of the MDM2200 IP satellite modem.
It provides a description of the modem and a detailed description of how to use the
GUI (Graphical User Interface).

2.1   Cautions and Symbols

The following symbols appear in this manual:

A caution message indicates a hazardous situation that, if not avoided, may result in minor or moderate injury. It may also refer to a procedure or practice that, if not correctly followed, could result in equipment damage or destruction.

A hint message indicates information for the proper operation of your equipment, including helpful hints, shortcuts or important reminders.

A reference message is used to direct to a location in a document with related document or a web-link.

2.2   Important Safety Precautions

Please first read the safety precautions which can be found on the CD-ROM provided with your modem.

3　Modem Description

3.1　Modem Front Panel
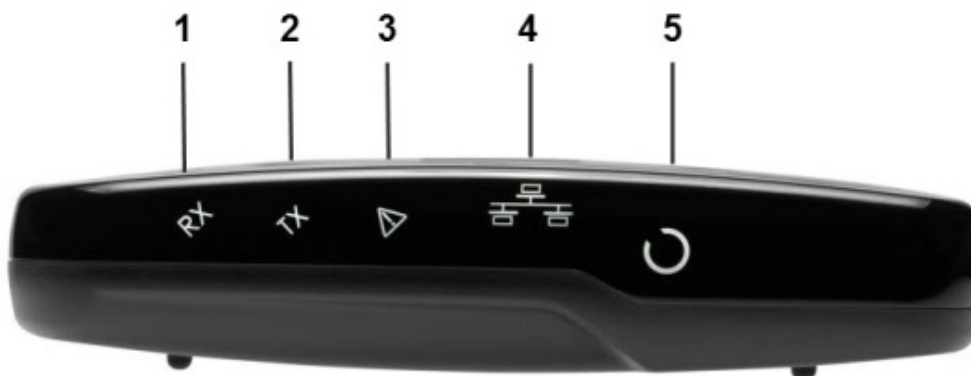
Nr	What	Description
1	RX indicator LED	Blue continuous - forward satellite signaling receiving.
2	TX indicator LED	Blue blinking - traffic transmitting via the satellite link.
3	Warning LED	Yellow continuous - when the terminal is not logged on to the satellite network
4	LAN indicator LEDs	• Left: Blue continuous - link layer status. • Right: Blue blinking - Ethernet frames are received or transmitted.
5	Power LED	Blue continuous - when powered up.

3.2 Modem Back Panel

Nr	What	Description
1	18 V/24 V power cable connector	Power connector (5.5/2.1mm plug).
2	TX connector	Indoor connection for the transmit coax cable.
3	RX connector	Indoor connection for the receive coax cable.
4	Micro SD	For future use - not yet supported.
5	Ethernet cable connector	Connection for the LAN, type RJ-45 (Ethernet cable).
6	Reset button	Multi-functional button: • Press once briefly (hold less than 5 seconds) to reboot the modem. • Press and hold for more than 5 seconds to perform a Factory Reset. This will reboot the modem and change all IP-settings back to the default factory settings.
7	USB Port	For future use - not yet supported.

3.3 Power Supply

- Universal input range: nominal 100 - 240 Volt / 50 - 60 Hz

- IEC60320/C14 socket

- CE approved

- Output 18V / 2A
(ILB2110, ILB2120, ILB2121) or 24 V / 2.5 A (ILB2140, ILB2141, ILB2145, ILB2210)

- Plug 5.5 x 2.1 mm

4   Modem Web Interface

4.1   Connecting the Modem to Your Computer

» Plug the network cable in the modem's and your computer's Ethernet ports.

» Connect the power adapter provided in the box gently to the modem and a wall outlet.
The result should resemble like the figure below:
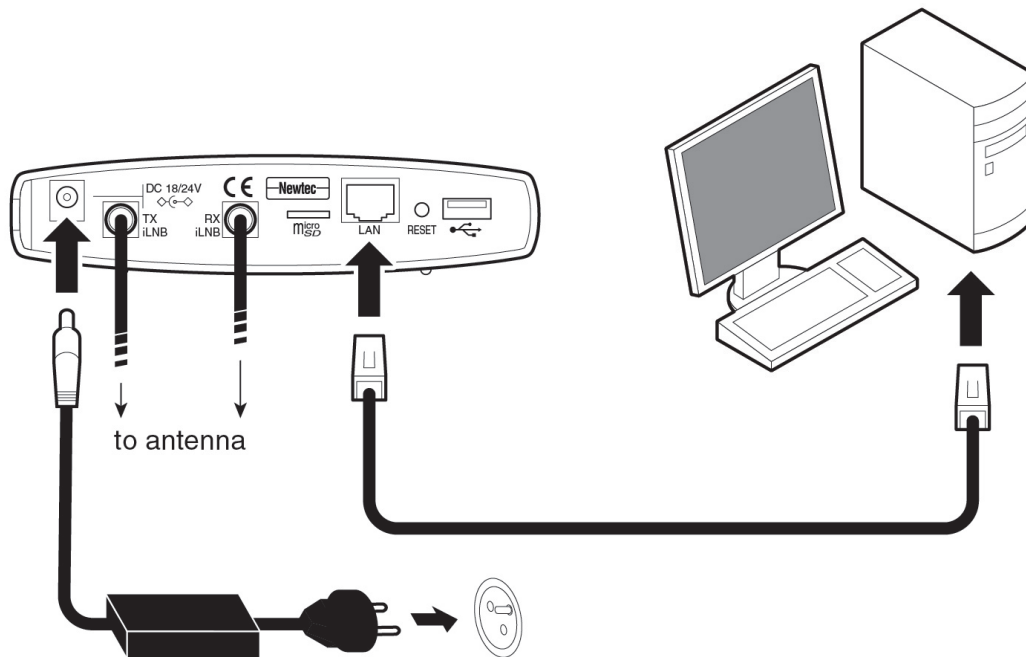
Check if your computer is set to DHCP. This way the computer can receive an IP address from the modem.

	To check and/or change your IP settings, please refer to the help pages of the Operating System on your computer.

4.2   How to Access the Modem Web Interface?

In the normal operational mode a connected computer should be configured in DHCP mode to retrieve
an IP address automatically and to retrieve the DNS server. The modem acts as a DHCP server for the computer.

Browse to the Web Interface

»   Type the modem's address in the address bar of the browser: 192.168.1.1.
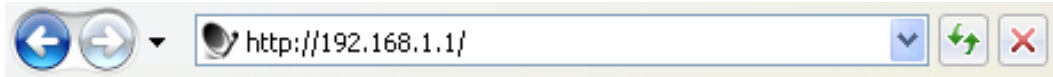
The first time your modem starts up, you are re-directed to the Terminal Installation page.
If your modem has already been installed before, you are re-directed to the Status page of the terminal.

When the terminal is not linked to the satellite network, after three minutes, the computer will automatically receive its IP address, via DHCP, from the modem and you will then be able to browse the web interface.

If no DHCP address is assigned to your terminal: remove the Ethernet cable from your computer, wait a few seconds, and plug the Ethernet cable back into your computer. If the problem remains, you need to assign a static IP address to your computer.

4.3 Overview Web Interface

4.3.1 General Lay Out

Each of the web interface pages contains the same elements.

- **A - Banner:**
  The banner contains the Newtec logo, the Air MAC address and the languages in which the GUI can be displayed.

- **B - Status bar:**
  The status bar always shows the most important status LEDs.
  This information will be specified in the body of the Status page.

- **C - Menu structure:**
  On the left hand side of the page the site navigation is found.
  Click an item to select it.

- **D – Body:**
  The actual content of the web interface is shown in the body.
  It always shows the page title and one or more content blocks or forms.

4.3.2   Menu Structure

Terminal Status
Terminal Installation
Terminal Configuration
Ethernet Interface
Satellite Interface
Outdoor Unit
Multicast
Device Info
Diagnostics
Logging
Test
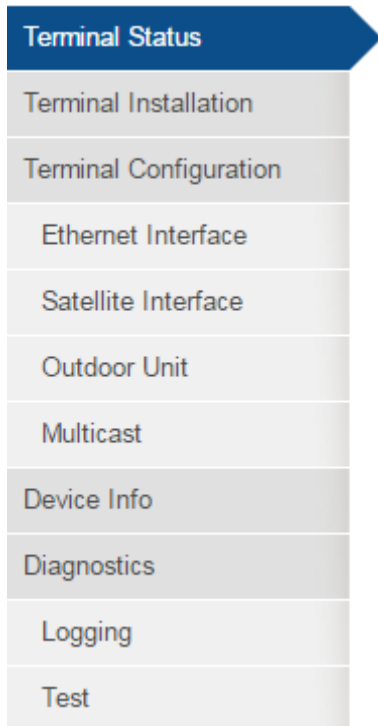
- **Terminal Status**
  Check on the device and network status.

- **Terminal Installation**

  – Run the installation procedure.

- **Terminal Configuration**

  – *Ethernet Interface*
    Check and alter the Ethernet interface configuration.

  – *Satellite Interface*
    Check and alter the Satellite interface configuration.

