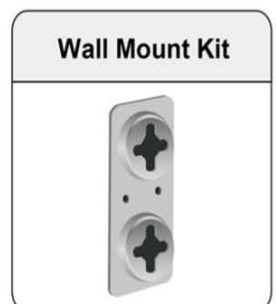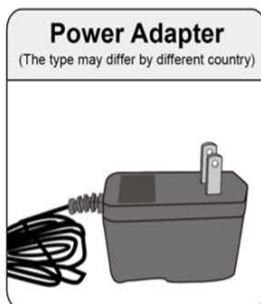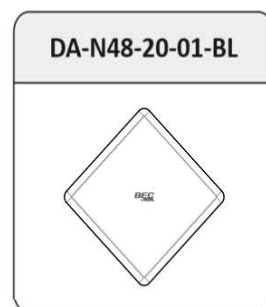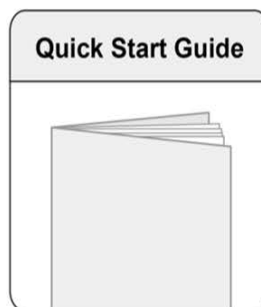# MX-220-UT-5G-B

Advanced Industrial 5G Router

Installation Guide

PLEASE READ THE QUICK START GUIDE AND FOLLOW THE STEPS CAREFULLY. THIS QUICK START GUIDE WILL HELP YOU INSTALL THE DEVICE PROPERLY AND AVOID IMPROPER USAGE.

Package Contents

➢ **MX-220-UT-5G-B**

➢ **RS232 DB9 Cable**

➢ **Power Adapter**

➢ **Serial DB9 Adapter**

➢ **Wall Mounting kit**

➢ **Quick Start Guide**

➢ **DA-N48-20-01-BL ant.**

➢ **Power Cable**

➢ **Din Rail Clip**

MX-220-UT-5G-B	Quick Start Guide	RS232 DB9 Cable	DA-N48-20-01-BL

Power Adapter (The type may differ by different country)	Power Cable	Serial DB9 Adapter	Din Rail Clip	Wall Mount Kit

NOTE: ALL IMAGES SHOWN ARE FOR ILLUSTRATION PURPOSE ONLY.
PACKAGE CONTENTS MAY DIFFER FROM ACTUAL PRODUCTS.

Warning

● **Do not use the router in high humidity or high temperatures.**
● **Do not use the same power source for the router as other equipment.**
● **Do not open or repair the case yourself. If the router is too hot, turn off the power immediately and have it repaired at a qualified service center.**
● Except antenna, do not use this product and all other accessories outside of cabinet.

Attention

● **Only use the power adapter that comes with the package. Using a different voltage rating power adaptor may damage the router.**

Device LEDs
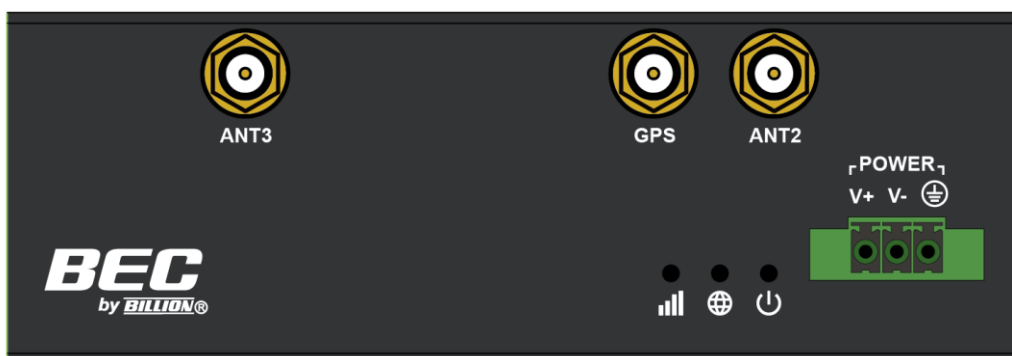
| Item		Description	
![WAN icon] **WAN (Cellular Signal Strength Indicator)**		**Green**	RSSI > -69dBm. Excellent signal.
		Green/ Fast Flashing	-69dBm > RSSI > -81dBm. Good signal.
		Red/ Fast Flashing	-81dBm > RSSI > -99dBm. Fair signal.
		Red/ Slow Flashing	-99dBm > RSSI. Poor signal.
		Red	No signal and the 5G NR module is in service.
		Off	No 5G NR module or 5G NR failure.
INTERNET		**Green**	IP traffic via WAN.
		Red	WAN IP request failed.
		Off	No WAN connection or in Bridge mode.
POWER		**Green**	System ready
		Red	Boot failure

Device Overview & Hardware Installation

Connect to Power Source

Mode 1. Attach the power converter with 3-pin terminal block to the MX-220-UT-5G-B and plug in the supplied power adapter or power supply system.

Mode 2. Attach the power **terminal block (TB)** to the MX-220-UT-5G-B and connect wire leads from a power supply to the **terminal block (TB)** plug. The **Red Wire (V+, Left Connector)** should connect to the positive supply voltage and **Black Wire (V-, Middle Connector)** should connect to the negative supply voltage. Input voltage range is from 9V to 56V. Then connect the grounding cable to the **Right Connector (GND)**.

