MRx18
miniRepeater
Release 2

Single-Band

User's Manual
M0139ADAB

Andrew Wireless Systems GmbH, 05-August-2025

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FIGURES AND TABLES

1. General

1.1. Abbreviations

3GPP	3rd Generation Partnership Project
AIMOS	Advanced Integrated Management and Operating System
ALC	Automatic Level Control
AMPS	American Mobile Phone System or Advanced Mobile Phone System
BITE	Built-In Test Equipment
	BTSBase Transceiver Station
CDMA	Code Division Multiple Access
CF	Center Frequency
CFO	Center Frequency Offset
CFR	Code of Federal Regulations
DL	Downlink
DoC	Declaration of Conformity
ESD	Electrostatic Discharge
ETS	European Telecommunication Standard
ETSI	European Telecommunication Standards Institute
GSM	Global System for Mobile Communication
GUI	Graphical User Interface
I2C-Bus	Inter-Integrated Circuit Bus (Philips)
ID No	Identification Number
IF	Intermediate Frequency
ISDE	Innovation, Sciences et Développement économique Canada
ISED	Innovation, Science and Economic Development Canada; formerly IC / Industry Canada
LED	Light Emitting Diode
LMT	Local Maintenance Terminal
LNA	Low Noise Amplifier

MCC	Mobile Country Code
MNC	Mobile Network Code
MR	Microwave Repeater
MS	Mobile Station
OIP-3	Output Intercept Point of the 3rdOorder
OMC	Operation and Maintenance Center
PA	Power Amplifier
PCS	Personal Communication System
PSU	Power Supply Unit
RED	Radio Equipment Directive
Rev	Revision
RF	Radio Frequency
RLP	Radio Link Protocol
RSSI	Receive Signal Strength Indication
RTC	Real-Time Clock
RX	Receiver
RoHS	Directive on Restriction of certain Hazardous Substances RSSIReceive Signal Strength Indication
SCL	Serial Clock
SDA	Serial Data
SMSC	Short Message Service Center
TCH	Traffic Channel
TX	Transmitter
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
UPS	Uninterruptable Power Supply
URL	Uniform Resource Locator

1.2. Health and Safety

Caution: High frequency radiation in operation. Risk of health hazards associated with radiation from the antenna(s) connected to the unit. Implement prevention measures to avoid the possibility of very close proximity to the antenna(s) while in operation.

1.3. Property Damage Warnings

1. **Attention:** Due to power dissipation, the unit may reach a very high temperature. Do not operate this equipment on or close to flammable materials. Use caution when servicing the unit.

2. **Attention:** If the plug of the unit's power supply cable serves as disconnecting device, the socket for devices with a plug connection must be easily accessible and within easy reach.

3. **Notice**: Although the unit is internally protected against overvoltage, it is strongly recommended to ground (earth) the antenna cables close to the repeater's antenna connectors for protection against atmospheric discharge.

4. **Notice**: ESD precautions must be observed. Before commencing maintenance work, use the available grounding (earthing) system to connect ESD protection measures.

5. **Notice:** Only suitably qualified personnel are allowed to work on this unit and only after becoming familiar with all safety notices, installation, operation and maintenance procedures contained in this manual.

6. **Notice:** Keep operating instructions within easy reach and make them available to all users.

7. **Notice:** Read and obey all the warning labels attached to the unit. Make sure that all warning labels are kept in a legible condition. Replace any missing or damaged labels.

8. **Notice:** Only license holders for the respective frequency range are allowed to operate this unit.

9. **Notice**: Make sure the repeater settings are correct for the intended use (refer to the manufacturer product information) and regulatory requirements are met. Do not carry out any modifications or fit any spare parts, which are not sold or recommended by the manufacturer.

Unless otherwise agreed to in writing by ANDREW®, ANDREW's general limited product warranty (https://www.andrew.com/about-us/terms/) shall be the warranty governing the MRx18 units, including the installation, maintenance, usage and operation of the MRx18 units.

1.4. Compliance

1. **Notice:** For installations, which have to comply with FCC RF exposure requirements, the antenna selection and installation must be completed in a way to ensure compliance with those FCC requirements. Depending on the RF frequency, rated output power, antenna gain, and the loss between the repeater and antenna, the minimum distance D to be maintained between the antenna location and human beings is calculated according to this formula:

$$D_{[cm]} = \sqrt{\frac{P_{[mW]}}{4 * \pi * PD_{[mW/cm^2]}}}$$

where

- P (mW) is the radiated power at the antenna, i.e. the max. rated repeater output power in addition to the antenna gain minus the loss between the repeater and the antenna.

- PD (mW/cm²) is the allowed Power Density limit acc. to 47 CFR 1.1310 (B) for general population / uncontrolled exposures which is
    - f (MHz) / 1500 for frequencies from 300MHz to 1500MHz
    - 1 for frequencies from 1500MHz to 100,000MHz

RF exposure compliance may need to be addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of 1.1307(b)(3).

2. **Notice:** For installations which have to comply with European EN50385 exposure compliance requirements, the following Power Density limits/guidelines (mW/cm²) according to ICNIRP are valid:
    - 0.2 for frequencies from 10 MHz to 400 MHz
    - f (MHz) / 2000 for frequencies from 400 MHz to 2 GHz
    - 1 for frequencies from 2 GHz to 300 GHz

3. **Notice:** Installation of this equipment is in full responsibility of the installer, who has also the responsibility, that cables and couplers are calculated into the maximum gain of the antennas, so that this value, which is filed in the FCC Grant and can be requested from the FCC data base, is not exceeded. The industrial boosters are shipped only as a naked booster without any installation devices or antennas as it needs for professional installation.

4. **Notice:** For installations which have to comply with FCC/ISED requirements:

   English:

   This device complies with FCC Part 15. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

   This device complies with Health Canada's Safety Code. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php.

   Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

   Antenna Stmt for ISED:

   This device has been designated to operate with the antennas having a maximum gain of 9 dBi. Antennas having a gain greater than 9 dBi are prohibited for use with this device without consent by ISED regulators. The required antenna impedance is 50 ohms.

   The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 100 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

   French:

   Cet appareil est conforme avec Santé Canada Code de sécurité 6. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues: http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-fra.php

   Antenne Stmt pour ISDE:

   Ce dispositif a été désigné pour fonctionner avec les antennes ayant un gain maximal de 9 dBi. Antennes ayant un gain plus grand que 9 dBi sont interdites pour une utilisation avec cet appareil sans le consentement des organismes de réglementation d'ISDE. L'impédance d'antenne requise est 50 ohms.

   L'antenne (s) utilisé pour cet émetteur doit être installé pour fournir une distance de séparation d'au moins 100 cm de toutes les personnes et ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou émetteur. Les utilisateurs et les installateurs doivent être fournis avec des instructions d'installation de l'antenne et des conditions de fonctionnement de l'émetteur pour satisfaire la conformité aux expositions RF.

5. **Notice:** The power supply of the unit complies with Overvoltage Category II. It also complies with the surge requirement according to EN 61000-4-5 (fine protection); however, installation of an additional medium (via local supply connection) and/or coarse protection (external surge protection) is recommended depending on the individual application in order to avoid damage caused by overcurrent.

For Canada and US, components used to reduce the Overvoltage Category shall comply with the requirements of IEC 61643-series. As an alternative, components used to reduce the Overvoltage Category may comply with ANSI/IEEE C62.11, CSA Certification Notice No. 516, CSA C22.2 No. 1, or UL 1449. Suitability of the component for the application shall be determined for the intended installation.

6. **Notice:** Corresponding local particularities and regulations must be observed. For national deviations, please refer to the respective documents that can be downloaded as well.

7. **Note:** For a Class A digital device or peripheral:

    This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

8. **Note:** For a Class B digital device or peripheral:

    This equipment has been tested and found to comply with the limits for a 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.

9. **Note:** This unit complies with European standard EN60950-1 / EN62368-1.

Equipment Symbols Used / Compliance

Please observe the meanings of the following symbols used in our equipment and the compliance warnings:

Symbol	Compliance	Meaning / Warning
---	FCC	For industrial (Part 20) signal booster: WARNING: This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.
---	ISED	WARNING: This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device. AVERTISSEMENT: Ce produit N'EST PAS un appareil de CONSOMMATION. Il est conçu pour être installé par un installateur approuvé par un titulaire de licence d'ISDE. Pour utiliser cet appareil, vous DEVEZ détenir une LICENCE d'ISDE ou avoir obtenu le consentement exprès d'un titulaire de licence autorisé par ISDE.
C€	CE	Indicates conformity with RED directive 2014/53/EU and RoHS directive 2011/65/EU & 2015/863/EU.
C€ 0700	CE	Indicates conformity with RED directive 2014/53/EU and RoHS directive 2011/65/EU & 2015/863/EU, certified by the notified body no. 0700..

WEEE Recycling

Do not put the units into the garbage but dispose of them properly according to local and/or regional regulations.

Country specific information about collection and recycling arrangements per the Waste Electrical and Electronic Equipment (WEEE) Directive and implementing regulations is available on the ANDREW® website (see chapter 1.6.2).

1.5. About ANDREW

ANDREW®, an Amphenol company, is the foremost supplier of one-stop, end-to-end radio frequency (RF) solutions. Part of the ANDREW portfolio are complete solutions for wireless infrastructure from top-of-the-tower base station antennas to cable systems and cabinets, RF site solutions, signal distribution, and network optimization. For patents see WWW.ADWPAT.COM.

ANDREW has global engineering and manufacturing facilities. In addition, it maintains field engineering offices throughout the world.

Andrew Wireless Systems GmbH based in Buchdorf/Germany, which is part of ANDREW, is a leading manufacturer of coverage equipment for mobile radio networks, specializing in high performance, RF and optical repeaters. Our optical distributed networks and RF repeater systems provide coverage and capacity solution for wireless networks in both indoor installations and outdoor environments, e.g. tunnels, subways, in-trains, airport buildings, stadiums, skyscrapers, shopping malls, hotels and conference rooms.

Andrew Wireless Systems GmbH operates a quality management system in compliance with the requirements of ISO 9001 and TL 9000. All equipment is manufactured using highly reliable material. To maintain highest quality of the products, comprehensive quality monitoring is conducted at all fabrication stages. Finished products leave the factory only after a thorough final acceptance test, accompanied by a test certificate guaranteeing optimal operation.

Hereby Andrew Wireless Systems declares that the radio equipment type Repeater is in compliance with radio equipment directive 2014/53/EU.
The full text of the EU declaration is available via the product catalog. To find the document (DoC), go to https://www.andrew.com/ and type the product name in the search box on the top of the page.

According to the DoC, our "CE"-marked equipment can be used in all member states of the European Union.

Note: Exceptions of and national deviations from this intended use may be possible. To observe corresponding local particularities and regulations, please refer to the respective documents (also in national language) which can be downloaded under the link specified in chapter 1.6.4.

To make the most of this product, we recommend you carefully read the instructions in this manual and commission the system only according to these instructions.

In case you need additional manuals as reference, they can be downloaded under the link specified in chapter 1.6.4. Application notes and other additional documents that may be required as reference can either be downloaded under the same link or are available upon request.

For technical assistance and support, please refer to the contact information in the next chapter.

1.6. Contacting ANDREW

The following sections tell you how to contact ANDREW® for additional information or for assistance.

1.6.1. Technical Support

The following sections tell you how to contact the ANDREW Technical Support team. Support is available 7 days a week, 24 hours a day.

Telephone Helplines

Use the following Helpline telephone numbers to get live support, 24 hours a day.