  – *Outdoor Unit*
    Check and alter the Outdoor Unit configuration.

  – *Multicast*
    Check and alter the Multicast configuration.

- **Device Info**
  Check the Hardware version. Check or alter the software version.

- **Diagnostics**

  – *Logging*: Generate a diagnostics report or check the modem logs

  – *Test*: Run tests on the device.

4.4   Status Bar

4.4.1   Ethernet LED

The **Ethernet** LED gives the general status of the Ethernet connection to the modem.

LED Color Code	Description
Red	Connection is not OK.
Yellow	Connection is OK, but no DHCP address is given.
Green	A DHCP address is given and the connection is OK.

4.4.2   Satellite LED

The **Satellite** LED gives the general status of the Satellite connection to the modem.

LED Color Code	Description
Red	No connectivity, no valid signal received.
Yellow	A valid signal was received. The terminal is busy logging in on the satellite network.
Green	The system is operational and the user is logged in on the satellite network.

4.4.3   Software LED

The **Software** LED gives the general status of the installed software or the updates.

LED Color Code	Description
Red	The terminal has a newer software version than the running software version, and the newer software version was not selected because the software validation process failed.
Yellow	The terminal is retrieving new software via satellite. This can take up to 10 minutes.
Green	No problem. The terminal is running with the latest software version.

4.4.4 Rebooting the Modem

See section *Modem Back Panel on page 5* for similarities with the hardware button reboot.
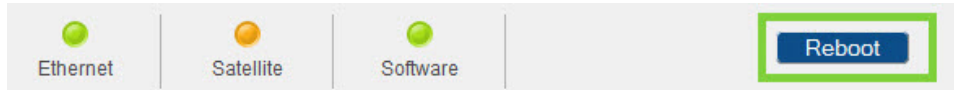
» Click the Reboot link at the right of the status bar to reboot the terminal.

The modem will reboot and return to the Status page. This may take up to one minute, including satellite link initialization.

4.5 Terminal Status

4.5.1 Introduction

The Status Page contains two parts as shown in the figure below:

» **Overview**
This part gives an overview of the modem, demodulator and software state.

» **Interface Statistics**
This part gives an overview of the modem statistics.

Terminal Status

Overview

Ethernet

Ethernet Status	Ok

Satellite

Modem Status	synchronised - CPM
Demodulator	-39.3 dBm, Es/No: 33.7 dB

Software

Version	3.0.1.6

Interface Statistics

Interface		Volume	Packets	Errors	Dropped
Ethernet Interface	RX	138.55 MB	1 491 576	0	0
	TX	44.34 MB	295 916	0	0
Satellite Interface	RX	38.66 MB	228 524	0	0
	TX	44.44 KB	318	9	9

4.5.2 Overview

4.5.2.1 Ethernet Overview

The Ethernet status in indicated by a state description. The possible Ethernet state descriptions are given below.

Ethernet status	Description
Ok	A DHCP address is given and the connection is OK.
Warning	Ony appears if DHCP is enabled. Connection is OK, but no DHCP address is given.
Error	Connection is not OK.

4.5.2.2 Satellite Overview

The Active Beam ID is indicated. Note: When no beam is selected (typically at first startup) this setting is set to N/A (Not applicable).
The modem state is indicated by a state description. The possible modem state descriptions are given below.

Modem State	Description
Awaiting installer action	The terminal is waiting for an action of the installer.
Satellite network lookup	The terminal is looking for the satellite network.
Synchronizing	The terminal found the satellite network and time synchronization.
Synchronized	The terminal is synchronized and can directly log in on the satellite network when IP traffic is received via the Ethernet interface.
Network login	The terminal is trying to log in on the satellite network.
Operational	The terminal is logged in.

An error message can be displayed. This error message displays the current error status and will be reset when the terminal has entered the satellite network and the terminal is operational.

> Please refer to the Troubleshooting Guide on the CD-ROM (provided with your modem) for more details on possible errors and actions needed to resolve the occurring error.

The demodulator state is built as follows: see table below for more details.

- *-95.0 dBM, Es/No: 23.2 dB, <Satellite network name>*

Demodulator Label Value	Description
-xx.x dBm	Indication of the received signal strength expressed in dBm. This indication can change when going from pointing mode to operational mode.
Es/No	Es/No is an indication of the received signal quality expressed in dB. This indication can change when going from pointing mode to operational mode.
Satellite network name	Optional satellite network name as specified by the Network Operator.

4.5.2.3 Software version

The running software version is indicated by its version number.

4.5.3 Interface Statistics

Modem State		Description
Interfaces	Ethernet interface	User side interface (Ethernet frames).
	Satellite interface	Satellite side interface (IP packets).
Directions	RX	Receive IP traffic of the modem, including all multicast and unicast traffic, as well as internal management traffic.
	TX	Transmit IP traffic of the modem, including all transmitted IP packets, unicast traffic, control and management traffic.
Statistics	Volume	Total number of received (or transmitted) bytes.
	Packets	Received (or transmitted) Ethernet frames or IP packets.
	Errors	Number of occurred errors.
	Dropped	Dropped Ethernet frames or IP packets.

4.6   Terminal Installation

4.6.1   Introduction

The first time your modem starts up, you are redirected to the Terminal Installation page. The installation procedure must be performed step by step, and starts with selecting an outdoor unit (see section *Selecting the Outdoor Unit on page 17*).

If your modem has already been installed before, an overview of the selected installation settings is displayed.

» Click Restart to restart the complete installation procedure.

4.6.2   Selecting the Outdoor Unit

ℹ️ "Outdoor Unit" is defined as the combined set of antenna and iLNB.

» Select the outdoor unit type which will be connected to your modem and confirm.

Terminal Installation

Outdoor Unit
Spot Beam
Antenna Pointing
Software Download
Validate Installation

Outdoor Unit

10 | 2W_Ka_(ILB2210)_-_75cm_(A ▾

Confirm

⚠️ Selecting an incorrect outdoor unit type may prevent the modem from logging onto the network.

⚠️ The supported outdoor unit type(s) are predefined in factory.

If, for some reason, your outdoor unit is not listed, please refer to
dd Outdoor Unit Parameters on page 44 .

4.6.3 Selecting the Spot Beam

> ⚠️ The spot beams are predefined in factory.
>
> If, for some reason, a new beam has to be added, please contact your Service Provider.

» Select the beam identifier corresponding to your location and confirm.

4.6.4 Pointing the Antenna

Before proceeding with this step, make sure that:

- Your antenna and iLNB are properly installed. For instructions, refer to the Installation Guide provided with your terminal.

- The RX interface of the iLNB is connected to the RX interface on the modem.

Note: The TX interfaces should not yet be connected.

» If two pointing carriers have been preconfigured, keep the pre-selected carrier. If pointing fails during the procedure, you will need to repeat this step with the other pointing carrier.

Terminal Installation

Outdoor Unit	🟢	10 | 2W_Ka_(ILB2210)_-_75cm_(ANT2010)
Spot Beam	🟢	1
Antenna Pointing		
Software Download		
Validate Installation		

Antenna Pointing

Pointing Carrier 1 | 19.87000 GHz ▼

Start Pointing   Skip Pointing

» Click Start Pointing to start the pointing procedure with the Point&Play tool and proceed to the next section: Using the Point&Play Tool.

» Click Skip Pointing to skip the pointing procedure (use if the antenna is already correctly pointed). You can proceed to *Software Download on page 23* .

4.6.4.1   Using the Point&Play Tool

The Point&Play tool helps you to point the antenna correctly. During the pointing procedure, the Point&Play tool can produce various sounds, each having a specific meaning described below.

High uninterrupted tone (correct tone):
The antenna points to the correct satellite and is receiving the strongest signal. Some fine-pointing might still be required to find the optimal position of the antenna (highest tone within the high uninterrupted tone range).
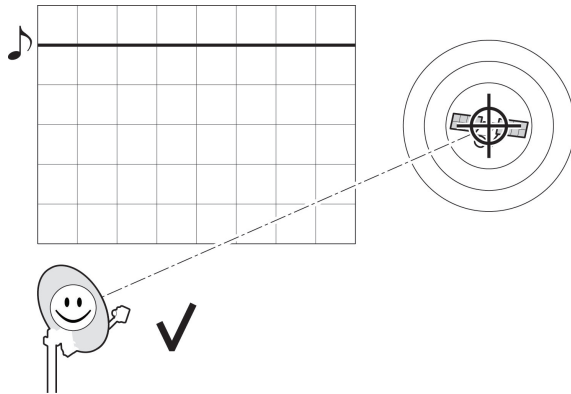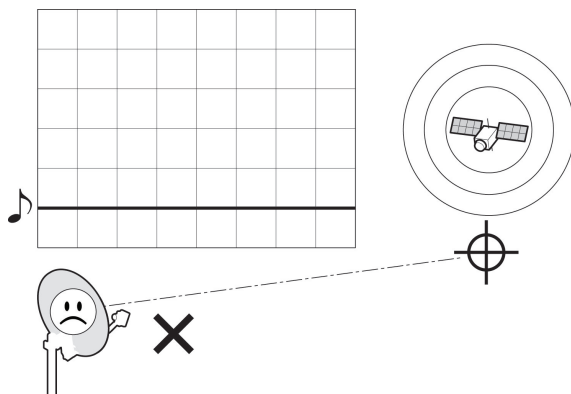

Medium or high interrupted tone:
The antenna points to the correct satellite but does not receive the strongest signal so far.
The pointing procedure must be continued until an uninterrupted high tone is perceived.
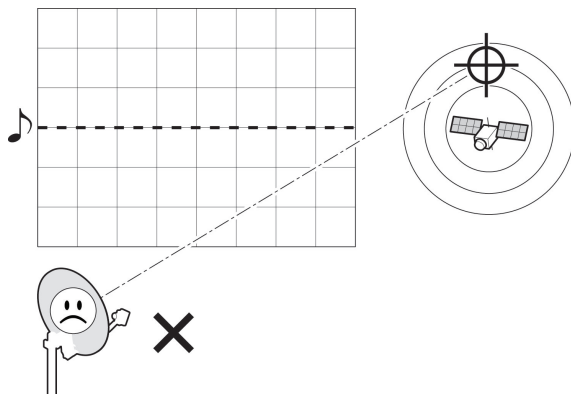
Low uninterrupted tone:
The antenna points to a wrong satellite or is not pointing to a satellite.