Attach the Antennas

This MX-220-UT-5G-B has four 5G NR antennas. It is a simple antenna setup for MX-220-UT-5G-B, screw the male SMA 5G NR antennas tight to the female connectors, and do not over-torque the antenna on the connector.
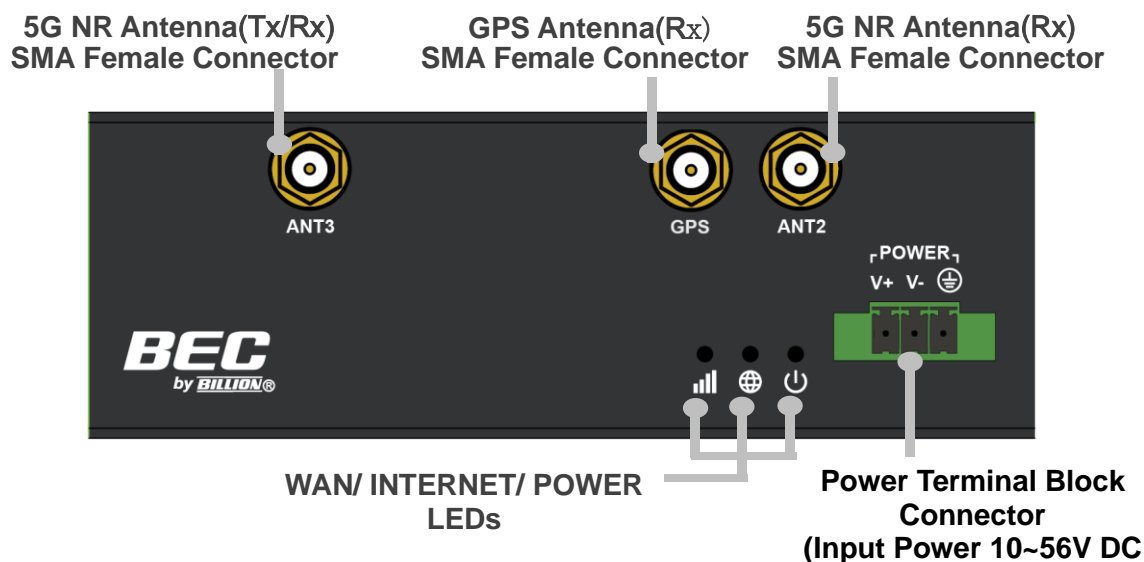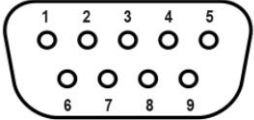

Insert the SIM card

Remove the SIM cover, then insert the SIM card (2FF) with the mental contacts (gold plate) **facing up** into the SIM slot, push it all the way in until you hear a click sound. Then replace the metal SIM cover after inserting the SIM card. Use the SIM 1 first and use the SIM 2 for a secondary/ back-up SIM. (*Note: Power off the device before inserting or removing the SIM card.)
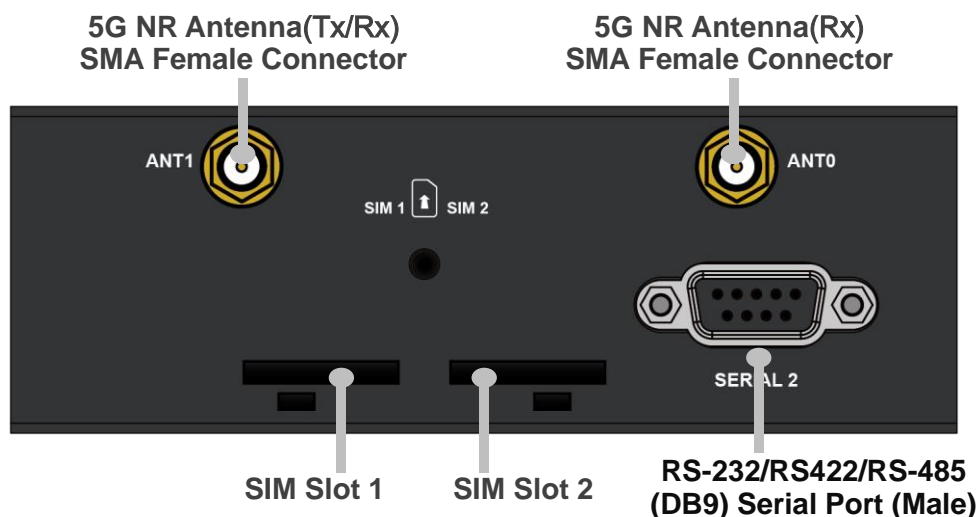
Connect to a Serial Device

Serial port 1 & 2 support RS232, RS485 and RS422, connect one end of the serial cable to the console port of the serial device.

Serial Port (RS-232, RS-485, RS-422) Pin Definition:

	RS-232 (DTE)	**RS-485**	**RS-422**
1	DCD (in)	Data – (in/out)	Tx – (out)
2	RX (in)	Data + (in/out)	Tx + (out)
3	TX (out)	X	Rx + (in)
4	DTR (out)	X	Rx – (in)
5	GND	GND	GND
6	DSR (in)	X	X
7	RTS (out)	X	X
8	CTS (in)	X	X
9	RI (in)	X	X

RS-232 Null Modem Connection:

DB9 Female
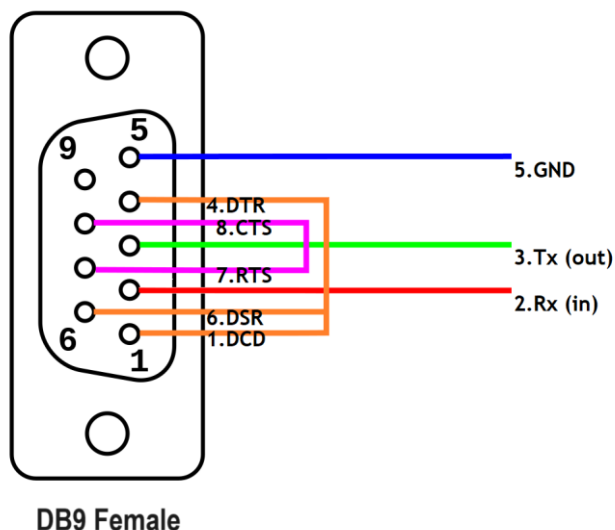
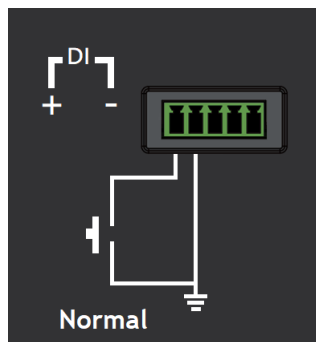## Digital Input & Console Terminal Block