24X7 +1 888-297-6433 (Toll free for U.S. and Canada)

EMEA 8:00-17:00 (UTC +1) + 800 73732837 (Toll free for parts of EMEA and Australia)

+ 49 909969333 (Toll charge incurred)

Calls to an EMEA Helpline outside of the 8:00 to 17:00 time frame will be forwarded to the 24x7 Helpline.

Online Support

Click the link below or scan the QR code to the right to submit tickets using the online Technical Support Form.

1.6.2. Waste Electrical and Electronic Equipment Recycling

The ANDREW focus on building a sustainable future includes protecting and preserving the environment. The challenges our planet now faces — including climate change, resource depletion and pollution — require urgent attention and innovative solutions.

We believe that sustainable practices are key to addressing these challenges and ensuring a healthier environment for future generations. Through responsible actions, eco-friendly initiatives and cutting-edge technologies, ANDREW is empowering businesses and communities to reduce their environmental impact. Join us in making a meaningful difference.

To learn more, scan the QR code to the right or click the link below:

https://www.andrew.com/sustainability/environment/weee/

1.6.3. Technical Training

1. To access training on the online technical training site, please click https://www.andrew.com/support/training/ or scan the QR code to the right:

2. From here you can see course catalogs, training calendars, and visit the training portal that lets you register for online and instructor-led courses and take online courses.

3. Instructor-led courses are conducted in North America and Europe. Before choosing a course, please verify the region.

4. For training related questions, please contact us: icn_training@andrew.com

1.6.4. Accessing User Documentation

1. Access to the Customer Portal requires a user account. If you don't have an account:

   - Visit My ANDREW at https://www.andrew.com/membership or by scanning the QR code to the right.

   - Click "New user registration" and follow the prompts.

   - After you have registered in My ANDREW, click the **Request access** button for the **Customer Portals**.

   - After having done the request, it might take several days to get approved. Then, you can select the **Indoor Wireless Resource Center for ANDREW** from the list of applications.

2. To go directly to the portal, where you can access the DAS-user documentation, scan the QR Code to the right.

   Alternatively, visit My ANDREW (see above) and use the **Indoor Wireless Resource Center for ANDREW** application.

3. In Tools and Documentation, search by product, document category, or title.

4. Click on the title of any document to open it.

2. Introduction

2.1. Purpose

The MRx18 is a bi-directional amplifier used to enhance signals between a mobile and a base station in a mobile network. It has been designed to increase signal strength in small and medium sized areas such as offices, shops, and basements. By boosting the signal level, the MRx18 increases indoor coverage and allows high data rate connectivity.

If weak signal transmissions occur within the coverage area due to indoor applications, topological conditions or distance from the transmitter, a repeater is used to extend transmission range. In the downlink path, the repeater picks up the signals from a donor antenna of a BTS / Node B, amplifies and re-transmits it into the required dark spot. In the uplink (UL) path the repeater picks up the signals from a mobile/UE and re-transmits it to the BTS/Node B.

2.2. The MRx18

The MRx18 gives designers a simple tool to solve their small area coverage and performance issues.

The MRx18 is easy to install. Also, a web-based browser simplifies to commission and configure the equipment. The RF link (donor) towards the base station is typically fed from an outdoor antenna while the coverage area is fed by an indoor antenna. The possibility to adjust the passband of a repeater helps to cover any specific segment or frequency band.

The MRx18 is available in one cabinet. Auto Gain functionality enables automatic gain adjustment in order to maximize performance; however, gain may be set manually if desired. An alarm interface with a display and LEDs indicates the status of the equipment locally. Moreover, the status and alarms of the MRx18 can be queried via the web-based browser. The MRx18 has an optional remote monitor function that provides equipment alarming and basic configuration settings via a GSM-SMS. Alarm SMSs (including heartbeat) can be sent to the OMC (AIMOS) or to any standard SMS receiver (even a mobile phone).

Features at a glance

- Easy to install due to light weight, small dimensions, and Auto Gain functionality

- Easy commissioning via web-based browser

- Automatic level control (ALC)

- Variable bandwidth

- Automatic power down/up option at user-defined DL RSSI threshold

- LEDs for local alarm indication

- Display of RSSI, gain, output power, status indication, and LAN IP address

- Optional remote control via SMS

- Ethernet connection for local configuration

- Complying with all regulatory agencies (GSM 05.05, 3GPP and FCC)

3. Functional Description

3.1. General

The name of a specific MRx18 miniRepeater reflects the frequency range in which it operates (e.g. MR918 => 900 MHz frequency range). The operation principle is depicted in the following block diagram:
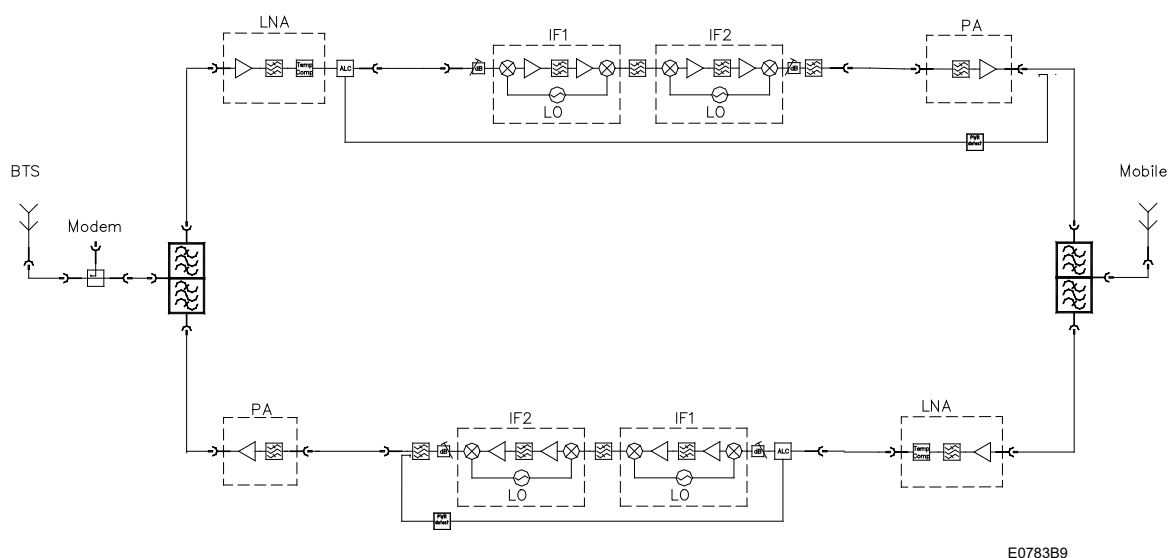

figure 3-1 Block diagram

3.2. Design and Connectors

RF coverage antenna connector, mobile, SMA

Ethernet connector

Reset and installation assistance switch

DC connector

Modem connector DC + Data

RF donor antenna connector, BTS, SMA

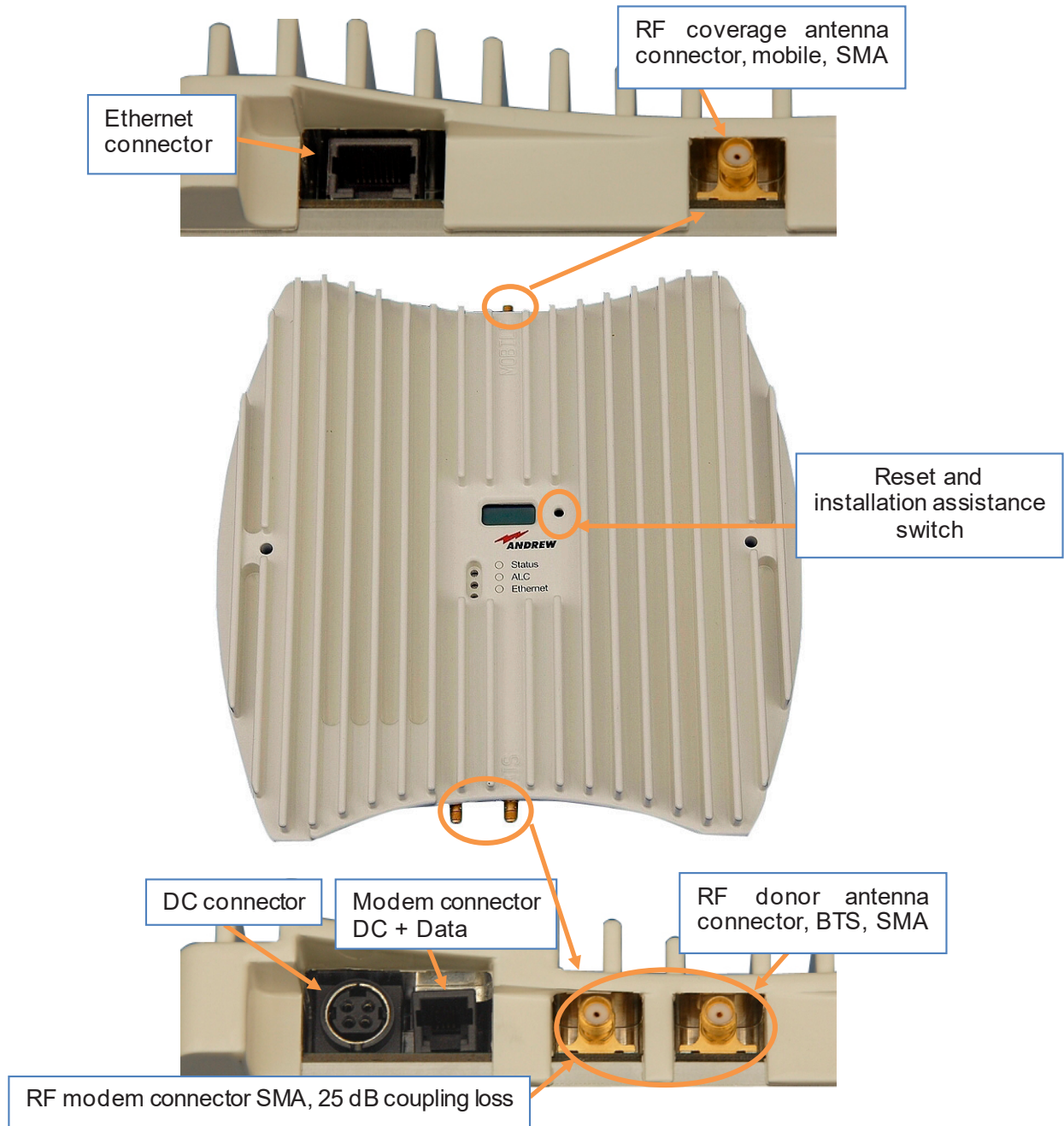RF modem connector SMA, 25 dB coupling loss

figure 3-2 Connectors of MRx18

Note: SMA connectors have a specified torque of 1.45 Nm. Use an appropriate tool to fasten and unfasten these connectors. Do not over-tighten the connectors or screws.

4. Installation and Commissioning

4.1. Mechanical Installation

4.1.1. Health and Safety for Mechanical Installation

Caution: Risk of serious personal injury by equipment falling due to improper installation. The installer must verify that the supporting surface will safely support the combined load of the electronic equipment and all attached hardware and components. The screws and dowels (wall anchors) used should also be appropriate for the structure of the supporting wall.

4.1.2. Property Damage Warnings for Mechanical Installation

1. **Attention:** Do not install the unit in a way or at a place where the specifications outlined in the Environmental and Safety Specifications leaflet of the supplier are not met.

2. **Attention:** It is the responsibility of the installer to verify that the supporting surface will safely support the combined load of the electronic equipment and all attached hardware and components and to ensure that the unit is safely and securely mounted.