To use the Point&Play tool:

» Connect the TX interface on the modem to the Point&Play tool.

» Connect the earphone to the Point&Play tool. Make sure the Point&Play tool is still switched off.

» Switch on the Point&Play tool by slowly turning the volume wheel until the green LED illuminates. Put on the earphone and adjust the volume if necessary.
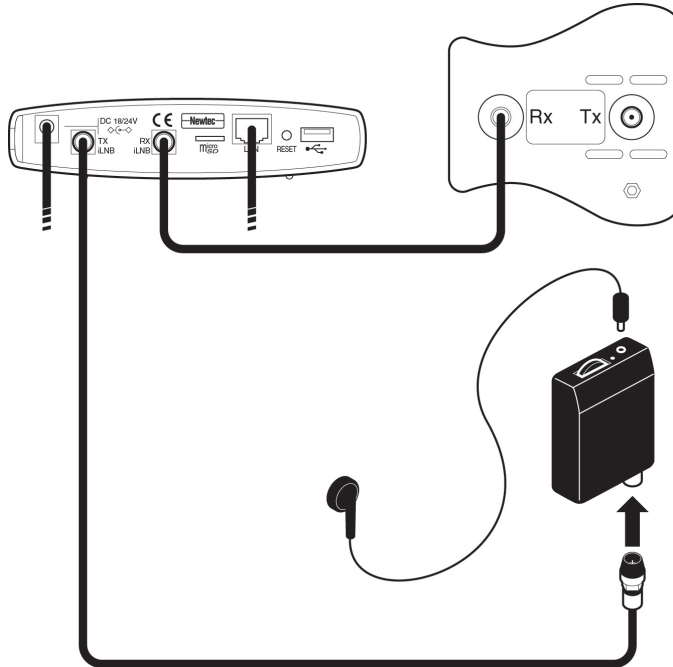
⚠ Ensure that the volume of the Point&Play® tool is not set too loud, otherwise damage to your hearing may occur.

• Start pointing the antenna until you hear the highest possible uninterrupted tone.
  Please refer to the installation guide for more information.

4.6.4.2　Check the Pointing

- If the antenna is correctly and optimally pointed, the message **Correct satellite - pointed optimally** appears in the modem webGUI. You can now proceed to the next section: Finishing the Pointing.

Antenna Pointing

Antenna Pointing

Demodulator　　　-35.2 dBm, Es/No: 7.4 dB

Modem Status　　　antenna pointing : Correct satellite - pointed optimally (0.0 dB below maximum measured level)

- If the antenna is not yet optimally pointed, the message **Correct satellite - not pointed optimally** is displayed. Continue the pointing procedure until optimal pointing is achieved.

Antenna Pointing

Antenna Pointing

Demodulator　　　-33.1 dBm, Es/No: 8.7 dB

Modem Status　　　antenna pointing : Correct satellite - not pointed optimally (15.3 dB below maximum measured level)

In case of problems, refer to the Troubleshooting Guide available on the CD-ROM provided with your modem.

4.6.4.3　Finishing the Pointing

» Switch off the Point&Play tool.

» Remove the TX cable from the Point&Play tool and connect it to the TX interface of the iLNB.

» Back at your computer, click Finish Pointing .

Antenna Pointing

Antenna Pointing

Demodulator　　　-35.2 dBm, Es/No: 7.4 dB

Modem Status　　　antenna pointing : Correct satellite - pointed optimally (0.0 dB below maximum measured level)

Finish Pointing

4.6.5 Software Download

The modem continuously checks for software updates.

» If the software is still up to date, this step is skipped automatically.
   You can proceed to the next step: Validating the Installation.

» If a newer software version is available, download will start automatically.

Once the download is complete, the new software is written to flash memory and the modem reboots to activate the new software. You can now proceed to the next step: Validating the Installation.

 You may need to refresh the page of your browser manually after the reboot.

4.6.6 Validating the Installation

When the previous step is completed, the following screen is shown:

The modem will now check if the quality of the installation needs to be validated.
Whether this validation is required or not, is determined by your Service Provider.

- If validation is not required, this step is skipped automatically. The following screen appears:

Your modem is now installed.
Depending on your Service Provider, you might need to register first before you can start browsing the web.

- If validation of your terminal installation is required by your Service Provider, please proceed with this section and execute the following sequence of tasks.

4.6.6.1 Accepting the Disclaimer

As this validation procedure involves sensitive information such as geographical location of the terminal which is subject to legal restrictions, a disclaimer is presented.
Please read the disclaimer message and indicate your acceptance by clicking Confirm .

4.6.6.2   Entering your Location
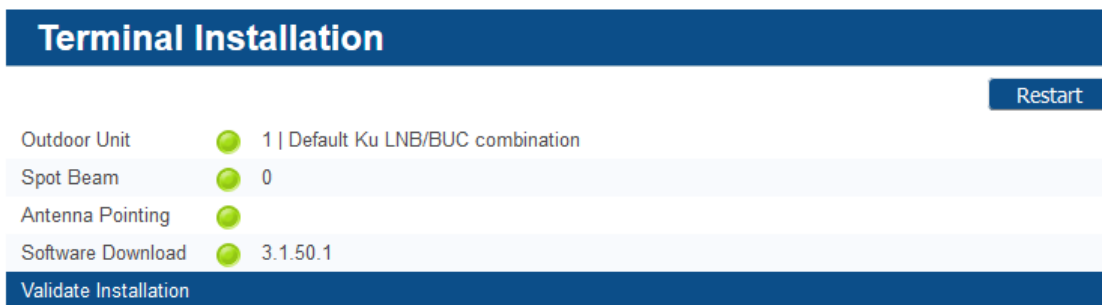
The validation of your installation is based on the geographical location of your terminal.

There are 2 options to enter this information:

- Option 1: Enter your address.

- Option 2: Enter your location's latitude and longitude.

Option 1: Enter your Address

» Enter the address where the terminal is located. At a minimum, your city and country are required.

» A list of one or more matching locations is displayed.
Select your address from the list and click Next to view your location on a map.
If your address is not listed or no results are displayed, refer to the Troubleshooting Guide available on the CD-ROM provided with your modem.

Terminal Installation

Restart

Outdoor Unit	🟢	1	Default Ku LNB/BUC combination
Spot Beam	🟢	0
Antenna Pointing	🟢	
Software Download	🟢	3.1.50.1
Validate Installation		

Validate Installation

Please wait for the map to display, and confirm that the position shown on the map is your terminal location.

Oxford St, London, UK

Latitude: 51.515309° N   Longitude: 0.141289° W
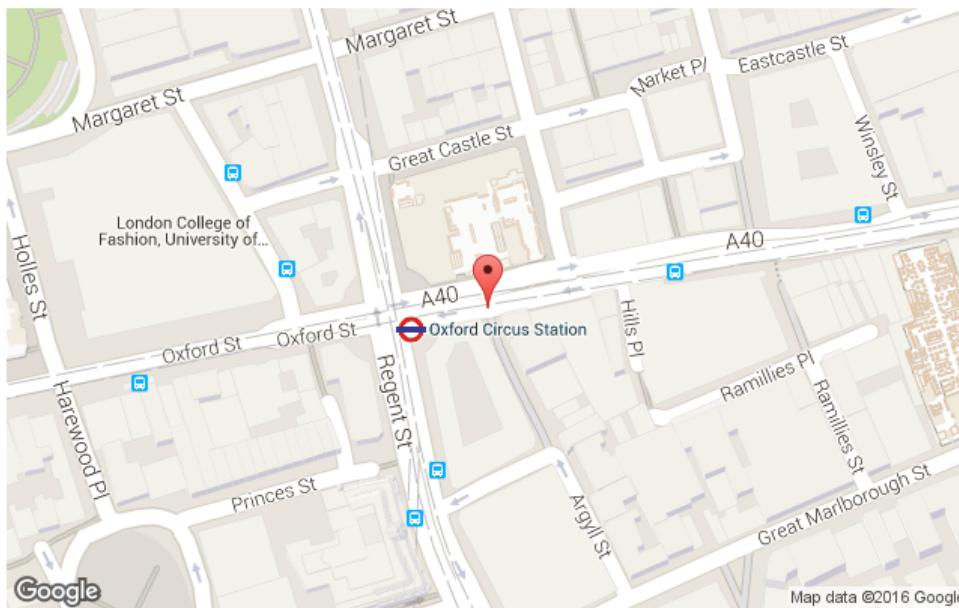
Back   Confirm

» Click Confirm to accept and proceed.
  If this is not your location, refer to the Troubleshooting Guide available on the CD-ROM provided with your modem.