Connect to a digital I/O device to monitor the statuses of measuring devices as well as the relays and operation switches of various types of control circuits.
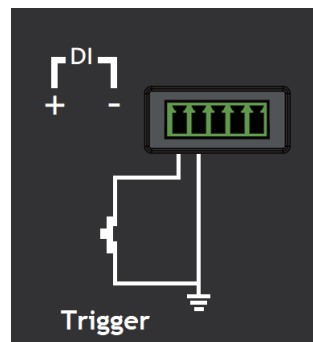
DI Port Switching Circuit

Action	Voltage
Normal (high)	DC 2V ~ 30V
Trigger (low)	DC 0 ~ 0.4V

Type 1:

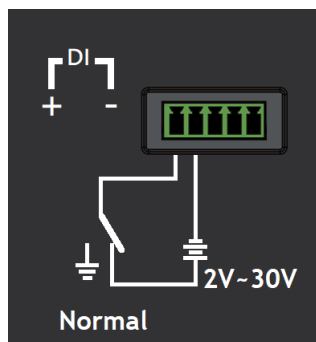Normal: Trigger:
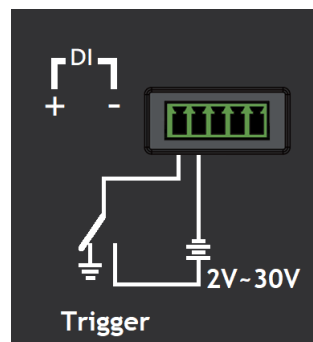
Type 2:

Normal: Trigger:

LAN Connection

Connect a Ethernet cable (Cat-5 or Cat-5e) to one of the LAN ports and the other side to the IED/ PLC/ PC's Ethernet interface. (*Note: LAN1 automatically becomes an ethernet WAN port when the ETH WAN internet interface is being selected in the GUI.)
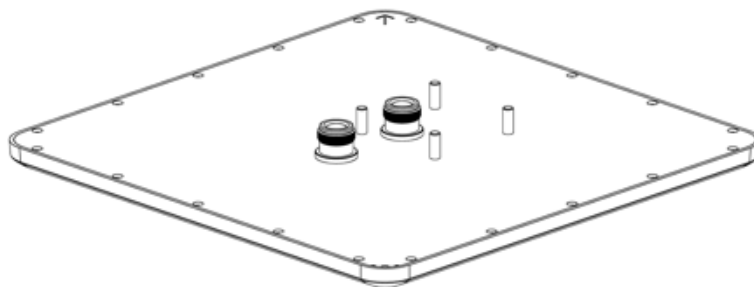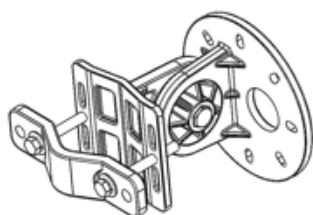
RESET Button

After the device is powered on, press it **6 seconds or above** to restore to factory default settings (this is used when you cannot login to the router, e.g., forgot your password).
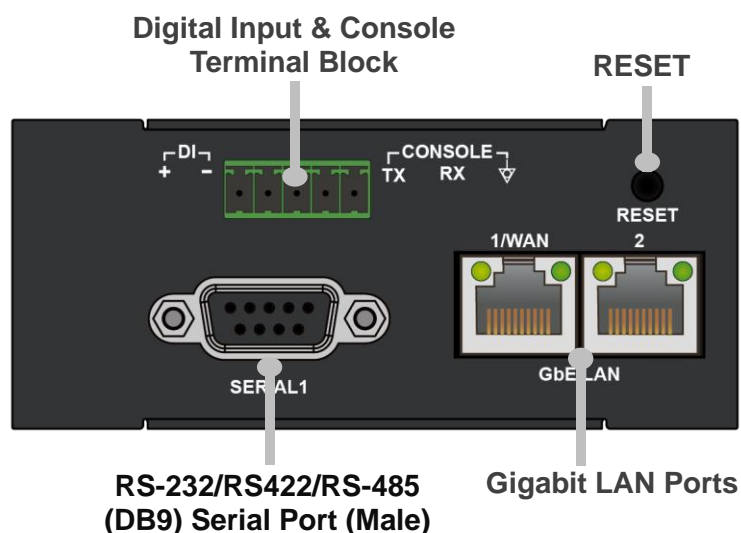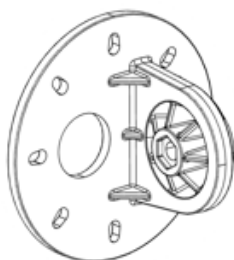
DA-N48-20-01-BL Installation Guide
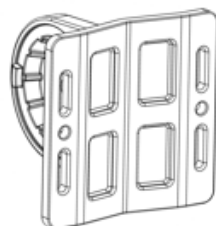
RT4R Die-Casting Mounting

- Easy Installation
- Flexible for a Wider Range of Pole Diameters
- Industry Grade Design & Reliability
- Heavy Equipment Supporting Capacity

Mounting Installation Package Content

- Mounting Kit:

Articulation Pole x 1

T-form Bracket x 1

M8x40 Screw Bolts x 1

M8 Nut x 1

M6 Nut x 4

Washer
M8 x 1
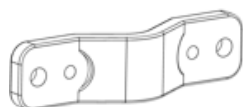M6 x 4

Spring Washer
M8 x 1
M6 x 4

- Wall Mount Installation Kit:

Wood Screw x 4
Wood / Gyprock Plug x 4

- Pole Mount Installation Kit:

W-Bar x 1

M6x60 Screw Bolts x 2

M6 Washer x 2
Spring Washer x 2

Stainless Hose Clamp x 2

Install articulation pole onto the antenna

Attach the articulation pole to back DA-N48-20-01-BL by using M6 nuts & washers.
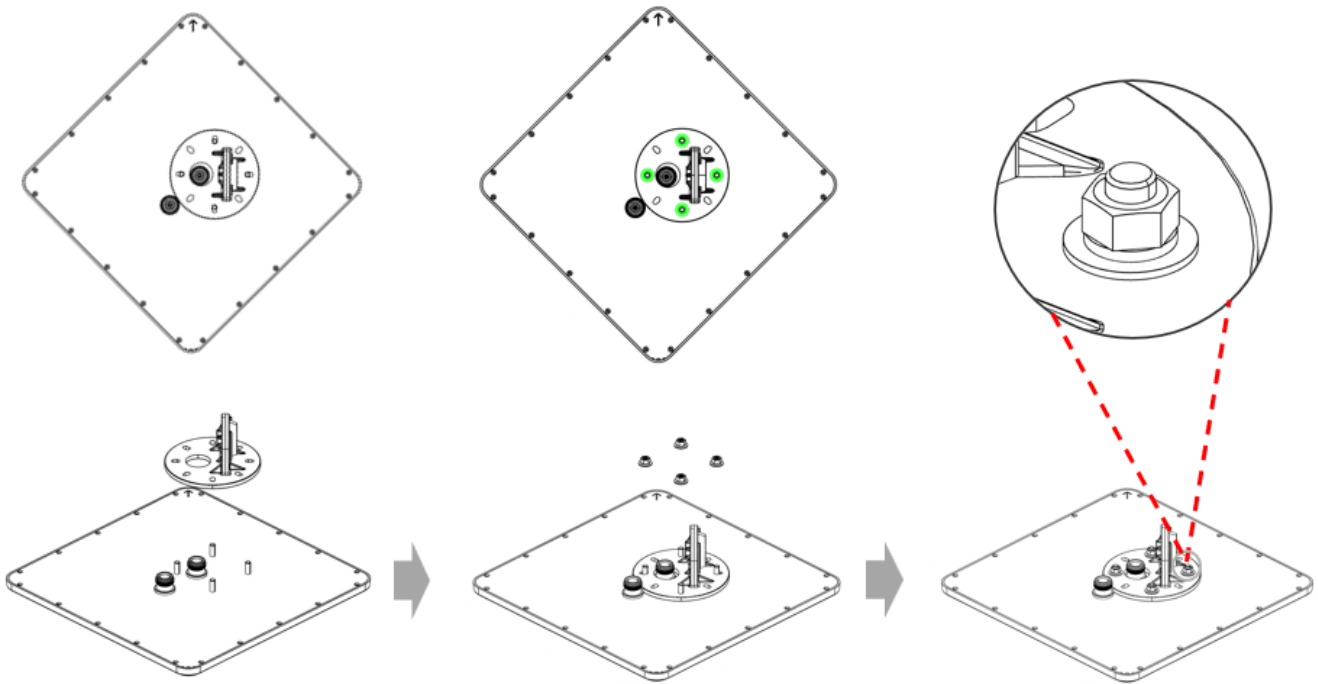
Installation for Wall

Fix the T-form Bracket to the wall by using the wood / gyprock screws.
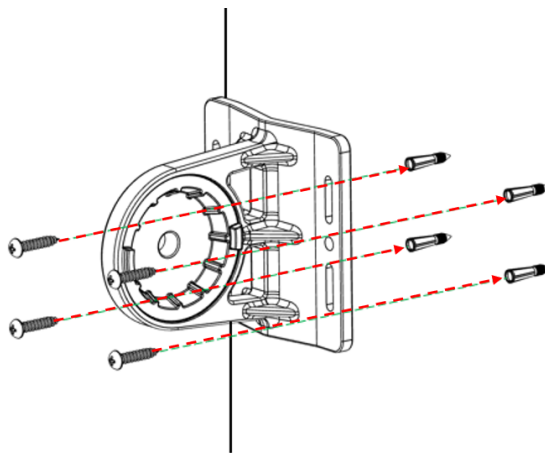
Installation for Pole

Mounting for Pole 1.5 to 3" (35~80mm)

Attach the T-from Bracket and the W-bar to the pole as shown in the above, then use M6x60 bolts, spring washer and washer to fix the mounting kit onto the pole.
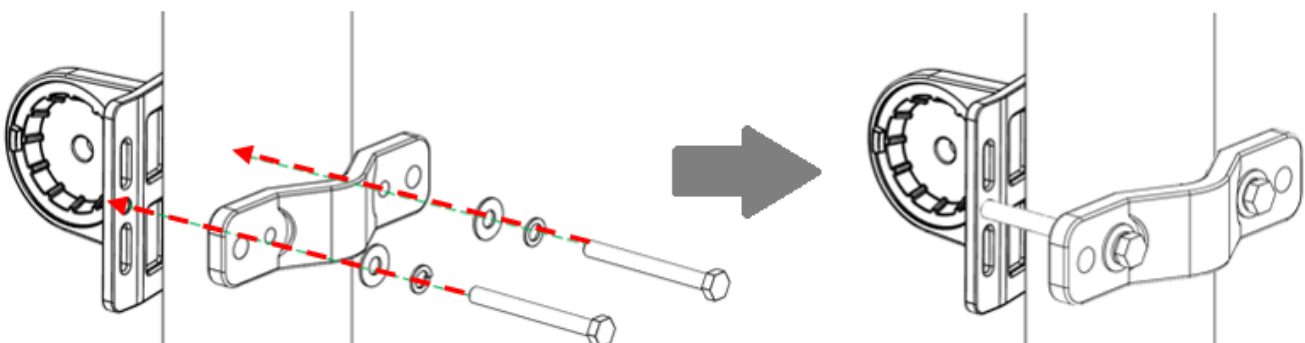
Mounting for Pole 1.5 to 3" (35~80mm)