3. **Notice:** Use proper mounting hardware depending on the structure of e.g. the wall where the unit will be installed.

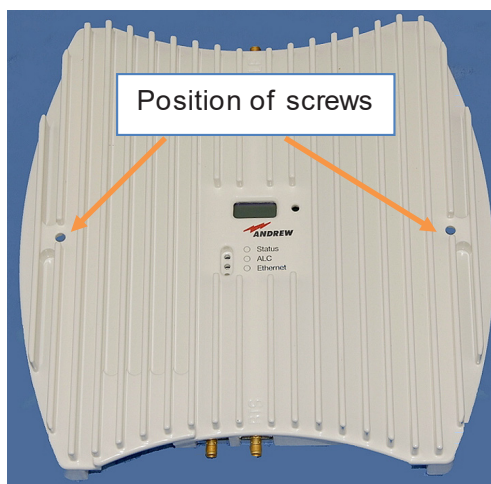Mount the MRx18 to a wall with two screws (spacers not required):

figure 4-1 MRx18, position of screws for wall mounting

4.2. Electrical Installation

1. **Notice:** The electrical installation has to be performed in accordance with the safety regulations of the local authorities. Due to safety reasons, the electrical installation must be performed by qualified personnel only. The repeater must not be opened.

2. **Notice:** Cable shields (outer conductors) of coaxial cables that lead into or out of the building must be included in the equipotential bonding system of the building, either on the devices or separately. If a galvanic isolator, a fully insulated subscriber junction box or house transfer points with galvanic isolation are used for the inner conductor and for the cable shield (outer conductor), there is no need for equipotential bonding for the subscriber terminal.

3. **Notice:** When exchanging or removing active or passive devices (e.g. amplifiers, splitters, or coaxial cables), care must be taken to avoid that leakage currents from terminal equipment cause dangerous voltages to arise between the interrupted parts (inner conductors and/or cable shields (outer conductors)) by disconnecting the loop. It must be ensured that the conductive connection of the cable shields (outer conductors) is maintained even when devices are exchanged or removed in order to avoid electric shock (dangerous body currents). The inner conductors must also be secured against contact. Before a temporary solution for the equipotential bonding is applied, the parts to be detached (e.g. the F-type plug-in connector of a removed cable) should remain connected to the temporary connection for equipotential bonding during the entire uninstallation/installation process.

4. **Notice:** Observe the labels on the front panels before connecting or disconnecting any cables.

➢ Connect the antenna cables to the antenna connectors and the antennas.

➢ Use only the power supply delivered with the unit. Do not modify the power supply unit (PSU) and cable.

Do not mount the PSU to the ceiling.

➢ Connect the DC connector of the power supply and provide mains to the power supply. Ensure the DC connector is plugged in correctly as in the following illustrations.
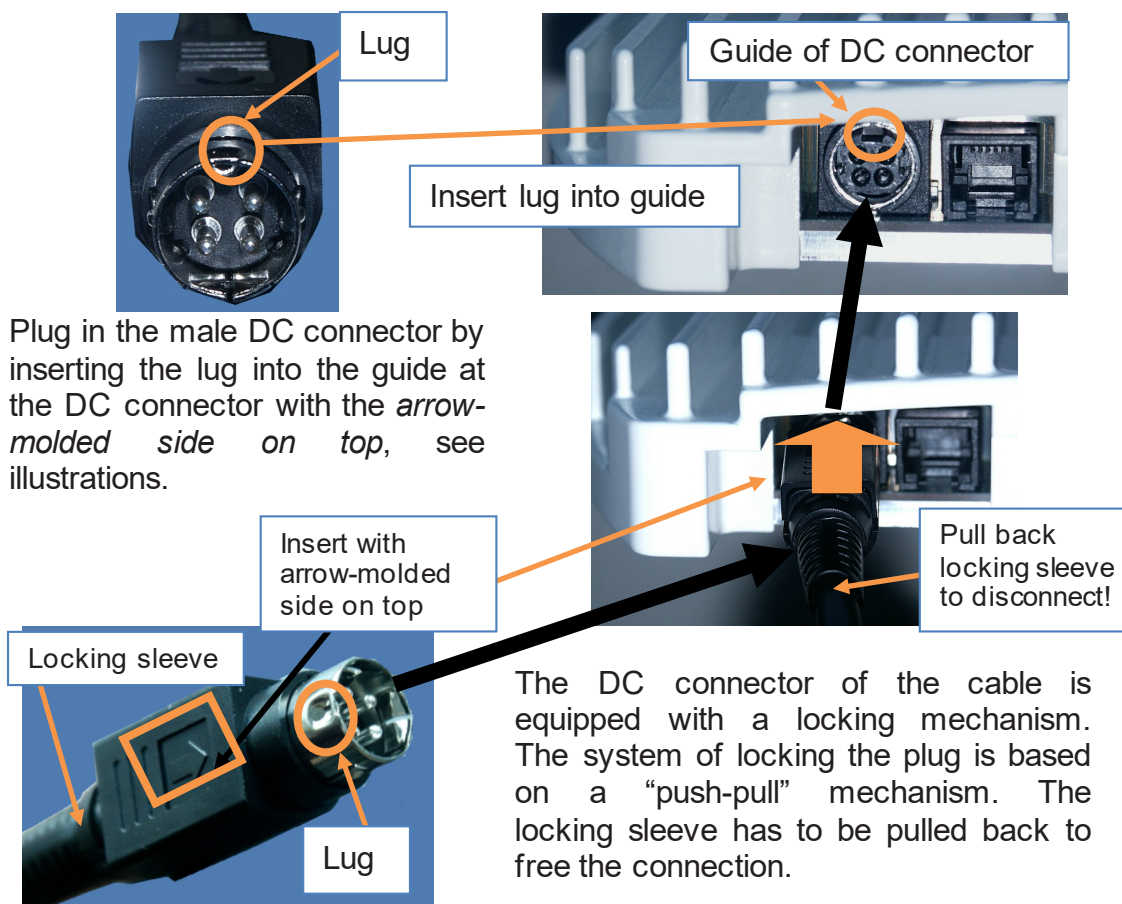

Lug

Guide of DC connector

Insert lug into guide

Plug in the male DC connector by inserting the lug into the guide at the DC connector with the *arrow-molded side on top*, see illustrations.

Insert with arrow-molded side on top

Pull back locking sleeve to disconnect!

Locking sleeve

Lug

The DC connector of the cable is equipped with a locking mechanism. The system of locking the plug is based on a "push-pull" mechanism. The locking sleeve has to be pulled back to free the connection.

figure 4-2 Power connection of DC connector with MRx18

➢ Align the donor antenna towards the BTS. The MRx18 provides antenna alignment assistance. Therefore, wait till **after** (!) the boot process has been finished (i.e. red ALC LED is blinking for four seconds). Then, press the "Reset and installation assistance" switch (see chapter *3.2 Design and Connectors*) for at least *five* seconds (but not longer than 9 sec) until the ALC LED flashes for two times, and then release the button immediately. This will set the gain to max. value and disable Auto Gain for about four minutes. The status LED will be blinking red/green. For a more structured overview of LED indications, refer to chapter 7.1. Align the donor antenna towards the BTS / Node B tower to reach the highest RSSI level possible. Check the RSSI level at the display (see chapter 7 Alarming and Supervision). After four minutes the gain and Auto Gain are adjusted to the values prior to the activation of the antenna alignment.

Note: With the "RSSI based Power Off" feature switched on, Antenna Alignment Assistance will be interrupted if the "RSSI power off" level is exceeded as the corresponding band will be switched off.

➢ Align the coverage antenna.

As the default settings of the repeater are set to 'Auto Gain enabled', only the frequencies have to be adjusted. Additionally, the repeater can be customized with a laptop or PC via Ethernet connector:

➤ For local connection, connect the **straight** CAT 6 patch cable to the Ethernet connector of the MRx18 and the network connector of a laptop or PC.

➤ **Please observe:** With SW V3.5.0 or later, the Ethernet connector needs to be enabled before it can be used. To do so, press the "Reset and installation assistance" switch for at least 10 seconds until the ALC LED flashes 3-4 times.

➤ Start a browser (e.g. Internet Explorer 11, or Mozilla Firefox, recommended version V70.0.1, or Chrome, recommended version 78.0 or higher) and enter URL: **http://192.168.1.1**. For IE11 it might be necessary to set the "Browser Mode" to Compatibility View as explained at the end of this chapter.

Note: **If the connection cannot be established**, it might be necessary to set the IP address of the computer or laptop (Start => Settings => Control Panel => Network Connections => *Your Network*-Connection => Properties => Internet Protocol (TCP/IP) => Properties => Enable 'Use the following IP address' and enter an IP address, e.g. 192.168.1.10). **Do not use IP addresses 192.168.1.2 or 192.168.1.1**.
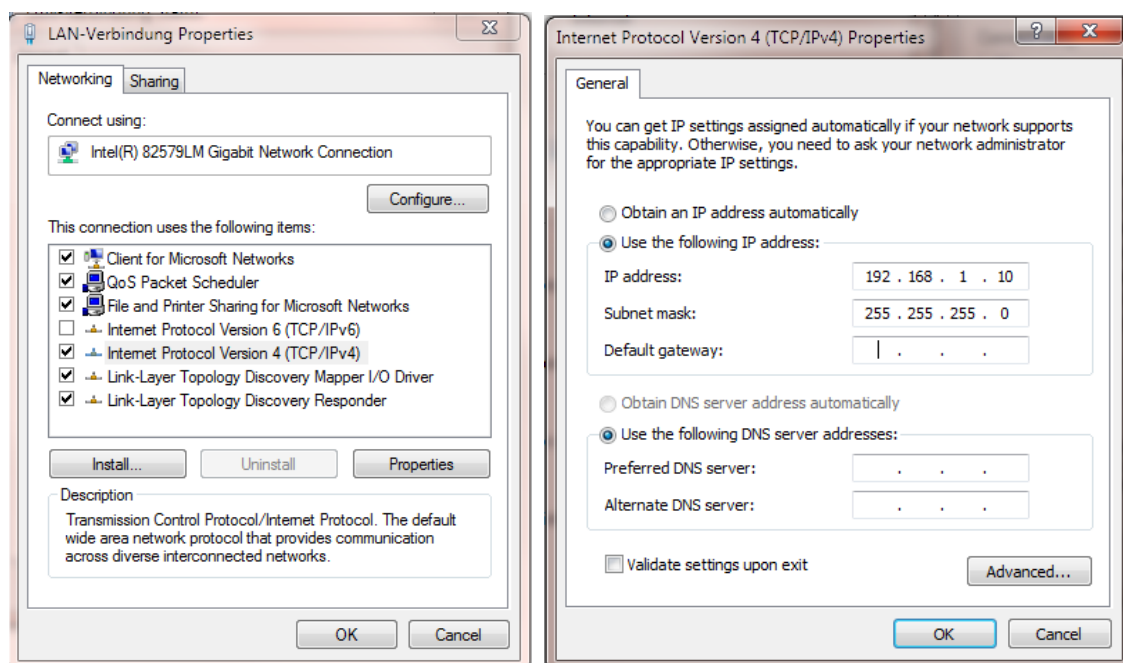
Before changing the settings in the Internet Protocol (TCP/IP) => Properties, please write down the current settings. Ensure no proxy server for internet access is activated any longer, either.

After having finished setting up the MRx18, please change all the TCP/IP settings to the original ones BEFORE re-connecting your computer to any other network. Re-activate the proxy settings if necessary, too.