Option 2: Enter your Location

» Enter your location's latitude and longitude.

⚠️ These values should be entered in degrees, minutes and seconds notation or in decimal form (using a dot as a separator).

Positive latitude = NORTH, positive longitude = EAST.

Validate Installation

Validate Installation

Please enter the terminal address or location (coordinates).

When entering an address, start typing and wait for the suggestions to appear, then select one of the suggested addresses.

○ [Address]

⦿ [51.51 N]   [0.14 W]

[Next]

» Click **Next** to continue.

4.6.6.3 Validation

Once the location is confirmed, the validation of the installation starts.

» When the validation is successful, the following screen is shown:

» If the validation fails, refer to the Troubleshooting Guide available on the CD-ROM provided with your modem.

4.7 Terminal Configuration

4.7.1 Ethernet Interface

This section describes the interface between the computer and the modem.

4.7.1.1 View the Ethernet Interface Configuration

Ethernet Interface Configuration

Terminal Status
Terminal Installation
Terminal Configuration
Ethernet Interface
Satellite Interface
Outdoor Unit
Multicast
Device Info
Diagnostics
Logging
Test

Ethernet

Ethernet MAC Address	00:07:ed:00:64:05
Management IP Address	192.168.1.1
Netmask	255.255.255.0

VLAN overview

Layer 3 VLANs

Port(s)	VLAN Tag	Virtual Network	Gateway Address (IPv4)	Gateway Netmask (IPv4)	Gateway Address (IPv6)	Gateway Netmask (IPv6)	DHCP4 Enabled
all	-			0			Yes

Edit

4.7.1.2 The Parameters of the Ethernet Interface

The displayed parameters and their description:
Ethernet

Parameter	Description
Ethernet	
Ethernet MAC address	MAC address of the Ethernet interface
Management IP address	Management IP address of the Ethernet interface
Netmask	Network range for the user's LAN

VLAN Overview

> *i*   The VLAN Overview parameters are set by the Service Provider and cannot be edited by the end user.

Parameter	Description
Layer 3 VLANs	
Ports	Indicates the external Ethernet port.
VLAN Tag	Indicates a separation between different virtual networks.
Virtual Network	Name of the virtual network the modem belongs to. An MDM22X0 can belong to 4 different networks.
Gateway Address (IPv4)	IPv4 address used as gateway address for the connected CPEs (Customer Premises Equipment) within that network.
Gateway Netmask (IPv4)	Network range for the user's LAN within that network.
Gateway Address (IPv6)	IPv6 address used as gateway address for the connected CPEs within that network.
Gateway Netmask (IPv6)	Network range for the user's LAN within that network.
DHCPv4 enabled	Indicates whether the DHCP server on the terminal is enabled or not.

4.7.1.3 Modify the Ethernet Interface Configuration

» Click on `Edit` in the Web Interface > View Configuration Ethernet interface to change the Ethernet Settings.

» Edit the parameters to be changed.

» Click on `Save` in the Web Interface > Edit Configuration Ethernet interface to save the new settings.

The Ethernet interface configuration is now saved.

4.7.2 Satellite Interface

This section describes the interface settings between the terminal and the satellite.

> ⚠️ The satellite interface settings are predefined in factory.
> These settings may only be changed upon advice of your
> Service Provider!

> ℹ️ A satellite beam covers a limited geographical area in which terminals are serviced by the satellite.

> 📋 The displayed satellite interface settings depend on the beam that was selected during the terminal installation.
> Refer to *Terminal Installation on page 16* for more information.

Every satellite interface setting consists of:

- **Initial Receive Carrier**

This is the initial receive carrier through which the modem will try to gain access to the network.

- **Pointing Carrier**

This carrier is needed to enable antenna pointing via the Point&Play mechanism. When two different pointing carriers are assigned to the terminal, the installer can perform his pointing on two different pointing carriers. At least one pointing carrier must be enabled.

Maximum two satellite interface settings per beam can be assigned to the terminal. This is for redundancy or migration reasons. In case two initial receive and/or pointing carriers are assigned to the terminal, one preferred carrier is marked.

In case no carrier setting is configured, no carrier setting is shown in the GUI.

4.7.2.1 View the Satellite Interface Configuration

As already mentioned above, maximum two initial receive carrier settings and pointing carrier settings can be assigned and displayed. Only the settings that are enabled are displayed. How to change the satellite interface configuration is described in section *Edit the Satellite Interface Configuration on page 37* .

If two initial receive carriers are enabled and displayed, the preferred initial receive carrier is marked green.

If two pointing carriers are enabled and displayed, the default pointing carrier is marked green.

> The pointing carrier that is used for pointing is selected through the Terminal Installation menu. Refer to *Terminal Installation on page 16* for more details.

> The parameter values in the figure below are just an example. They are randomly chosen and may therefore differ from the predefined settings on your modem.

If multiple beams are configured, you can select another beam from the dropdown list in the General section to view its satellite settings. Changing the active beam is done via the Terminal Installation menu.

Terminal Status

Terminal Installation

Terminal Configuration

Ethernet Interface

Satellite Interface

Outdoor Unit

Multicast

Device Info

Diagnostics

Logging

Test

Satellite Settings

General

Configured Beam ID	0
Beam ID	0 ▼

Satellite Properties

Polarization Skew	0.00°
Orbital Position	23.50° East
Satellite Latitude Variance	0.00°
Max Skew	0.00°
TX Polarization	Horizontal
Extra Hunt Parameters	

Initial Receive Carrier

	Initial Receive Carrier 1
Default	◉
Transport Mode	DVB-S2X - Annex M
Time Slice Number	4
Frequency	11.0500000 GHz
Symbol Rate	300.00000 Mbaud

Pointing Carrier

	Pointing Carrier 1
Default	◉
Transport Mode	DVB-S
Time Slice Number	
Frequency	11.1370000 GHz
Symbol Rate	22.00000 Mbaud

Edit

4.7.2.2 The Parameters of the Satellite Interface

The displayed parameters and their descriptions are shown in the table below.

Parameter	Description
General	
Configured Beam ID	Identifier of the beam in which the terminal currently operates.
Beam ID	Identifier of the beam whose parameters are displayed in the GUI.
Satellite Properties	
Polarization Skew	Skew angle in degrees applied by the satellite operator. Check with your satellite operator to know this value. Value is a positive or negative integer with dotted decimal notation.
Orbital Position	Orbital position of the satellite in degrees and East/West selection.
Satellite Latitude Variance	Only applicable in case of automatic pointing. Value which is typically used for inclined orbit satellites. Check with your satellite operator to know this value.
Max Skew	The maximum skew angle. Check with your satellite operator to know this value.
TX Polarization	Reflects the polarization of the received carrier. Possible values are: • Horizontal • Vertical • Circular Left • Circular Right
Extra Hunt Parameters	Future use
Initial Receive Carrier	
Default	Marker for the default Initial Receive Carrier.
Transport Mode	• DVB-S • DVB-S2 (CCM) • DVB-S2 (ACM)
Frequency	Initial receive frequency (GHz)
Symbol Rate	Initial receive symbol rate (Mbaud)
Polarization	Reflects the polarization of the received carrier. Possible values are: • Horizontal • Vertical • Circular Left • Circular Right
Pointing Carrier	
Default	Marker for the default pointing carrier

Parameter	Description
Transport Mode	• DVB-S • DVB-S2 (CCM) • DVB-S2 (ACM)
Time Slice Number	Future use
Frequency	Initial receive frequency (GHz)
Symbol Rate	Initial receive symbol rate (Mbaud)
Polarization	Reflects the polarization of the received carrier. Possible values are: • Horizontal • Vertical • Circular Left • Circular Right

4.7.2.3 Edit the Satellite Interface Configuration

» Click Edit in the Web Interface > View Satellite Configuration Interface.

Editing can be disabled by the Service Provider. In such case, the Edit button is not present and the configuration settings are read-only.

» Edit the parameters to be changed.

At least the preferred initial receive carrier and default pointing carrier must be enabled.

» Click Save in the Web Interface > Edit Configuration Satellite Interface to save the new settings.

The adjusted satellite interface configuration is now ready for use.

Refer to *Terminal Installation on page 16* if you want to change the selected beam.

4.7.3   Outdoor Unit

4.7.3.1   Introduction

An "Outdoor Unit" (ODU) is defined as the combined set of antenna and iLNB.
The MDM2200 modem hardware and software support several ODU types, but in order to verify the quality of a terminal installation, the system should know which ODU is actually used.