Fix the T-from Bracket to the pole by using the stainless hose clamp.
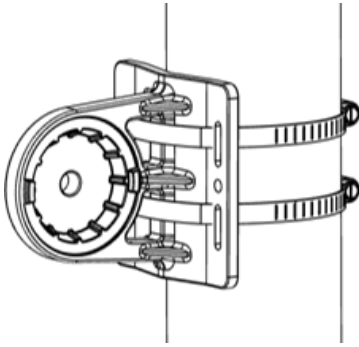
Install Articulation Pole with The T-formed Bracket

After finishing the previous two steps, fix the articulation pole to the T-formed bracket by using M8x40 bolts, nut, spring washer and washer.

LMR-240 5-in-1 Extended Cable

■ ANT0   ■ ANT2   □ GPS
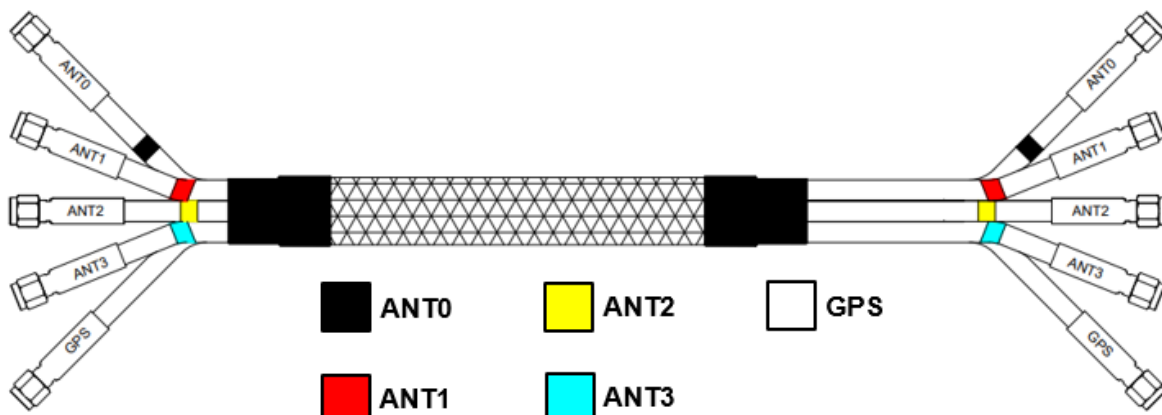
■ ANT1   ■ ANT3

Connect ANT1 & ANT3 to DA-N48-20-01-BL

Install N to SMA Adapter

Connect the N to SMA Adapter to ANT1 (Red) and ANT3 (Blue).