➤ Enter User name: **MRx18** and password: **MRx18** (case-sensitive).

➢ Commission the repeater according to the description in the following chapter and save settings to the repeater.

➢ Disconnect the CAT 6 patch cable and check LEDs and display of the repeater.

In case username or password have been forgotten, these settings can be reset to the default factory settings.

To reset username and password to the default factory settings, press the "Reset and installation assistance switch" during the boot process (i.e. red ALC LED is blinking for four seconds after power has been supplied) and keep the switch pressed until the boot process starts again (Ethernet LED starts blinking). It is not possible to execute a reset when a local connection is established.

Browser mode settings for IE11:

Open the „Compatibility View Settings" and mark all checkboxes:
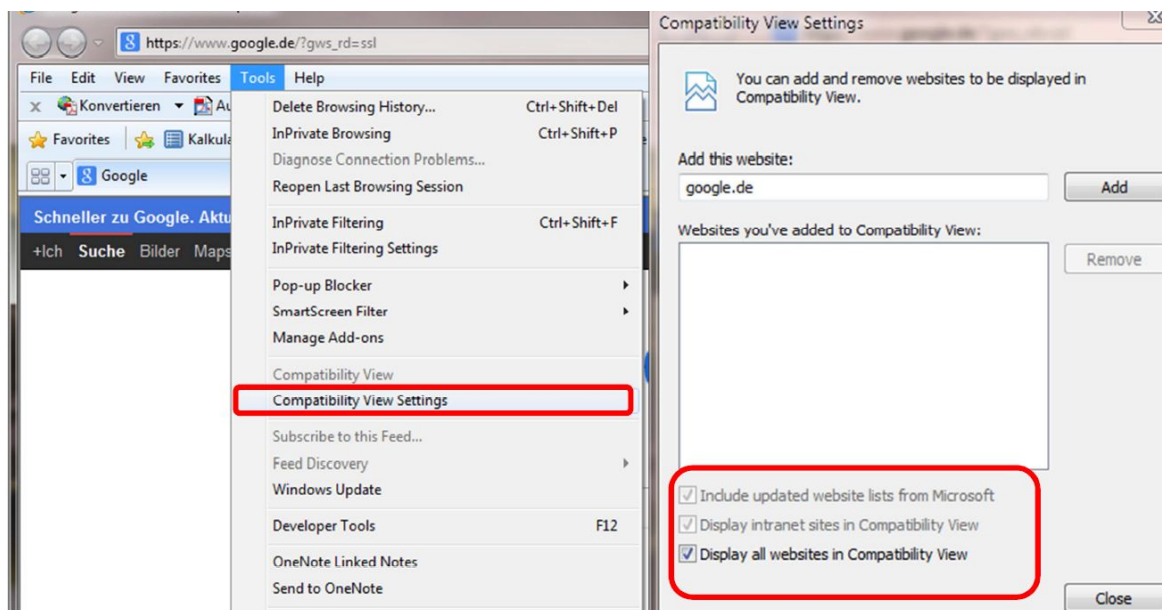
5. Software Setup

Note: With SW V3.5.0 or later, proceed as follows for login:

1. The Ethernet connector needs to be enabled before it can be used. To do so, press the "Reset and installation assistance" switch for at least 10 seconds until the ALC LED flashes 3-4 times.

2. Enter URL: http://192.168.1.1, Username: MRx18, Password: MRx18 (case-sensitive).

5.1. Login
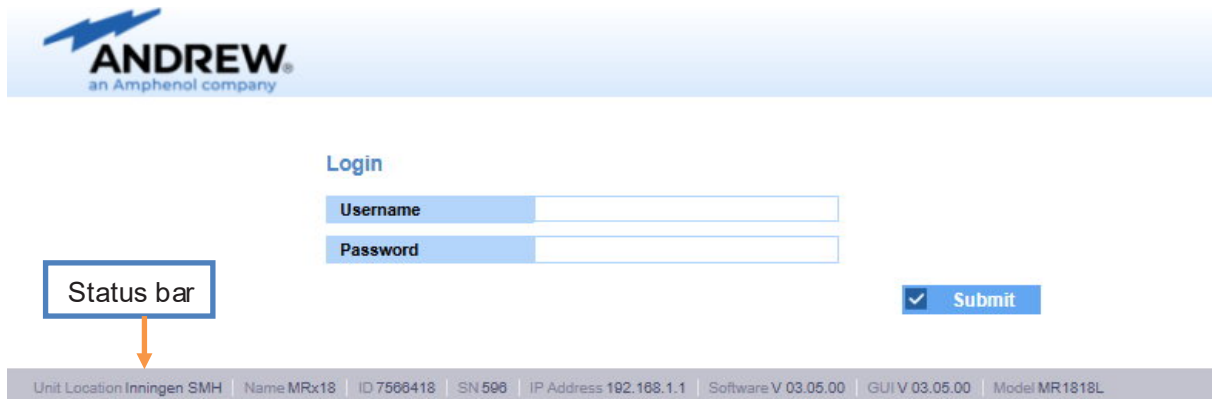
*figure 5-1 Login page*

Enter Username: MRx18
Enter Password: MRx18
Please note that username and password are case-sensitive when entering "MR**x**18".

Click the [✓ Submit] button.

If an incorrect username or password has been entered, an error message appears. This message prompts to insert your username or password anew. Press key F5 to refresh the login mask.

If an incorrect username or password has been entered for three times, the interface to the repeater is locked for 30 minutes.

5.2. Menu Bar – Buttons
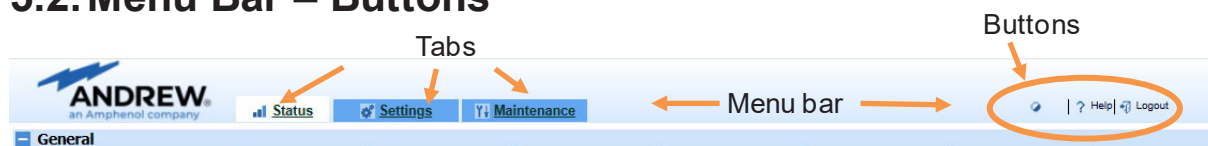
The menu bar consisting of tabs and buttons is always visible.
For description of the tabs, please refer to the following chapters.
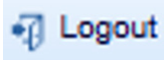The following buttons are provided on top of the right side of the menu bar:

Button	Explanation
	The **first** button is **Contrast** Click this button to have the webpage displayed in high contrast. To switch back into default contrast, just click on the button again and the webpage will be displayed in default contrast again. High-contrast Webpages are available for each of the Status, Settings, and Maintenance pages (an example of a high-contrast page is shown in chapter *5.4*).
	The **second** button is **Help**. It provides context-sensitive help to the Status, Settings and Maintenance pages. By clicking this button, the corresponding help page with detailed information will be opened immediately.
	The **third** button is **Logout**. Click this button to logout and quit the session. Then the logout page will be opened (see chapter 5.7 Logout).

table 5-1 Menu bar buttons, description

5.3. Status Bar

figure 5-2 Status bar

The status bar is located on the bottom of each webpage. The following information is displayed: These data is being read out of the MRx18 repeater.

Designation	Description
Unit Location	Displays the unit location of the MRx18 repeater – user defined area entered in chapter *5.5.3 Settings – Modem Control.*
Name	Displays the designation of the repeater.
ID	Displays the Identification Number of the MRx18 repeater.
SN	Displays the Serial Number of the MRx18 repeater.
IP Address	Displays the current repeater IP address set: 192.168.1.1.
Software	Displays the current software version installed.
GUI	Displays the current version of the Graphical User Interface (GUI).
Model	Displays the specific repeater type of the MRx18.

table 5-2 Status bar, description

5.4. Status

figure 5-3 Status – General & Alarms

In order to show this page in high-contrast view, use the corresponding button of the menu bar (see chapter *5.2*):

In the Status page, actual values are shown. The values are referenced to the condition when the status page has been opened.

Furthermore, present alarms of the MRx18 are listed in this page. No values/alarms are captured in case the RF section is switched off (see chapter 5.5.1).

Button	Explanation
Refresh	This button updates the values of the Status page.
Auto Refresh	By clicking this button, the values of the Status page are automatically updated every 3 seconds. Auto Refresh is deactivated by pressing this button once again or by leaving the Status page.

table 5-3 Refresh and Auto Refresh buttons, description

Status - Description of *General* Parameters	
Band	For the single band repeater MRx18 only *one* band is displayed.
Actual Gain (dB) DL/UL	The current UL and DL gain is shown, even if Auto Gain is activated.
Output Power (dBm) DL/UL	The current measured output power in DL and UL is shown, for low output power levels "<-10.0" is displayed.
RSSI Level (dBm)	The current DL input level at the donor antenna port is indicated.
ALC DL/UL	The condition of the ALC is displayed herein. When ALC is active, the ALC limit is stated in brackets, e.g. "active (18)".
Current Consumption	Shows if the current is within the pre-defined limits.
Temperature	The current temperature condition is displayed. If temperature rises above 80° C, an alarm is generated and the RF section of the repeater is powered down until normal temperature is reached.
RSSI Based Power OFF	The condition of the automatic RSSI Based Power OFF is displayed. If the RSSI level exceeds the RSSI power off level, the band amplifier is switched off. Possible states are 'not active', 'active' and 'disabled'.

table 5-4 Status – General

Alarms							
Band	Local Oscillator	RSSI Level	ALC		Current Alarm	Temperature	
			DL	UL			
MR1818L	OK	OK	OK	OK	OK	Disabled	

Description of *Alarms*		
Parameter	**Cause**	**Solution**
Local Oscillator	The LO does not lock.	Restart repeater. If the error persists, contact technical support.
RSSI Level	If P-out is <-10dBm with adjusted gain on RSSI-level.	Check antenna alignment, donor antenna and antenna cables. Increase the gain.
ALC DL/UL	Input power too high.	Decrease gain, set 'Auto Gain enabled' or decrease input power with external attenuators.
Current Alarm	Power consumption is not within the defined range.	Restart repeater. If the error persists, contact technical support.
Temperature	Temperature too high. (>80°C)	Check installation location of MRx18 and improve ventilation.

table 5-5 Status – Alarms

The severity and latency time of the alarms can be changed/set in the Settings page (see chapter 5.5.2). Before an alarm is notified and displayed, the repeater has to be in alarm condition for the set latency time.
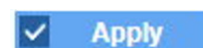
5.5. Settings

In the Settings pages current information on settings of all parameters is shown. The settings of these parameters can be changed in those pages.
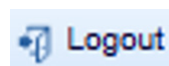
The sub-tabs of the Settings page are the following:
- *Radio Frequency*
- *Alarms*
- *Modem Control*
- *User Account*

Note:

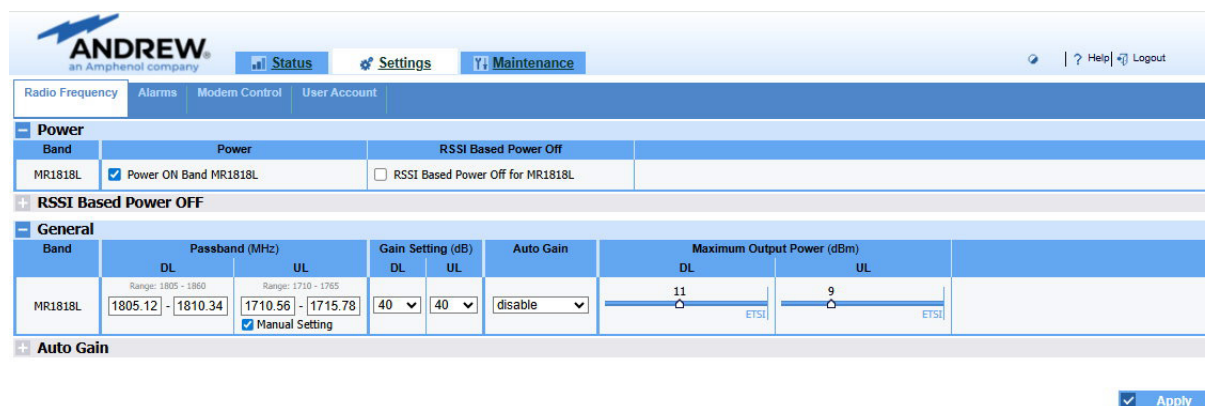|	
✓ **Apply**	Changed settings at the Settings pages will only become valid by clicking the Apply button. Then, all changes made will be saved to the repeater.
Logout	Additionally, changes made to Settings and User Account require a logout by the user to make the changes valid. After a disconnection without Logout or a timeout of the session, changes in these tabs will not be applied.