An ODU type is known to the terminal in one of the following ways:

- Normally one or more ODU types are predefined in factory. If only one ODU type is preconfigured, this ODU will be selected automatically during the installation procedure (see *Terminal Installation on page 16*). If multiple types are predefined, then the user can select the ODU he is actually using via a dropdown list during the installation procedure.

- If no ODU types have been preconfigured, the user must first add one or more ODU types before starting the installation procedure (see *Add Outdoor Unit Parameters on page 44*).

> ⚠️ ODU types are not only configured in the modem, but are also set by the Network Operator in the hub. Consequently the parameters visible in the modem GUI must match with the ones defined at the hub side, in order for the modem to be able to transmit and receive. This is particularly important when adding new ODU types.

> ℹ️ The ODU types are not affected by a factory reset of the modem.

4.7.3.2 Display Outdoor Unit Parameters

When selecting the Outdoor Unit configuration from the menu, the parameters of the ODU which was selected during installation are displayed by default. If multiple outdoor unit types are defined, you can use the dropdown box to select the ODU for which you want to display the parameters.

> Editing or adding an ODU can be disabled by the Network Operator. In such case, the Edit or Add buttons are not present and the ODU configuration settings are read-only.

ODU Configuration

ODU Type Configuration

Active ODU ID	1
ODU Type ID	1
ODU Description	500mW Ku (ILB2110) -75cm(ANT2010)
Power Off Timeout	1 secs
Elevation Offset	0 °
Reflector Type	Single Offset
Linear Polarization Indication	0 °
Positive Feed Reading	Clockwise
Feed Reading When RX Hor	1 °

Receive

LNB Type	Single/Dual
22 kHz Tone	Band selection
Voltage	Off
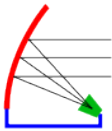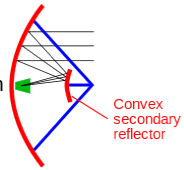
	L.O.	RF Start	RF Stop
Low Band	9.750 GHz	10.700 GHz	11.700 GHz
High Band	10.600 GHz	11.700 GHz	12.750 GHz

Transmit

	Multiplicator	RF Start	RF Stop
MUC	5	13.750 GHz	14.500 GHz

Current	Min	Max
	140 mA	910 mA

The displayed parameters and their descriptions are shown in the table below.

Parameter	Description
ODU Type Configuration	
Active ODU ID	Indicates which outdoor unit is active at the moment.
ODU Type Id	Select the ODU type you want to activate.
	Positive integer used as unique identifier.
	• Range 1-32 is reserved for Newtec ODU types.
	• Range 33-64 is for user definable ODU types.
ODU Description	String used as a description of the selected ODU type.
Power Off Timeout	Not yet supported
Elevation Offset (Used with Newtec Terminal Installation app)	This is the delta between the antenna real elevation and the elevation of the reference plane to which the smartphone will be placed for the elevation measurement. This offset is different for different antenna types. For ANT2010 75 cm this is 72.5°. This means that when the elevation is 17.5°, the reference plane is 17.5° + 72.5° = 90°, which is vertical.
Reflector Type (Used with Newtec Terminal Installation app)	We support the following 2 antenna types:
	• Single-offset antennas Off-axis or Offset feed
	• Cassegrain antenna with a subreflector Cassegrain — Convex secondary reflector
Linear Polarization Indication (Used with Newtec Terminal Installation app)	This indicates the midrange value of the feed reading. For the front end type ILB2220 (Ku) this is 90°, since the reading is from 0 to 180°. For other front end ILB types it is 0°, because the range is for example from: -45° to +45°.
Positive Feed Reading (Used with Newtec Terminal Installation app)	This indicates if reading is clockwise or counterclockwise. For the front end type ILB2120 (Ku) this is clockwise , since reading clockwise is from 0° to 180°. For some other front end types it is clockwise, because reading clockwise is for example from: -45° to +45°.
Feed Reading When RX Hor	When the antenna and front end ILNB is aligned with a linear polarized horizontal signal from the satellite, the feed reading can be +/- 90° or 0°.

Parameter	Description
(Used with Newtec Terminal Installation app)	For the combination ANT2010 (75cm) and ILB2120(Ku) this is +/- 90°.
Receive	
LNB Type	Determines which type of LNB is used. Possible values are: • Single/Dual • Multi band (not applicable for this modem type)
22 kHz Tone	Used to inform the LNB about which frequency band it needs to use. Refer to the LNB datasheet to know which values to set. Possible values are: • Off • On • Band selection
Voltage	Used to inform the LNB about which polarization it needs to use. Refer to the LNB datasheet to know which values to set. Possible values are: • Off • Fixed 13 V (only visible when using the 24 Vout power supply) • Fixed 18 V (only visible when using the 24 Vout power supply) • Band selection (if not set via 22 kHz tone) Only visible when using the 24 Vout power supply. • Polarization selection Only visible when using the 24 Vout power supply.
Low Band L.O.	Local oscillator frequency (in GHz) used when the LNB is operating in low band, see the LNB datasheet. Only applicable if 'Band selection' is used in 22 kHz or Voltage settings. If 'Band selection' is not used, then only set one local oscillator frequency (as there is no distinction between high and low band).
Low Band RF Start	Minimum frequency used by the LNB when operating in low band, see the LNB datasheet. Only applicable if 'Band selection' is used in 22 kHz or Voltage settings. If 'Band selection' is not used, then only set one RF Start frequency (as there is no distinction between high and low band).
Low Band RF Stop	Maximum frequency used by the LNB when operating in low band, see the LNB datasheet. Only applicable if 'Band selection' is used in 22 kHz or Voltage settings. If 'Band selection' is not used, then only set one RF Stop frequency (as there is no distinction between high and low band).

Parameter	Description
High Band L.O.	Local oscillator frequency (in GHz) used when the LNB is operating in high band, which can typically be found in the LNB datasheet. Only applicable if 'Band selection' is used in 22 kHz or Voltage settings. If 'Band selection' is not used, then only set one local oscillator frequency (as there is no distinction between high and low band).
High Band RF Start	Minimum frequency used by the LNB when operating in high band. Only applicable if 'Band selection' is used in 22 kHz or Voltage settings. If 'Band selection' is not used, then only set one RF Start frequency (as there is no distinction between high and low band).
High Band RF Stop	Maximum frequency used by the LNB when operating in high band. Only applicable if 'Band selection' is used in 22 kHz or Voltage settings. If 'Band selection' is not used, then only set one RF Stop frequency (as there is no distinction between high and low band).
Current Min / Max	Minimum/maximum allowed current on the RX interface. This input is required for correct functioning of the current measurement test (see section *Hardware Test on page 54*). Not visible if single coax LNB is used.
Transmit	
MUC Multiplication factor	Multiplication factor used by the MUC to convert from IF to RF-band (as n*transmitted IF freq = transmitted RF freq, where n = multiplication factor).
MUC RF Start	Minimum RF frequency the MUC can transmit.
MUC RF Stop	Maximum RF frequency the MUC can transmit.
Current Min / Max	Minimum/maximum allowed current on the TX interface. This input is required for correct functioning of the current measurement test (see section *Hardware Test on page 54*).

4.7.3.3   Edit Outdoor Unit Parameters

> Editing can be disabled by the Service Provider. In such case, the Edit button is not present and the configuration settings are read-only.

» Click `Edit` to edit the *parameters on page 39* of an existing outdoor unit type.

> Entering incorrect settings can prevent your modem from logging onto the network!
> Only change outdoor unit settings when requested by your Service Provider or Network Operator.

The ODU Type ID and ODU Description parameters cannot be edited.
The editable parameters are described in the table above.

» Click `Save` in the Web Interface > Edit Outdoor Unit Parameters to save the new settings.

4.7.3.4 Add Outdoor Unit Parameters

> ℹ️ Adding an ODU can be disabled by the Network Operator. In such case, the Add button is not present and the ODU configuration settings are read-only.

> ⚠️ When adding a new outdoor unit in the modem, it should also be configured with the exact same settings in the hub by the Network Operator. If an outdoor unit type in the modem has no matching entry in the hub, the modem will possibly be prevented from logging onto the network. Please contact your Service Provider or Network Operator in case of doubt!

» Click Add to create an outdoor unit type.

Add ODU Configuration Settings

General

Active ODU ID	10
ODU Type ID	
ODU Description	
Power Off Timeout	secs

Receive

LNB Band Selection   None

	L.O.	RF Start	RF Stop
	GHz	GHz	GHz

Current	Min	Max
	mA	mA

Transmit

TX Detection Freq   kHz

	Multiplicator	RF Start	RF Stop
MUC		GHz	GHz

Current	Min	Max
	mA	mA

Save   Cancel

» Enter the *parameters on page 39* for the new ODU type.

> ⚠️ Entering incorrect settings can prevent your modem from logging onto the network! Contact your Service Provider or Network Operator in case of doubt.