N to SMA Adapter x 2

LMR-240 Extended Cable
x 1

Straight SMA Adapter
x 1

R/A SMA Adapter
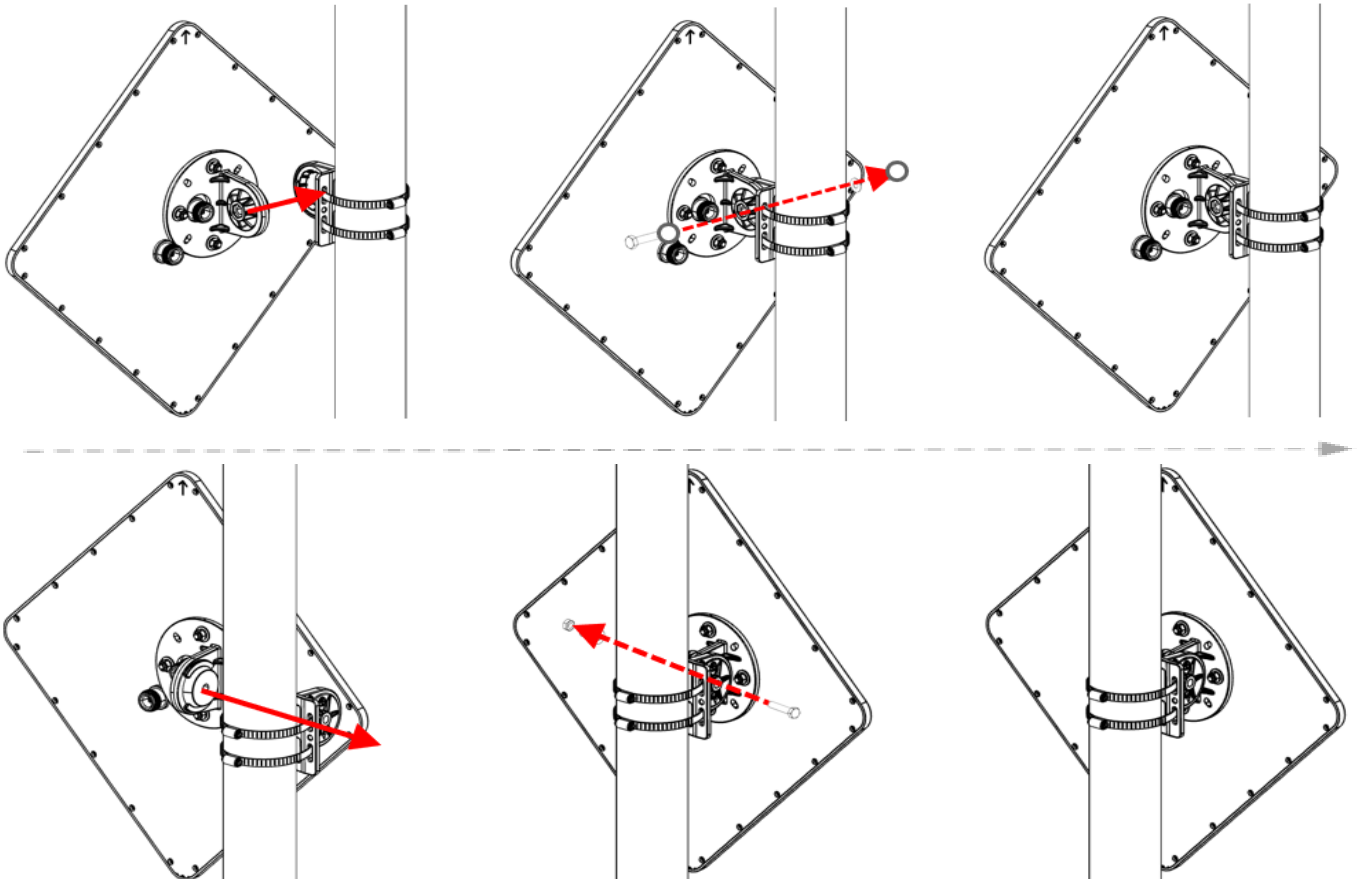x 5

ANT1

ANT3
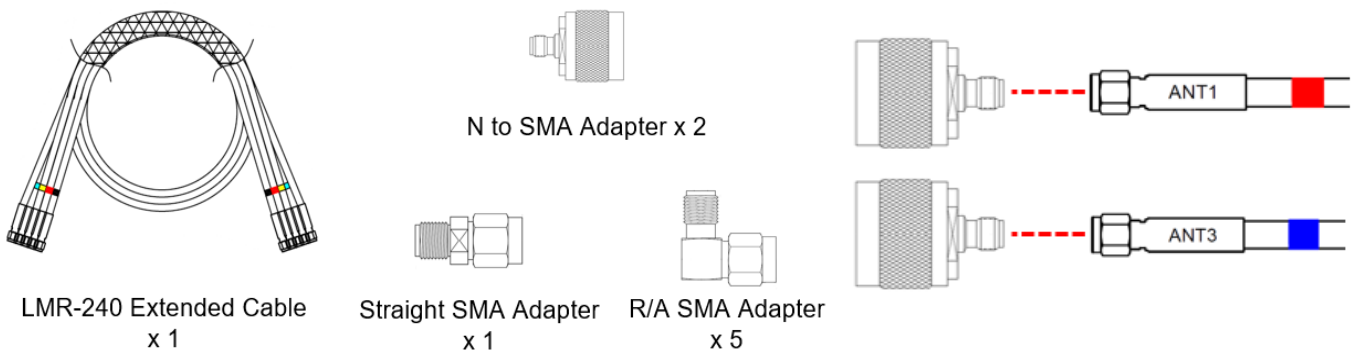
Connect the LMR-240 extended cable (N male) to antenna (N female).

(ANT1)

(ANT3)

ANT3

ANT1

ANT1

ANT3
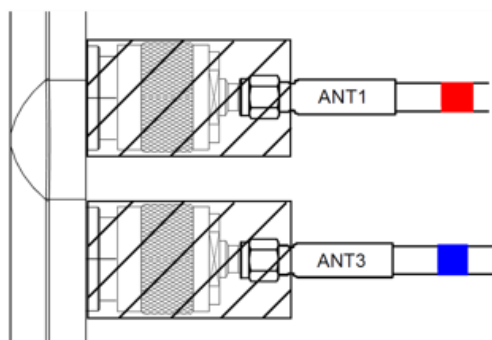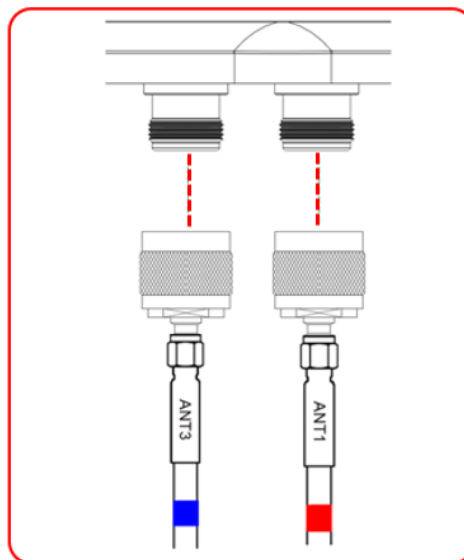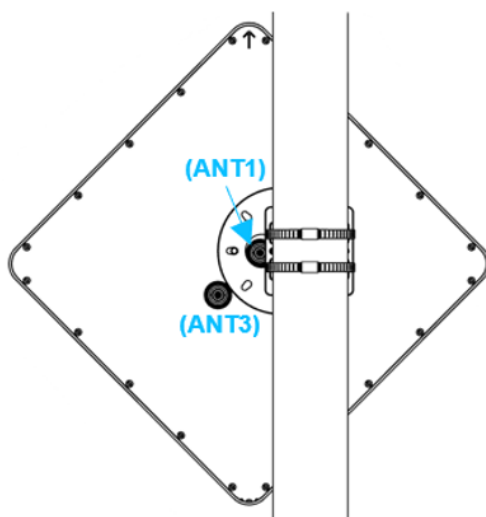
After finishing connection, bundle each SMA connector by using waterproof tape.

Install SMA & R/A SMA Adapter

GPS

ANT0

ANT2

ANT1

ANT3

STEP 1:
Connect the R/A SMA Adapter to each SMA male on the other end of LMR-240 extended cable.