5.5.1.Settings – Radio Frequency

figure 5-4 Settings – Radio Frequency

Radio Frequency - Description of *Power* Parameters	
Band	For the single band repeater MRx18 only *one* band is displayed.
Power	To power on, check "Power ON Band MRx18". Uncheck "Power ON Band MRx18" to power down the RF-section of the repeater.
RSSI Based Power Off	Switch on /disable the automatic RSSI dependent band power control. If the RSSI level exceeds the set RSSI level threshold, the band amplifiers are switched off.

table 5-6 Radio Frequency – Power

Radio Frequency - Description of *RSSI Based Power OFF* Parameters	
Band	For the single band repeater MRx18 only *one* band is displayed.
Threshold Power OFF (> dBm)	If the measured RSSI level exceeds this threshold, the amplifiers for this band are switched off. Possible settings are -20 to -50 dBm in steps of 1.
Offset Power On (dB)	Offset in dB that has to be exceeded to switch the amplifiers on again. For the above example (threshold -32 dBm, offset 9 dB) an RSSI level of -42 dBm or less switches the amplifiers on again. Possible settings are 1 to 10 dB in steps of 1.
Latency Time (s)	Latency time in seconds that the RSSI level above the RSSI threshold has to persist to cause an amplifier switch off. Possible values are in the range from 30 to 900 seconds.
Internal Power On Attempt (h)	Time interval in hours after which the RSSI is measured again for the band that has been switched off due to high RSSI level. Possible values are 0 (which means disabled) and 1 to 24 hours.

General							
Band	**Passband (MHz)**		**Gain Setting (dB)**		**Auto Gain**	**Maximum Output Power (dBm)**	
	DL	**UL**	**DL**	**UL**		**DL**	**UL**
MR1818L	Range: 1805 - 1860 1805.12 - 1810.34	Range: 1710 - 1765 1710.56 - 1715.78 ☑ Manual Setting	40 ⌄	40 ⌄	disable ⌄	11 ⌂　　　ETSI	9 ⌂　　　ETSI

Radio Frequency - Description of General Parameters	
Band	For the single band repeater MRx18 only *one* band is displayed.
Passband (MHz)* **DL/UL**	Enter the DL frequency range to be amplified (start and stop frequency) within the duplexer range that is indicated above the field. **Note:** It is not recommended to amplify different modulation types (e.g. LTE, UMTS, GSM, …) within one frequency band. Step size is 10 kHz. Recommended bandwidth for UMTS networks: 1 UMTS carrier: 4.6 MHz 2 UMTS carriers: 9.6 MHz 3 UMTS carriers: 14.6 MHz For LTE, the actual channel width corresponds to the repeater passband, i.e. (in case of a 10 MHz LTE channel, for example) start and stop frequency must be adjusted to produce a 10 MHz passband. Depending on the passband DL, the passband UL is set accordingly. When **Manual Setting** is activated, the UL passband can be adjusted independently from the DL frequency setting.
Gain Setting (dB) DL/UL	Select the gain for UL and DL. When Auto Gain is enabled, the entries are not applied. For the MR2118 and MR2618 a warning is displayed (and field turns red) for an UL gain >70dB to guarantee full compliance to ETSI. Otherwise an uplink spurious requirement might be slightly exceeded.
Auto Gain	With Auto Gain activated, the repeater will automatically set its gain to the maximum value. Depending on the DL input level, gain is decreased to optimize the output power to the value adjusted at the *Maximum Output Power (dBm) DL* without reaching the ALC level. Gain is increased after the time selected at *Auto Gain Time Interval* has expired, when the DL input level decreases. UL gain is set accordingly with respect to Auto Gain imbalance setting.
Maximum Output Power (dBm) DL/UL	The ALC limit level or max. output power can be selected for DL and UL independently by shifting the slider to left or right. Depending on application / network, the output-power value specified in chapter *8.1 Electrical Specifications MRx18* must be entered in order to meet the respective standards. ETSI refers to the standards meeting <-36 dBm or <-30 dBm intermodulation products. For output power values that do not refer to ETSI, the intermodulation products are <-13 dBm.

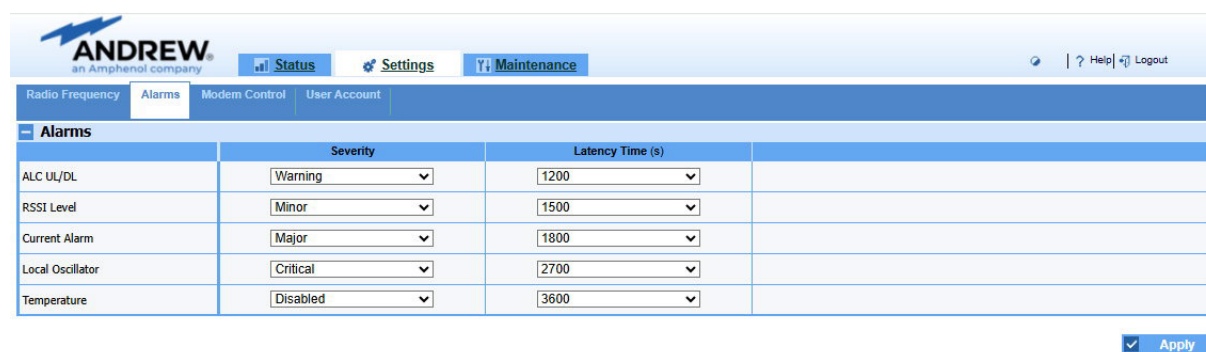* Passband corresponds to 3 dB bandwidth

table 5-7 Radio Frequency – General

		Auto Gain		
	Band	UL/DL Imbalance (dB)	Time Interval	
	MR1818L	3	0s / 12h	

Radio Frequency - Description of *Auto Gain* [*] Parameters	
Band	For the single band repeater MRx18 only *one* band is displayed.
UL/DL Imbalance (dB)	When Auto Gain is enabled, the gain is adjusted automatically. With an entry in the Auto Gain imbalance field, the UL gain is decreased compared to the DL gain for this value.
Time Interval	Possibility to select between four behaviors of Auto Gain: **0s / 24h:** Gain is reduced without latency time in case of too high input power. Every 24 hours the repeater tries to increase gain by 1 dB to max. output power in case input power has decreased again. **0s / 12h:** See above, but the interval for a try to increase gain again is 12 hours. **10s / 12h:** Gain is reduced after a latency time of 10s in case of too high input power. Interval for a try to increase gain again is 12 hours. **10s / 24h:** See above, but the interval for a try to increase gain again is 24 hours. <u>Note:</u> This setting (10s / 24h) is recommended for **LTE**, **UMTS**, and **HSDPA**.

[*]   If Auto Gain is disabled, these parameters cannot be accessed.

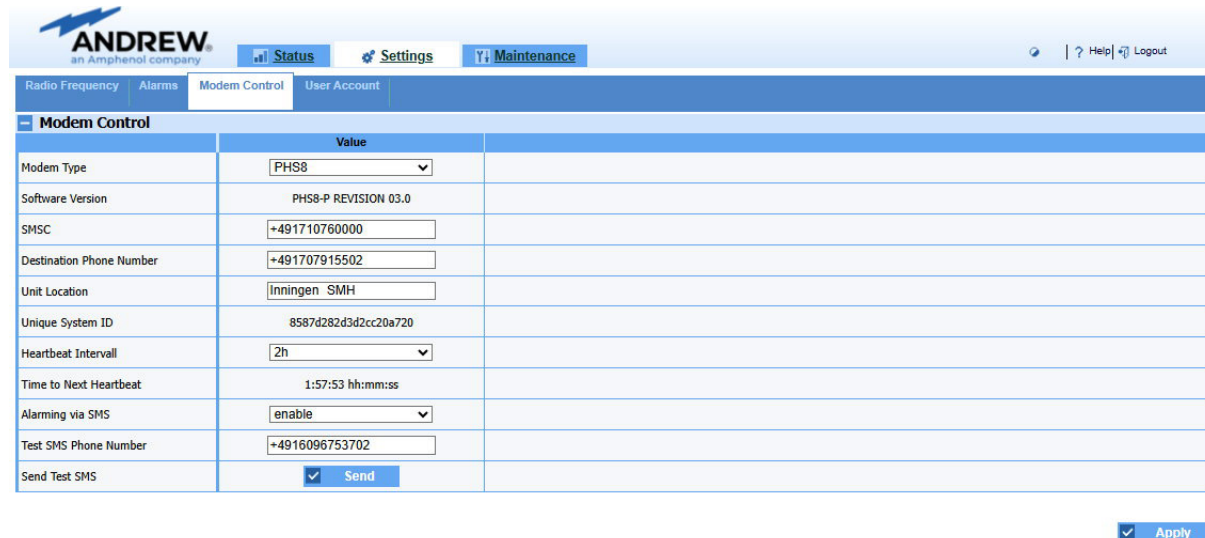*table 5-8 Radio Frequency – Auto Gain*

5.5.2. Settings – Alarms

figure 5-5 Settings – Alarms

Alarms -	
Parameter	**Description of *Severity / Latency Time***
ALC UL/DL	A severity level can be assigned to each alarm. It is also possible to disable alarms.
RSSI Level	The severity of alarms may be: disabled, warning, minor, major, critical
Current Alarm	The latency time for each alarm can selected from a drop-down list in a range from 10 seconds to 3600 seconds (in pre-defined steps). This setting
Local Oscillator	means that the repeater has to be in alarm condition for the set period of time before an alarm is notified and displayed on the *Status* page (see
Temperature	chapter *5.4*).

table 5-9 Settings – Alarms

5.5.3.Settings – Modem Control

figure 5-6 Settings – Modem Control

Modem Control - Description *of Value* Parameter	
Modem Type	Different modems can be selected for SMS remote monitoring. If a modem is connected to the repeater, it is automatically initialized during the boot process of the repeater. If no reboot is performed, the modem type has to be selected manually.
Software Version	The software version of the modem connected to the repeater is shown. If no modem is connected or the modem cannot be recognized, the message "no valid modem found" appears.
SMSC	The Service Center Phone Number (SMSC) is entered here (including country code, +CC, e.g. +49 for Germany). If the SMSC is stored to the SIM card of the modem, no entry needs to be done.
Destination Phone Number [1]	Both the number of the destination for alarm messages and heartbeat SMS and the sender for SMS are determined herein. The number should be preceded with the country code (i.e. +CC, e.g. +49 for Germany). Only decimal digits are allowed, no spaces. The max. size of the phone number is 20 decimal digits.
Unit Location [1]	The Unit Location is sent with each SMS to get information about e.g. address location or building where the repeater is installed. No validation is done with the entry. The Unit Location is a user-defined field. The settings are only applied in the status bar at the bottom of each page after a new login. Max. 20 characters are allowed.
Unique System ID [1]	The Unique System ID is for identification of the repeater within AIMOS software. This field is read-only.