» Click Save in the Web Interface > Add Outdoor Unit Type to save the new settings.
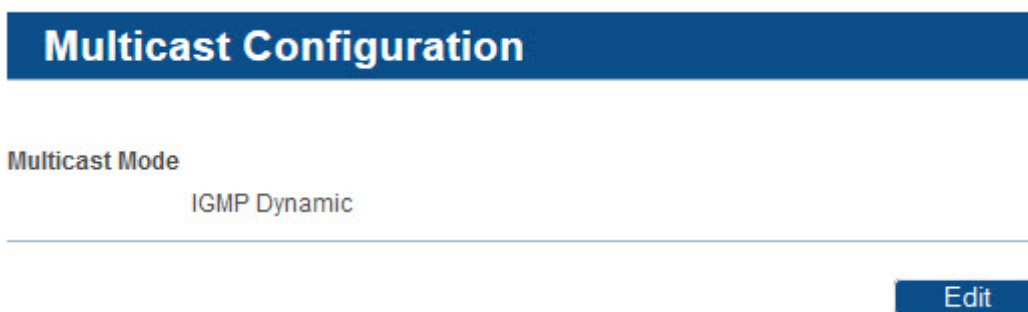
4.7.4   Multicast

The satellite can send several sessions to a number of satellite terminals at the same time.

This is IP multicasting. There are two configurations possible in the satellite terminal to receive these programs:

- **Static IP addresses**:
  IP addresses where the sessions are received. You will be provided with these addresses if needed.

- **IGMP:**
  A protocol that lets you receive multicast sessions (maximum 10) without entering specific IP addresses.

4.7.4.1   View the Multicast Configuration

Multicast Configuration

Multicast Mode

IGMP Dynamic

Edit

4.7.4.2   The Multicast Parameters

The displayed parameters and their description are shown below:

Parameter	Description
Multicast Mode	• Disabled: Multicast mode is disabled. • Static: The active Multicast Configuration is based on entered Static Multicast IP Addresses. • IGMP Dynamic: Dynamic IGMP multicast mode.
Static Multicast IP Address 1-10	Maximum 10 multicast IP Addresses can be assigned and active in case of Static Multicast Mode.

4.7.4.3 Edit the Multicast Configuration

» Click Edit in the Web Interface > View Multicast configuration to change the Multicast Settings.

» Edit the parameters.

Multicast Configuration

Multicast Mode

Static ▼

Static Multicast IP Addresses
(max. 10)   238.1.1.1   Remove Selected

[   ]   Add

Save   Cancel

» Click Save in the Web Interface > Edit Multicast configuration to save the new settings.

⚠ In case an invalid multicast IP address is replacing a valid multicast IP address, the last valid multicast IP address will still be in use.

You see a committed multicast configuration screen, which confirms the applied settings:

Multicast Configuration

Multicast Mode

Static

Static Multicast IP Addresses
(max. 10)   238.1.1.1

Edit

If "disabled" mode is selected, following screen is shown:

Multicast Configuration

Multicast Mode

Disabled

Edit

A similar screen is shown if "IGMP Dynamic" mode is selected.

4.8   Device Info

Device Info

Software

Current Software Version   3.0.1.6
Alternative Software Version 3.0.0.7

Hardware

Hardware ID   NTC/2299.AA
Hardware Version   1

4.8.1   Software

The modem software is automatically upgraded over the satellite without any user interaction. In general, the only requirement for an upgrade to be successful is for the modem to have satellite connectivity during the time of upgrade.

To allow a secure modem software upgrade mechanism, the flash memory of the modem can contain two different software versions. A newly installed software version has to pass an automatic software validation procedure.

- After a successful software validation, the modem is automatically rebooted to activate the new software.

The following table gives a description of the parameters in the Software menu:

Parameter	Description
Software version	
Currently Running Software Version	The currently installed software version is displayed.
Alternate Software Version	Only displayed when an alternative software version is present.

- When this software validation process fails, the old software version remains in use. The passive memory bank now contains a newer software version that did not pass the validation process. In this case, the user has the possibility to re-trigger the validation process. This situation can occur when a user turns off his modem during the validation process or when satellite connectivity was not possible to establish during the validation process.

> When a newer version is present and validation fails, the software LED is red.
>
> Refer to section *Software LED on page 11* for more information on the meaning of the software status LEDs.

To re-trigger the validation process:

- Click `Try Alternate Version`

A confirmation window appears:
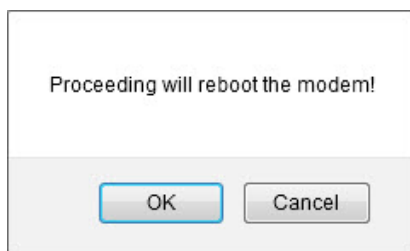
A total reboot, including satellite link initialization might take up to 10 minutes.

> If the web interface doesn't refresh automatically, navigate back to the Status page.
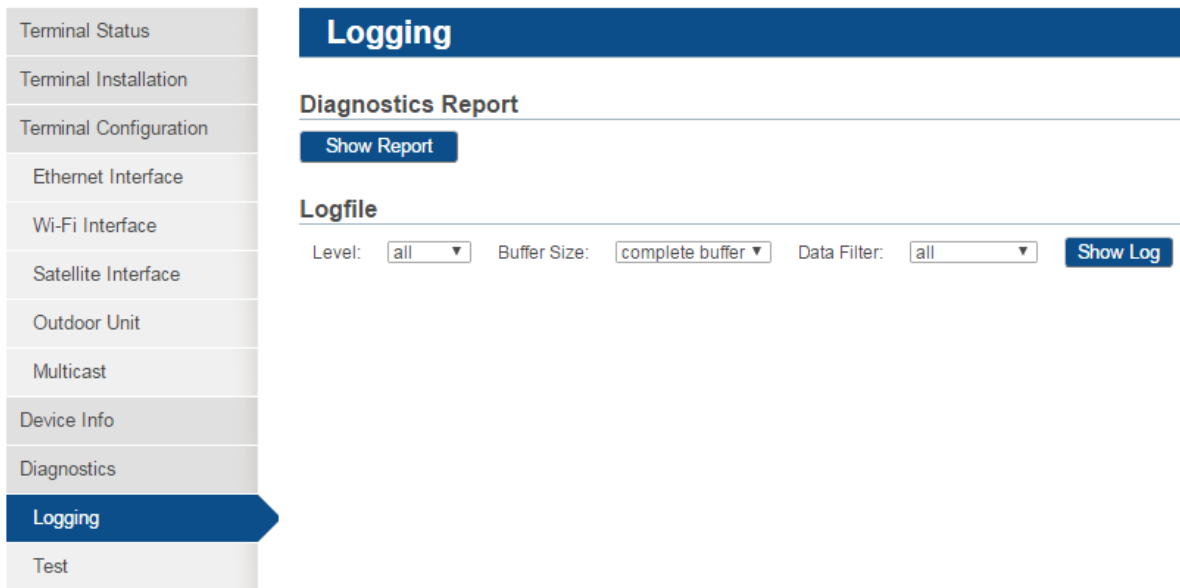
4.8.2 Hardware

Below are given the displayed parameters and their description. These values are read only.

Parameter	Description
Device	
Hardware ID	Hardware identifier of the modem
Hardware Version	Hardware version number of the modem

4.9 Diagnostics

You can create a Diagnostic Report by simply clicking the Show Report button.

The Diagnostic Report consists of the elements described in the following sections.

4.9.1 The Short Diagnostic Report

The short Diagnostic Report exists out of following information:

- Terminal Identification
- Terminal Status
- Terminal Configuration

4.9.2 The Extended Diagnostic Report

The Extended Terminal Diagnostic Report has the following structure:

- Terminal Firmware + FPGA version
- Terminal general status report
- Internal modem driver states
- Layer 2 counters of modem driver
- Terminal initial configuration
- Terminal operational configuration
- Running processes
- Ethernet link status
- Memory usage info
- Network configuration
    - IP interface Addresses
    - Multicast Addresses
    - Ethernet ARP Cache
    - Policy-Based Routing
    - Network Link
    - IP routing
    - IP tables
    - IP-6 tables
    - ARP Tables
- Tellitec-client configuration
- DHCP leases
- Terminal Logfile

The diagnostic report is provided as a web page in your browser.

This page can now be saved as a text file from the browser.

4.9.3 Generating a Log File

The most important modem state changes, occurred errors, events, etc. are logged in the logfile.

The expert has the possibility to filter in terms of; severity level, buffer size and data type.

» Filter the required logs by choosing level, buffer size and data filter.

The possible severity levels are:

The possible buffer sizes in number of lines are:

- The possible data types

- Click Show Log
  The logs are displayed. See below an example of a partial Logfile:

Every five minutes specific performance counters will be added to the logfile.