STEP 2:
Connect the Straight SMA Adapter to the R/A SMA Adapter of ANT2 (Yellow).
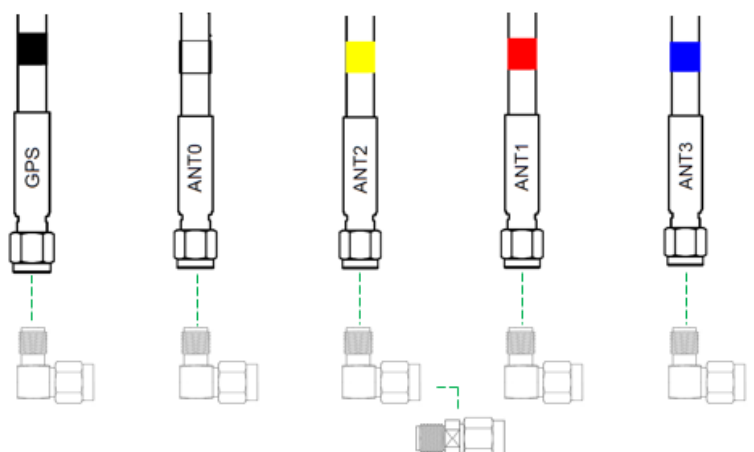
Connect LMR-240 5-in-1 Extended Cable to Device (in a cabinet)

After finishing the previous two steps, connect the LMR-240 Extended Cable to the corresponding connector of device which put in an outdoor cabinet.
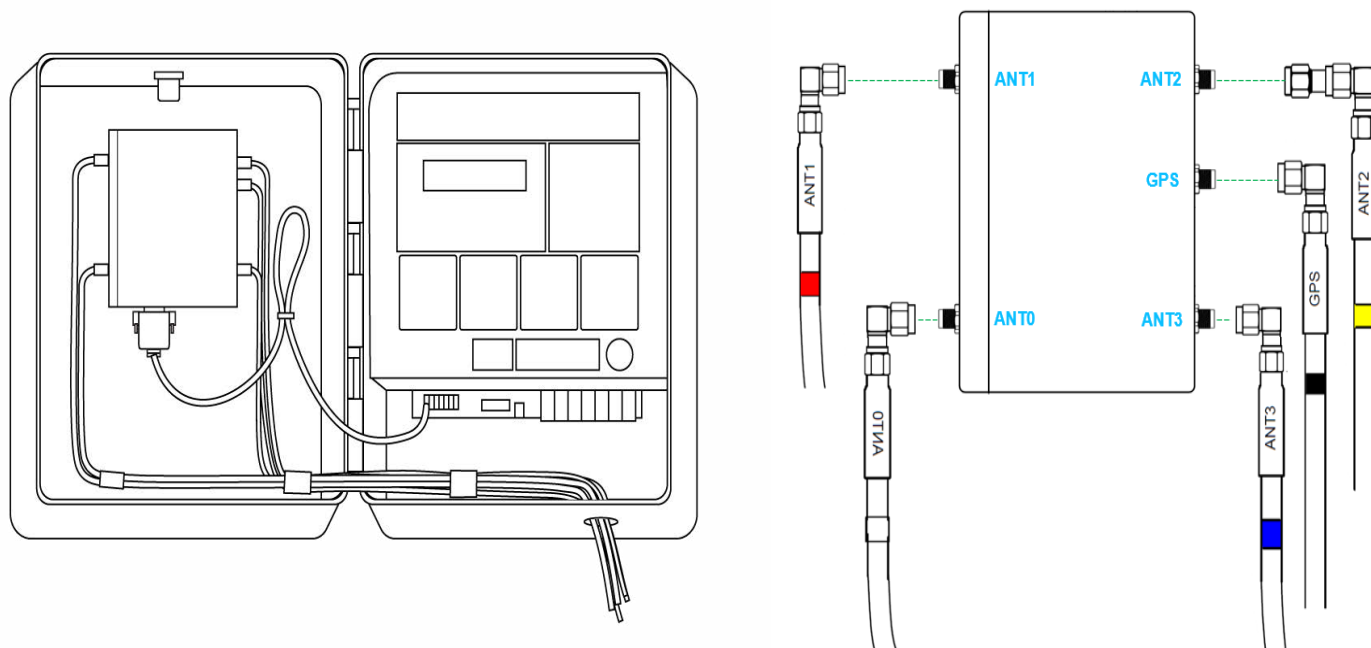
Hardware Installation

Before installation, please attach and fasten the wall mounting kit or din rail clip to the bracket holder of the MX-220-UT-5G-B.
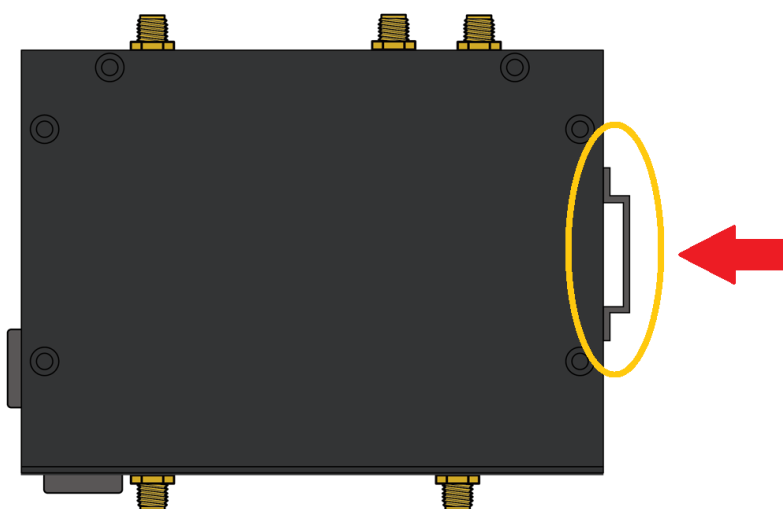
Wall MOUNTING

There is a mounting location on the bracket holder of MX-220-UT-5G-B to mount the Wall mounting kit. The Wall mounting kit is designed to securely attach and mount the MX-220-UT-5G-B onto a wall. Please follow the steps to complete wall mounting installation.