[1] With integration in AIMOS a configuration SMS is sent from AIMOS that overwrites the entries of these fields by the entries coming from AIMOS

Modem Control - Description *of Value* Parameter	
Heartbeat Interval	A heartbeat SMS is sent after a certain period of time that can be selected in this field. The heartbeat indicates that the supervision of the repeater is working. If no heartbeat message is sent after the interval entered, the connection and supervision is down. If heartbeat interval is set to "0", the heartbeat functionality is disabled.
Time to Next Heartbeat	Depending on the heartbeat interval the time that still remains until the next heartbeat will be sent to the destination phone number is indicated.
Alarming via SMS	The alarming via SMS can be disabled in case no alarm and heartbeat SMS shall be sent to the destination phone number. However, settings can be changed or the status of the repeater can be queried via SMS, when Alarming via SMS is disabled.
Test SMS Phone Number	To check connectivity of the modem, a test SMS can be sent to a different receiver, e.g. your own mobile. The test SMS will contain Unit Location, Modem RSSI level, date, and timestamp.
Send Test SMS	Click this button to send a test SMS to the receiver entered in Test SMS Phone Number field.

table 5-10 Settings – Modem Control

To make the changes valid, the Apply button has to be pressed and the user has to log out.
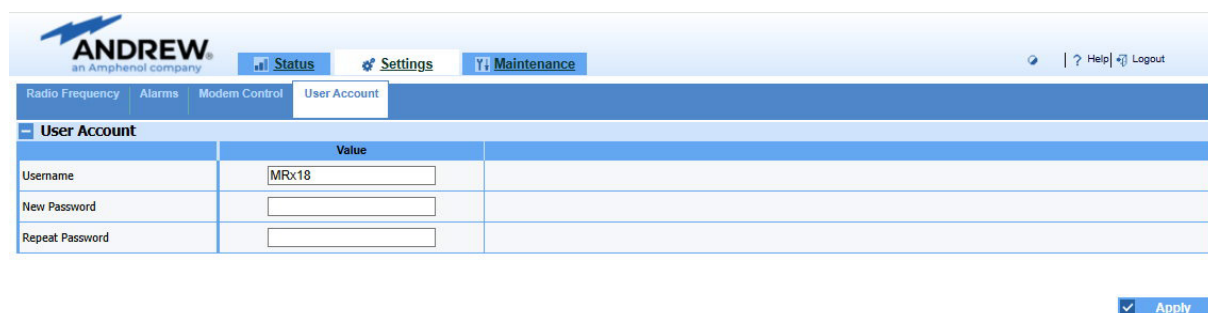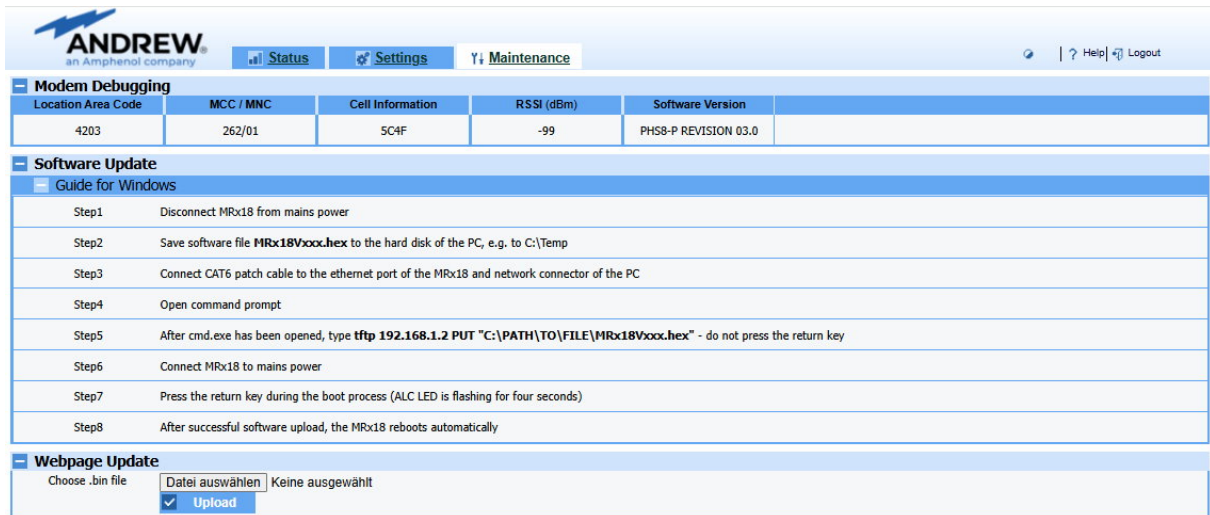
5.5.4. Settings – User Account

figure 5-7 Settings – User Account

User Account	
Parameter	**Description *of Value***
Username	To login the user name is required. The default user name can be changed. Max. 8 characters are allowed.
New Password	The password to login can be changed. Max. 8 characters are allowed.
Repeat Password	The new password has to be repeated.

table 5-11 Settings – User Account

To make the changes valid, the Apply button has to be pressed and the user has to log out.

5.6. Maintenance

figure 5-8 Maintenance

In the Maintenance page current information on the modem is available (e.g. cell information). Moreover, the Webpages can be updated and a guide to update the MRx18 software is provided here.

Maintenance - Description *of Modem Debugging* Parameters	
Location Area Code	The Location Area Code of the existing server cell is indicated. This information is provided by the connected modem. "No network" is stated in case no modem is connected or is recognized to/by the repeater or the modem is not able to access to a mobile network.
MCC/ MNC	The Mobile Country Code (MCC) and Mobile Network Code (MNC) of the server cell are indicated. The first three digits show the MCC, the last two digits the MNC. The MCC and MNC are detected by the connected modem. "No network" is stated in case no modem is connected or is recognized to/by the repeater or the modem is not able to access to a mobile network.
Cell Infor- mation	The cell information displays the ID of the cell the modem is served. "No network" is stated in case no modem is connected or is recognized to/by the repeater or the modem is not able to access to a mobile network.
RSSI (dBm)	The received signal level at the antenna port of the modem is displayed. The loss of 25 dB of the modem coupler integrated in the repeater is considered. "No network" is stated in case no modem is connected or is recognized to/by the repeater or the modem is not able to access to a mobile network.
Software Version	The software version of the modem connected to the repeater is shown. If no modem is connected or the modem cannot be recognized, the message "no valid modem found" appears.

table 5-12 Maintenance – Modem Debugging

	Software Update	
	Guide for Windows	
Step1	Disconnect MRx18 from mains power	
Step2	Save software file **MRx18Vxxx.hex** to the hard disk of the PC, e.g. to C:\Temp	
Step3	Connect CAT6 patch cable to the ethernet port of the MRx18 and network connector of the PC	
Step4	Open command prompt	
Step5	After cmd.exe has been opened, type **tftp 192.168.1.2 PUT "C:\PATH\TO\FILE\MRx18Vxxx.hex"** - do not press the return key	
Step6	Connect MRx18 to mains power	
Step7	Press the return key during the boot process (ALC LED is flashing for four seconds)	
Step8	After successful software upload, the MRx18 reboots automatically	

Description of Software Update Parameters	
Guide for Windows	The procedure how to update the repeater software.

table 5-13 Maintenance – Software Update

For software update, please also refer to chapter *5.8 Upload New Software Version.*

Note: **Observe that SW and GUI (webpage file) always have to be updated to the same version.**
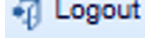

Maintenance	
Webpage Update	**Description**
Choose .bin file	The Webpages can be updated by uploading the .bin file. Choose the bin file by clicking the **Browse…** button and then click the **Upload** button to upload and update the webpage.

table 5-14 Maintenance – Webpage Update

5.7. Logout

The Logout page can be accessed by clicking .

By clicking the **Logout** button, the session will be quit and the Login page opened:

figure 5-9 Logout

Logout is possible from the Status, Settings, and Maintenance pages at any time.

Note: **Settings made in User Account will only become valid after the user has executed a manual logout.**

5.8. Upload New Software Version

The software can be updated. The new software version is delivered as MRx18Vxxx.hex file.

Note: Observe that SW and GUI (webpage file) always have to be updated to the same version.

Note: As the new PCBs of the MRx18 single band are only supported by SW V3.3.0, a downgrade to a prior SW version must NOT be done (as indicated by the corresponding label on the unit). After a downgrade, the unit will function properly no
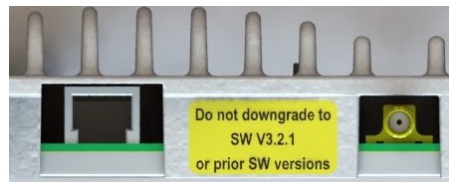
longer and installing a SW version ≥V3.3.0 will be required.

Observe that from Windows 7 onwards the TFTP-Client required for the upload is deactivated by default. Therefore, it has to be activated via Control Panel → All Control Panel Items → Programs and Features → Turn Windows features on or off:
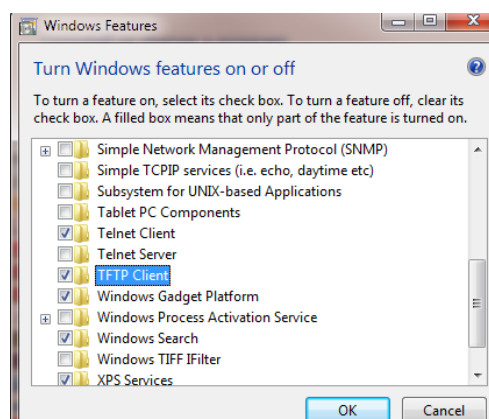
1. Disconnect the MRx18 from mains power.

2. Save the new software version file to a folder on the hard disk or USB-stick of the laptop or PC, e.g. to C:\Temp.

3. For **local** connection, connect the **straight** CAT 6 patch cable to the Ethernet connector of the MRx18 and the network connector of a laptop or PC.

4. Open a command prompt (Start – Run…- cmd) and enter: tftp 192.168.1.2 PUT "C:\Temp\MRx18Vxxx.hex" (Do not press return button yet).

figure 5-10 Upload new software version

5. Provide power to the MRx18 and press the return button of the laptop or PC during the boot process (i.e. red ALC LED is blinking for four seconds). After the software upload, the MRx18 will reboot automatically.

Note: Only the software is updated, the configuration settings made before the update are not changed.

If the software upload had not been successful, it might be necessary to set the IP address of the PC or laptop to a fixed IP, e.g. to 192.168.1.10 (please see chapter 4.2 Electrical Installation).

6. Optional Equipment

6.1. External Modem (Kit)

As an option, the MRx18 can be also equipped with an external modem for remote supervision. Besides alarm forwarding via SMS (including heartbeat), settings of the MRx18 can be changed remotely via AIMOS or by a mobile by sending SMS commands.

Several modems are available as kits; for their exact designation please see chapter *8.4 Spare Parts List*.

Further information is available in a separate manual which can be downloaded as well.

Notes: **For proper operation, the minimum level <u>at the modem antenna port</u> has to be >-100 dBm.**

The coupling loss of the modem coupler integrated in the MRx18 repeater is approx. 25 dB. Thus, the minimum level <u>at the BTS port of the repeater</u> has to be >-75 dBm.