The logged values correspond with the values displayed on the status page - interface statistics part of the screen.

```
Jan  1 00:05:01 (none) user.info perf: eth0: 21516 185 0 0 44428 117 0 0 21516 185 0 0 44428 117 0 0
Jan  1 00:05:01 (none) user.info perf: modem: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Jan  1 00:10:01 (none) user.info perf: eth0: 35756 332 0 0 63006 185 0 0 14240 147 0 0 18578 68 0 0
Jan  1 00:10:01 (none) user.info perf: modem: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Jan  1 00:15:01 (none) user.info perf: eth0: 46253 435 0 0 78032 240 0 0 10497 103 0 0 15026 55 0 0
Jan  1 00:15:01 (none) user.info perf: modem: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Jan  1 00:20:01 (none) user.info perf: eth0: 63598 666 0 0 391703 500 0 0 17345 231 0 0 313671 260 0 0
Jan  1 00:20:01 (none) user.info perf: modem: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Jan  1 00:25:01 (none) user.info perf: eth0: 77945 842 0 0 563701 674 0 0 14347 176 0 0 171998 174 0 0
Jan  1 00:25:02 (none) user.info perf: modem: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

The meaning of the respective counter is described in the table below:

Counter Number	Counter Description
Counter 1	Total - RX bytes
Counter 2	Total - Rx packets
Counter 3	Total - RX errors
Counter 4	Total - RX packets dropped
Counter 5	Total - TX bytes
Counter 6	Total - TX packets
Counter 7	Total - TX errors
Counter 8	total - TX packets dropped
Counter 9	Last 5 minutes - RX bytes
Counter 10	Last 5 minutes - RX packets
Counter 11	Last 5 minutes - RX errors
Counter 12	Last 5 minutes - RX packets dropped
Counter 13	Last 5 minutes - TX bytes
Counter 14	Last 5 minutes - TX packets
Counter 15	Last 5 minutes - TX errors
Counter 16	Last 5 minutes - TX packets dropped

4.9.4 Test

To view the functioning status of the satellite terminal, or to identify problems that may occur, several tests can be run on the terminal:

Overview

Tests

Hardware

☑ ODU current measurement

Software

☑ Software

LAN

☑ Ethernet status

☑ Number of TCP Sessions

Satellite connection

☑ Physical layer status

☑ Data link layer status

☑ Network layer status

Traffic

☑ Ping traffic

☑ DNS traffic

☑ HTTP get traffic

[Start] [Stop Active] [Select All] [Deselect All] [Export To Test File]

4.9.4.1 Test Descriptions

4.9.4.1.1 Hardware Test

The Hardware test verifies the proper functioning of the iLNB by measuring the current in the receive and transmit path between the modem and the iLNB.

Possible test results:

*   A successful hardware test means that both the RX and TX current are within the expected range. The figure below shows an example of a successful hardware test.

Tests

Hardware

☑ ODU current measurement

ODU Rx Current = 168
ODU Tx Current = 163

*   A failed hardware test means that at least one of the measured currents falls outside the expected range. This indicates a problem in the receive and/or transmit path.

Tests

Hardware

☑ ODU current measurement   ● No current detected on TX

> ℹ️ If the hardware test has failed, please always verify the installation of the coaxial cable. A defect cable, swapped TX and RX cables, or loose contacts at one or more connectors can cause the hardware test to fail even if the iLNB itself is working correctly.
> If the problem persists, please contact your Service Provider.

*   In some cases, the hardware test cannot be executed because of the actual modem state e.g. during pointing. In this case, one is requested to try again later.

Tests

Hardware

☑ ODU current measurement   ● Test cannot be executed right now, please try again later

4.9.4.1.2 Software Test

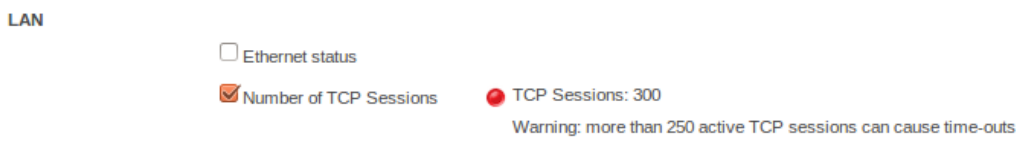The Software test verifies the validity of the software.

4.9.4.1.3 LAN Test

The LAN test is composed of two tests:

- The "Ethernet status" exists of three tasks:

  » Checking the Ethernet physical layer.

  » Obtaining the IP address off the computer connected to the modem.

  » Checking the IP address of the computer, provided via DHCP by the modem.

- The "Number of TCP sessions" shows how many TCP sessions are currently active.

> ℹ The maximum number of TCP sessions is set by the Network Operator.

- If more than half the maximum allowed number of TCP sessions is active, a warning message is displayed. In the example shown below, the maximum number was set to 500.

> **LAN**
>
> ☐ Ethernet status
>
> ☑ Number of TCP Sessions   🔴 TCP Sessions: 300
>
> Warning: more than 250 active TCP sessions can cause time-outs

- If the number of active TCP sessions exceeds the maximum number set by the Network Operator, an error message is displayed, TCP sessions will be delayed until the number drops again below the maximum. In the example shown below, the maximum number was set to 500.

> **LAN**
>
> ☐ Ethernet status
>
> ☑ Number of TCP Sessions   🔴 TCP Sessions: 650
>
> Maximum number of TCP sessions exceeded
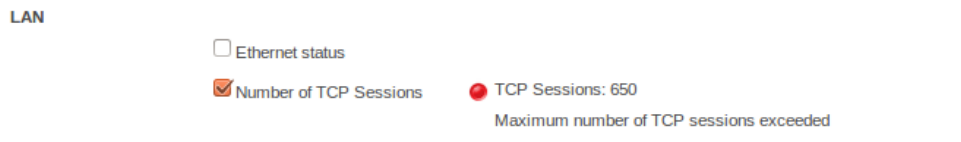
4.9.4.1.4 Satellite Connection Test

The Satellite connection test is composed of three tests:

- The Physical layer test, checks if the physical layer of the modem - satellite connection is able to receive data.
- The Data link layer test, checks if the system is able to send data to the satellite.
- The Network layer test, checks the IP connection.

4.9.4.1.5 Traffic Test

The Traffic test is composed of three tests:

- A Ping traffic test, tests if ping packets can be transported over the network from the modem, over the satellite to the hub site.

- The DNS traffic test resolves a URL via a name server at the hub site.

- The HTTP get traffic test verifies the TCP acceleration and pre-fetching.

> The HTTP get traffic test uses a TCP connection and can hence not be executed when the maximum number of TCP sessions is exceeded (see section *LAN Test on page 55*). In this case the HTTP get traffic test will time out or should be stopped manually.

4.9.4.2 On-Screen Test Results

Mark (☑) or unmark (☐) the tests that you want to run.

Click on the **START** button to start the execution of the tests.

During and after test execution, the state of the tests is shown on screen (see table below) until finally are results are available.

Test waiting for execution	🟠
Test is being executed	🟠
Test is finished and successful (passed)	🟢
Test is finished and unsuccessful (failed)	🔴

Overview

Tests

Hardware

☐ ODU current measurement

Software

☑ Software   🟢 running software version: 3.0.1.6
                                 alternative software version: 3.0.0.7

LAN

☑ Ethernet status   🟢 link up, 100baseTx-FD

☐ Number of TCP Sessions

Satellite connection

☑ Physical layer status   🟢 Ok

☑ Data link layer status   🟢 Ok

☑ Network layer status   🟢 Ok

Traffic

☑ Ping traffic   🟢 10 packets transmitted, 10 packets received, 0% packet loss
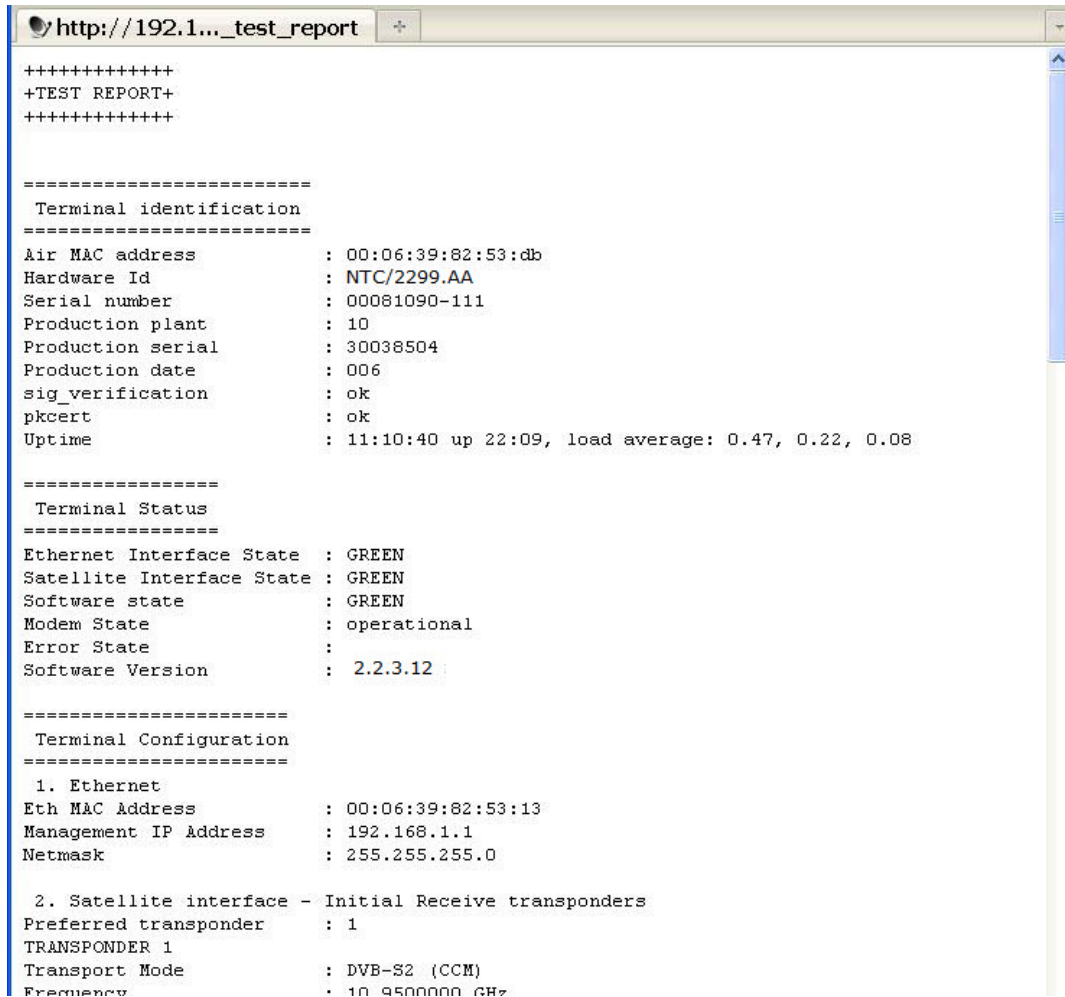   round-trip min/avg/max = 538.967/551.189/562.667 ms

☑ DNS traffic   🟢 Ok

☑ HTTP get traffic   🟢 Ok

[Start] [Stop Active] [Select All] [Deselect All] [Export to text file]

4.9.4.3   Export Test Results

Click Export To Text File to export the on-screen test results.
A web page with the test results in text format will be provided.
This page can now be saved as a text file from the browser.

```
http://192.1..._test_report    ✛

+++++++++++++
+TEST REPORT+
+++++++++++++


========================
 Terminal identification
========================
Air MAC address          : 00:06:39:82:53:db
Hardware Id              : NTC/2299.AA
Serial number           : 00081090-111
Production plant        : 10
Production serial       : 30038504
Production date         : 006
sig_verification        : ok
pkcert                  : ok
Uptime                  : 11:10:40 up 22:09, load average: 0.47, 0.22, 0.08


==================
 Terminal Status
==================
Ethernet Interface State  : GREEN
Satellite Interface State : GREEN
Software state           : GREEN
Modem State              : operational
Error State              :
Software Version         :  2.2.3.12


========================
 Terminal Configuration
========================
 1. Ethernet
Eth MAC Address          : 00:06:39:82:53:13
Management IP Address    : 192.168.1.1
Netmask                  : 255.255.255.0

 2. Satellite interface - Initial Receive transponders
Preferred transponder    : 1
TRANSPONDER 1
Transport Mode           : DVB-S2 (CCM)
Frequency                : 10.9500000 GHz
```

5   Appendix A - Acronyms

Acronym	Description
AC	Alternating Current
ACM	Adaptive Coding Modulation
CCM	Constant Coding Modulation
CE approved	Conformité Européenne (European health & safety product label)
DC	Direct Current
DHCP	Dynamic Host Configuration Protocol
DVB-S	Open standard for Digital Video Broadcasting over Satellite
DVB-S2	Improved version of DVB-S standard
GHz	GigaHertz
GUI	Graphical User Interface
HTTP	Hyper Text Transfer Protocol
IGMP	Internet Group Management Protocol
iLNB	Interactive Low Noise Block-down converter
IP	Internet Protocol
LAN	Local Area Network
LED	Light Emitting Diode
LNB (iLNB)	Low Noise Block-down converter
LO	Local Oscillator
MAC address	Medium Access Control
MHz	MegaHertz
MODEM	Modulator/Demodulator
ODU	Outdoor Unit
RF	Radio Frequency
RX	Receive
TCP	Transport Control Protocol
TX	Transmit
URL	Universal Resource Locator (WWW)
USB	Universal Serial Bus

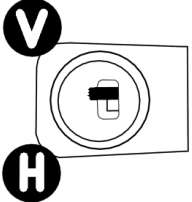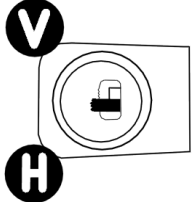# 6   Appendix B - Licenses

GNU software is used in this product:

You can download GNU Wget from the following location:
http://www.gnu.org/software/wget/

# 7   Appendix C - ILB2145 Polarization Switch

The ILB2145 supports the reception of both DTH and VSAT carriers, and the transmission of VSAT carriers in Ku-Band. The polarization of the transmitted carrier is determined by the physical mounting and orientation of the ILB2145.

Typically satellite receivers use the LNB supply voltage as the means to select Receive polarization when used with universal LNB's or dual polarization LNB's (voltage convention: 14 V = vertical or 18 V = horizontal). In order to preserve the voltage convention for Receive polarization selection regardless of the Transmit polarization, there is an internal polarization switch in the iLNB which is preset in factory according to the Transmit polarization. The table below shows the link between the internal switch position, the physical orientation of the ILB2145 and the polarization of the transmit carrier.

Transmit Carrier Polarization	Horizontal	Vertical
ILB2145 Mounting Position	Approx. Vertical	Approx. Horizontal
Polarization Switch Position	Up (**V**)	Down (**H**)

To change the position of the internal polarization switch (in order to transmit at the opposite polarization than the one which was set in factory), execute the following steps:
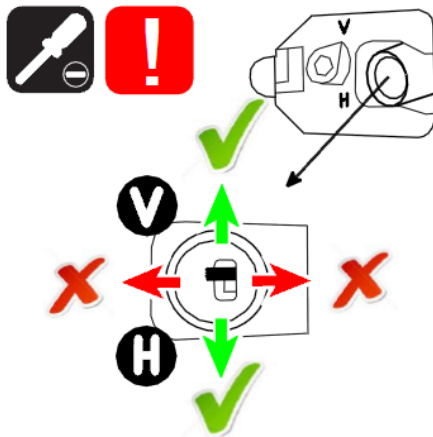
»   Remove the side cover
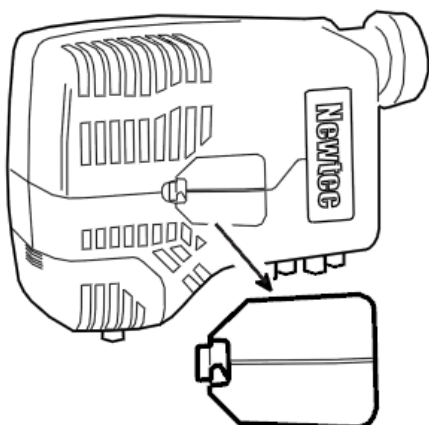
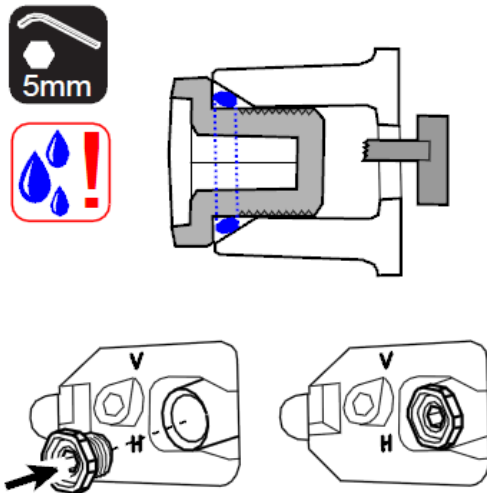» Remove the sealing plug with a 5 mm Allen key.
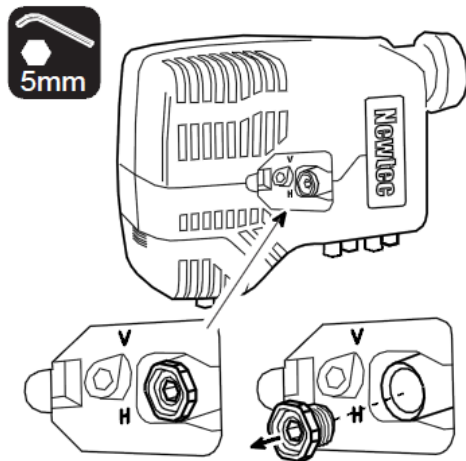
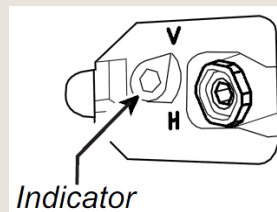» Use a small screwdriver to move the position of the polarization switch.

⚠ Make sure to move the switch in the direction of the slot. Do not wrench!

» Put the sealing plug back and tighten it enough to avoid moisture insertion.

Please note that the switch at the left of the sealing plug only serves as an indicator to reflect the position of the internal polarization switch. It has no impact on the polarization.

Indicator

» Place the cover back.