6.2. Antenna

An omni-directional multi-band coverage antenna can be directly mounted to the MRx18 antenna port (labeled *Mobile*) as illustrated to the right.
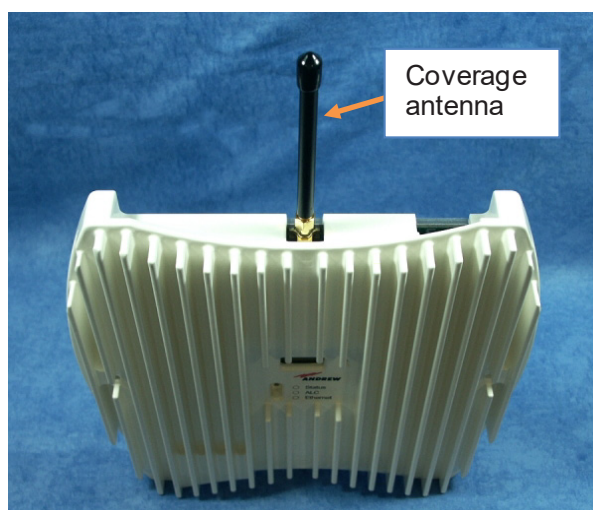

figure 6-1 Coverage antenna for MRx18, optional equipment

6.3. Adapter Cable

Cables with SMA male to N-female connectors can be ordered, if required. The length of the cable is 500 mm.

7. Alarming and Supervision

For alarming and supervision, the MRx18 is provided with an alarming interface represented by three LEDs. Without having to connect a PC or laptop locally to the MRx18, the display provides the status information described in the following chapter.
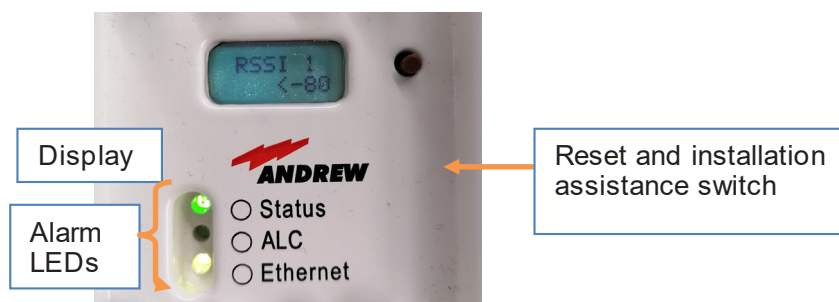

figure 7-1 Display and alarm LEDs

7.1. Alarm LEDs

LED	Color	Function/ Indication
Status	Green	A green light indicates the normal operation of the repeater. Power is present and the current consumption of the unit is within the specifications.
	Orange	An orange light indicates that current consumption of the repeater is not within defined limits or the LO cannot lock and the repeater might not work properly.
	Off	If the LED is off, the respective MRx18 does not receive any DC power.
	Red	A red light indicates the temperature alarm, which switches to power-down mode once an over-temperature has been reached. The temperature sensor of the controller will continue to check the temperature in power-down mode. As soon as the temperature has returned to normal, the controller will enable the RF-section.
	Blinking red/green	Blinking red/green indicates the antenna alignment assistance for approx. four minutes.
ALC	Off/red	A red LED indicates that the input power received by the repeater is too high. The output power of the repeater must be limited. This will be done by the ALC. Limitation of power ensures that the final stage is not overdriven and that intermodulation is kept below the limits.
	Blinking red	The LED is blinking red for four seconds during the boot process.
	Blinking red 2 times	The LED is blinking red two times during normal operation after pressing the "Reset and installation assistance switch " for more than 5 seconds but less than 10 seconds. Releasing it in that time frame activates the antenna assistant.
	Blinking red 3-4 times	The LED is blinking red for more than two times (3-4) during normal operation after pressing the "Reset and installation assistance switch " for more than 10 seconds and release it to activate the Ethernet port.
Ethernet	Off/green	The LED is green if the repeater is connected via Ethernet. LED is blinking during data transfer via Ethernet connection.

table 7-1 Alarm LEDs

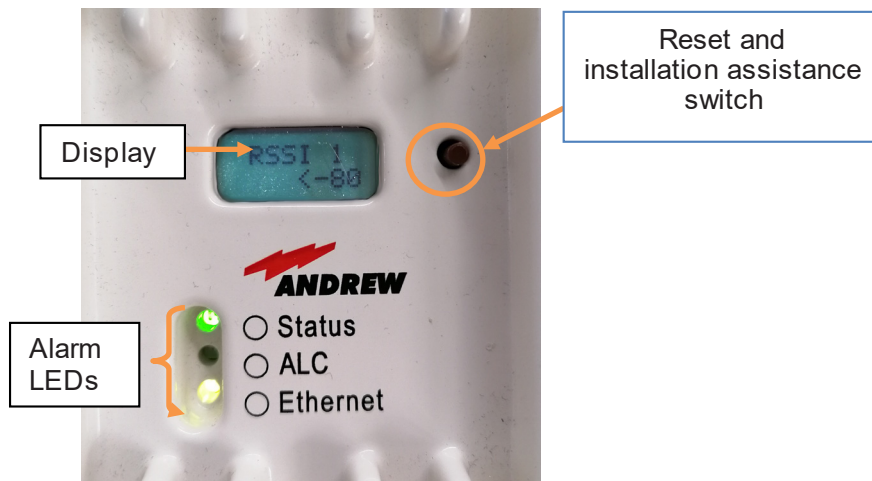## 7.2. Display and Reset & Installation Assistance Button

figure 7-2 Display with reset button and alarm LEDs

Functions of the Reset and installation assistance switch:

➢ **To align the donor antenna** of the MRx18 towards the BTS via the antenna alignment assistance (as described in chapter *4.2 Electrical* Installation), press the "Reset and installation assistance" switch (illustrated in figure above) for at least *five* seconds but not more than 9 seconds **after** (!) the boot process has been finished (i.e. red ALC LED is blinking for four seconds). The time for releasing the button to activate the assistance is indicated by the ALC LED flashing 2 times This will set the gain to max. value and disable Auto Gain for about 4 minutes. The status LED will be blinking red/green. Align the donor antenna towards the BTS / Node B tower to reach the highest RSSI level possible. Check the RSSI level at the display (see chapter 7 *Alarming and Supervision*). After four minutes the gain and Auto Gain are adjusted to the values prior to the activation of the antenna alignment.

➢ **To active the Ethernet port for local configuration**, this button has to be pressed for more than 10 seconds. The time for releasing the button to activate the Ethernet port is indicated by the ALC LED flashing 3-4 times.

➢ **To activate the display from sleep mode** this button has to be pressed. Even when an alarm is raised, the display will not be switched on. Thus, active alarms are initially only indicated by the LED's until the button is pressed. Then, the alarm information is indicated on the display. The display will be switched off automatically after 10 minutes even if an existing alarm is indicated on the display.

➢ **To reset username and password** to the default factory settings, press the 'Reset and installation assistance switch' during the boot process (i.e. red ALC LED is blinking for four seconds after power has been supplied) and keep the switch pressed until the boot process starts again (ALC LED starts blinking again).

➢ By pushing the reset and installation assistance button several times, several pieces of **status information of the MRx18 can be queried**. Information given is on **RSSI**, current **gain** UL and DL, current **output power** UL and DL (abbreviated by Pout in the display), and on the LAN status. The reset and installation button is used to switch between the status information in the following sequence:

RSSI → Gain → Output power → LAN status.

Reset and installation assistance button
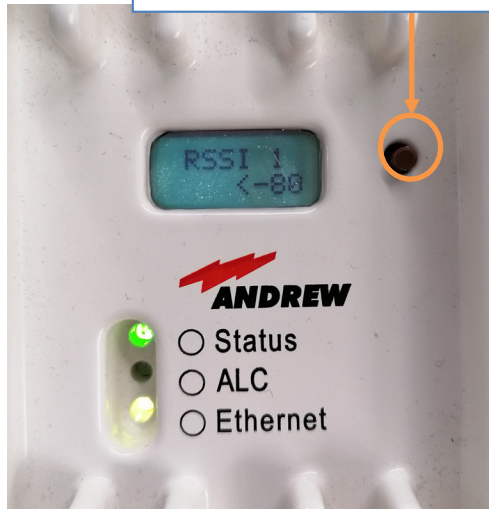
figure 7-3 Display – RSSI

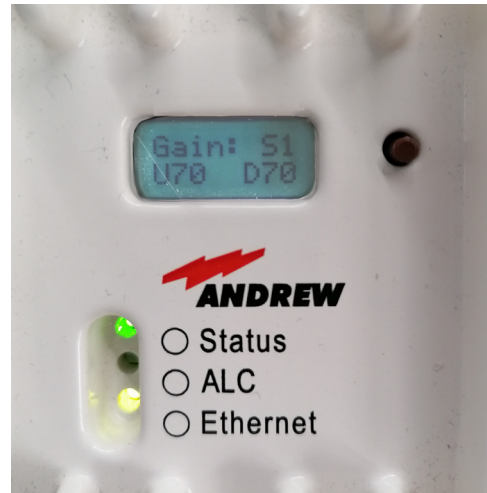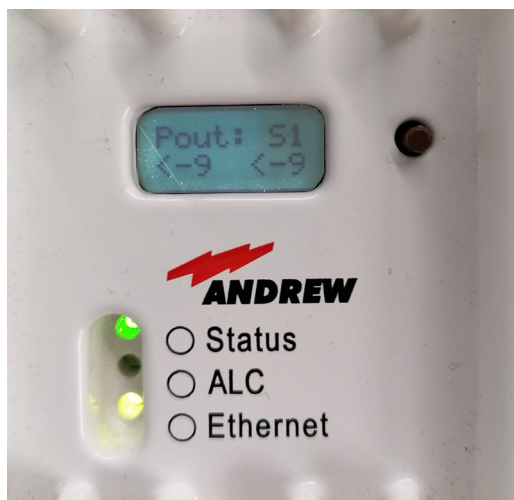
figure 7-4 Display – Gain UL and DL
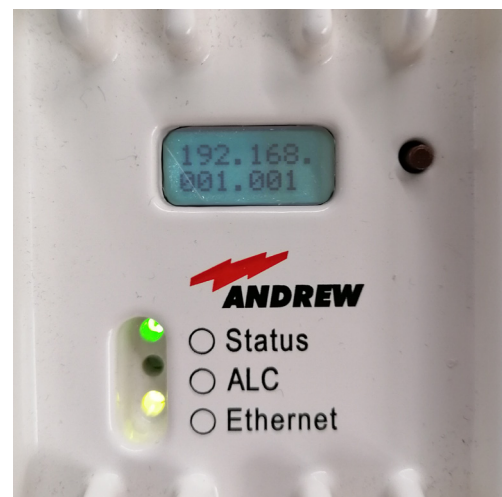

figure 7-5 Display – P$_{out}$ UL and DL

figure 7-6 Display – LAN IP Address

In alarm condition the display shows* the segment and kind of alarm. When the MRx18 is in normal operation with no active alarms, "System Ok" is indicated.

*   When the display is in sleep mode it has to be activated by the "Reset and installation assistance button", first.

8. Appendix

8.1. Electrical Specifications MRx18

Frequency range		GSM900/UMTS900/LTE900	
		MR918	MR918E
	UL	890 – 915 MHz	880 – 905 MHz
	DL	935 – 960 MHz	925 – 950 MHz
Bandwidth options [1]		variable 1 MHz to 25 MHz in steps of 10 kHz	
Gain		70 dB	
Gain adjustment range		30 dB in steps of 1 dB	
Flatness		±3 dB	
RF output power UL/DL [2]		+18 dB @ 1 carrier +15 dB @ 2 carriers	
OICP3	UL/DL	+42 dBm	
Spurious emission		according to GSM05.05, 3GPP	
		according to 3GPP	
P-1dBc	UL/DL	+28 dBm	
Noise figure	UL/DL	6.0 dB @ max. gain	
Delay		5 µs	
Power supply	Mains power	100 Vac to 240 Vac	
	Local power	6 Vdc	
Power consumption [3]		24 watts	
Antenna port	Connector	SMA Female	
	Return loss	10 dB	
Indoor antenna (optional)	Antenna gain	2.0 dBi	
	Radiation	Omni	

All figures are typical values.

[1] Recommended bandwidth for UMTS carriers: 1 carrier: 4.6 MHz, 2 carriers: 9.6 MHz, 3 carriers: 14.6 MHz
[2] MRx18 extended power versions: +24 dBm @ 1 carrier, +21 dBm @ 2 carriers meeting <-13 dBm intermodulation products
[3] Not considering power supply losses

All data is subject to change without notice.

GSM1800 / LTE1800 – MR1818			
Frequency range	UL	**MR1818L** 1710 MHz -1765 MHz	**MR1818U** 1730 MHz -1785 MHz
	DL	1805 MHz -1860 MHz	1825 MHz -1880 MHz
Bandwidth options [1]		variable 1 MHz to 25 MHz in steps of 10 kHz	
Gain		70 dB	
Gain adjustment range		30 dB in steps of 1 dB	
Flatness		±3 dB	
RF output power UL/DL [2]		+18 dB @ 1 carrier +15 dB @ 2 carriers	
OICP3	UL/DL	+42 dBm	
GSM1800 / LTE1800 – MR1818			
Spurious emission		According to GSM05.05, 3GPP	
P-1 dBc	UL/DL	+28 dBm	
Noise figure	UL/DL	6.0 dB @ max. gain	
Delay		5 µs	
Power supply	Mains power	100 Vac to 240 Vac	
	Local power	6 Vdc	
Power consumption [3]		24 watts	
Antenna port	Connector	SMA Female	
	Return loss	10 dB	
Indoor antenna (optional)	Antenna gain	2.0 dBi	
	Radiation	Omni	

All figures are typical values.

[1]   Recommended bandwidth for UMTS carriers: 1 carrier: 4.6 MHz, 2 carriers: 9.6 MHz, 3 carriers: 14.6 MHz

[2]   MRx18 extended power versions: +24 dBm @ 1 carrier, +21 dBm @ 2 carriers meeting <-13 dBm intermodulation products

[3]   Not considering power supply losses

All data is subject to change without notice.

UMTS2100 / LTE2100 – MR2118		
Frequency range	UL	1920 MHz – 1980 MHz
	DL	2110 MHz – 2170 MHz
Bandwidth options [1]		variable 1 MHz to 25 MHz in steps of 10 kHz
Gain		75 dB
Gain adjustment range		30 dB in steps of 1 dB
Flatness		±2.5 dB
RF output power UL/DL [2]		+18 dB @ 1 carrier +15 dB @ 2 carriers
OICP3	UL/DL	+42 dBm
Spurious emission		According to 3GPP
P-1dBc	UL/DL	+28 dBm
Noise figure	UL/DL	6.0 dB @ max. gain
Delay		5 µs
Delay ripple		±200 ns
EVM		3.5 %
PCDE @ SF = 256		-42 dB
Power supply	Mains power	100 Vac to 240 Vac
	Local power	6 Vdc
Power consumption [3]		24 watts

All figures are typical values.

[1] Recommended bandwidth for UMTS carriers: 1 carrier: 4.6 MHz, 2 carriers: 9.6 MHz,
3 carriers: 14.6 MHz

[2] MRx18 extended power versions: +24 dBm @ 1 carrier, +21 dBm @ 2 carriers meeting <-13 dBm
intermodulation products

[3] Not considering power supply losses

All data is subject to change without notice.

LTE2600 - MR2618		
Frequency range	UL	2500 MHz to 2570 MHz
	DL	2620 MHz to 2690 MHz
Bandwidth options		variable 1 MHz to 25 MHz in steps of 10 kHz
Gain		75 dB
Gain adjustment range		30 dB in steps of 1 dB
Flatness		±3 dB
RF output power [1]	UL	+18 dBm @ 1 carrier +15 dBm @ 2 carriers [2] +10 dBm @ 6 carriers
	DL	+18 dBm @ 1 carrier +15 dBm @ 2 carriers +10 dBm @ 6 carriers
OICP3	UL/DL	+42 dBm
Spurious emission		according to 3GPP
P-1dBc	UL/DL	+28 dBm
Noise figure	UL/DL	6.0 dB maximum gain
Delay		3.5 µs
Delay ripple		±200 ns
EVM		3.5 %
Power supply	Mains power	100 to 240 Vac
	Local power	6 Vdc
Power consumption [3]		27 watts
Antenna port	Connector	SMA Female
	Return loss	10 dB

All figures are typical values.

[1] **Note:** The manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be made by means of input power or gain reduction and not by an attenuator at the output of the device.
[2] For certain passband adjustments and carrier constellations the limits for unwanted emissions for protection of base station receiver might require slight restrictions
[3] Not considering power supply losses

All data is subject to change without notice.

LTE800 - MR818		
Frequency range	UL	832 MHz to 862 MHz
	DL	791 MHz to 821 MHz
Bandwidth options		variable 1 MHz to 25 MHz in steps of 10 kHz
Gain		70 dB
Gain adjustment range		30 dB in steps of 1 dB
Flatness, maximum		±3 dB
RF output power	UL	+18 dBm @ 1 carrier +15 dBm @ 2 carriers
	DL	+ 18 dBm @ 1 carrier +15 dBm @ 2 carriers
OICP3	UL/DL	+42 dBm
Spurious emission		according to 3GPP
P-1dBc	UL/DL	+28 dBm
Noise figure	UL/DL	6.0 dB maximum gain
Delay		5.0 µs
Power supply	Mains power	100 to 240 Vac
	Local power	6 Vdc
Power consumption [1]		24 watts
Antenna port	Connector	SMA Female
	Return loss	10 dB

All figures are typical values.

[1] Not considering power supply losses

All data is subject to change without notice.

System Supervision and Control – All miniRepeater	
Alarms	Temperature, Current, ALC
Options	Remote control and heartbeat via SMS

8.2. Environmental and Safety Specifications MRx18

Note: The specifications for environmental and safety conditions are according to ETS 300 019 (European Telecommunication Standard). For further details, please refer to the "Environmental and Safety Specifications" leaflet of the supplier.

Operating temperature range	+5° C to +40° C
Ingress protection	IP30

All data is subject to change without notice.

8.3. Mechanical Specifications MRx18

Height, width, depth	240 x 240 x 35 mm (9.5 x 9.5 x 1.4 in)
Weight	1.5 kg (3.3 lb)

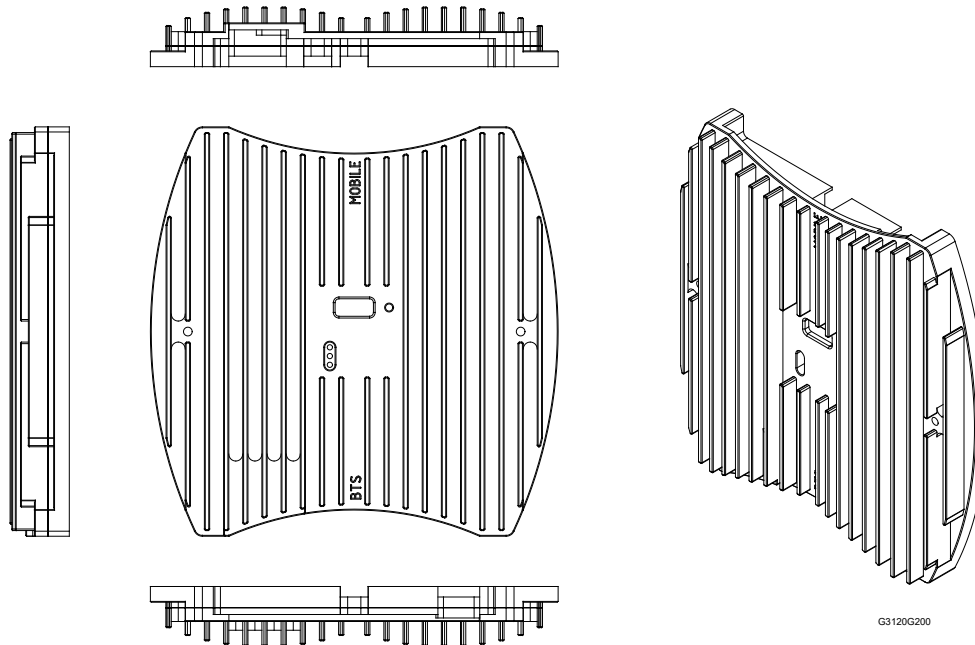**All data is subject to change without notice.**

figure 8-1 Cabinet drawing MRX18

8.4. Spare Parts List

Note: When sending back the unit, use an appropriate packaging. We strongly recommend using the original packaging.

Repeaters:	ID No:
MR818	7657462
MR918	7599148
MR918E	7599149
MR1818L	7566418
MR1818U	7600606
MR2118	7618228
MR2618*	7633937

*   In case MR2618 is equipped with a modem kit, 60W power supply kit is recommended (see parts list in the following).

Part:	ID No:
PSU Kit AC IN 100-240V/OUT 6 V 30W AUS	7563232
PSU Kit AC IN 100-240V/OUT 6 V 30W EURO	7563219
PSU Kit AC IN 100-240V/OUT 6 V 30W IND	7563220
PSU Kit AC IN 100-240V/OUT 6 V 30W UK	7563233
PSU Kit AC IN 100-240V/OUT 6 V 30W ZA	7563231
PSU Kit AC IN 100-240V/OUT 6V 60W EURO	7604783
PSU Kit AC IN 100-240V/OUT 6V 60W IND	7565820
PSU Kit AC IN 100-240V/OUT 6V 60W ZA	7565921
PSU Kit AC IN 100-240V/OUT 6V 60W AUS	7565922
PSU Kit AC IN 100-240V/OUT 6V 60W UK	7565923
Antenna 791-960 1710-2690	7579858
RF Cable-Kit SMA to 4.3-10 L500mm	7861794
RF Cable-Kit SMA to N 500 mm	7594320
Modem-Kit EGS5-3 MRX18	7721516
Modem-Kit MC93 MRx18	7851077

Last Replaceable Unit (LRU) is the entire miniRepeater MRx18 listed above, except for the power supply kits and the optional equipment (antennas, RF cable kit, and modem kits) listed above.

Note: To ensure compatibility with your system, do not order any individual components (e.g. modems) of the kits available. Make sure to always order the complete kit (ID must be listed above) as spare part.

The manufacturer reserves the right to replace the spare parts listed above by equivalent substitutes!

9. List of Changes

Version	Changes	Release Date
M0139ADZ		26-April-2023
M0139ADAB	- Branding update in all chapters - V3.5.0 specifics added, and LAN Connectivity information deleted where applicable - AIMOS added to chapter *1.1* - Link updated in chapter *1.3* and reference to new WEEE chapter added in chapter *1.4* - Contact information updated in chapter *1.6* - AIMOS information added to chapter *2.2* - Automation tool information deleted in chapter *5.8* - New cable kit added in chapter *8.4*	05-August-2025

10. Index

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