Step 1.
Install clip in the appropriate position. Attach and fasten the wall mounting kit to the bracket holder of the MX-220-UT-5G-B using two mounting screws included in this mounting kit.

Step 2.
1. Hold the wall mount up to the wall at the installation site and mark each screw location on the wall.
2. Screw the screws into the wall at each location and hang the wall mount on the two screws.
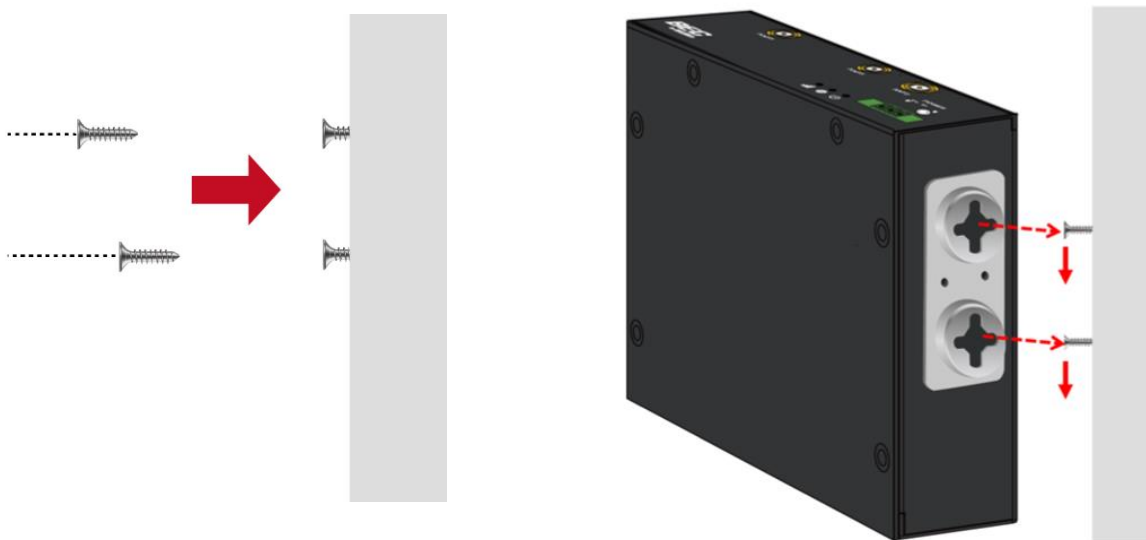
DIN RAIL MOUNTING

There is a mounting location on the bracket holder of MX-220-UT-5G-B to mount the DIN rail clip. The DIN Rail mounting kit is designed to securely attach and clip the MX-220-UT-5G-B onto a TS35 or standard 35mm top hat (EN 500022/BS 5584). Please follow the steps to complete the DIN rail mounting installation.

Attaching to a DIN Rail

Step 1.
Install clip in the appropriate position. Attach and fasten the DIN Rail clip (known as clip) to the bracket holder of the MX-220-UT-5G-B using two clip mounting screws included in this mounting kit.
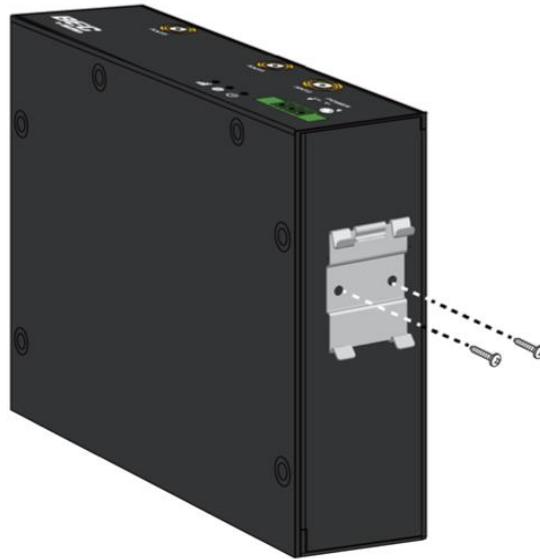
Step 2. Clip and secure the MX-220-UT-5G-B onto a DIN Rail.

❶ Hook the top of the clip onto the top edge of the DIN Rail. Make sure the clip is firmly against the rail.

❷ Push down the bottom of the MX-220-UT-5G-B to snap it onto the lower edge of the DIN rail.
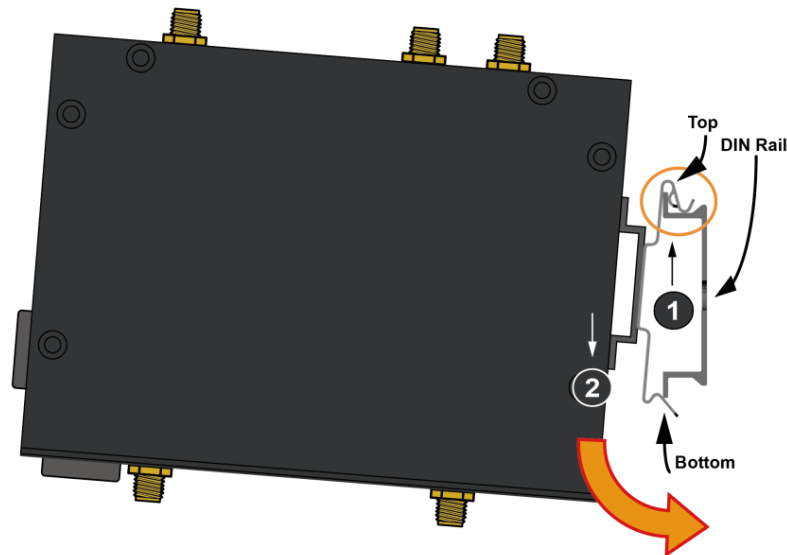
❸ The MX-220-UT-5G-B is now mounted on the DIN Rail.
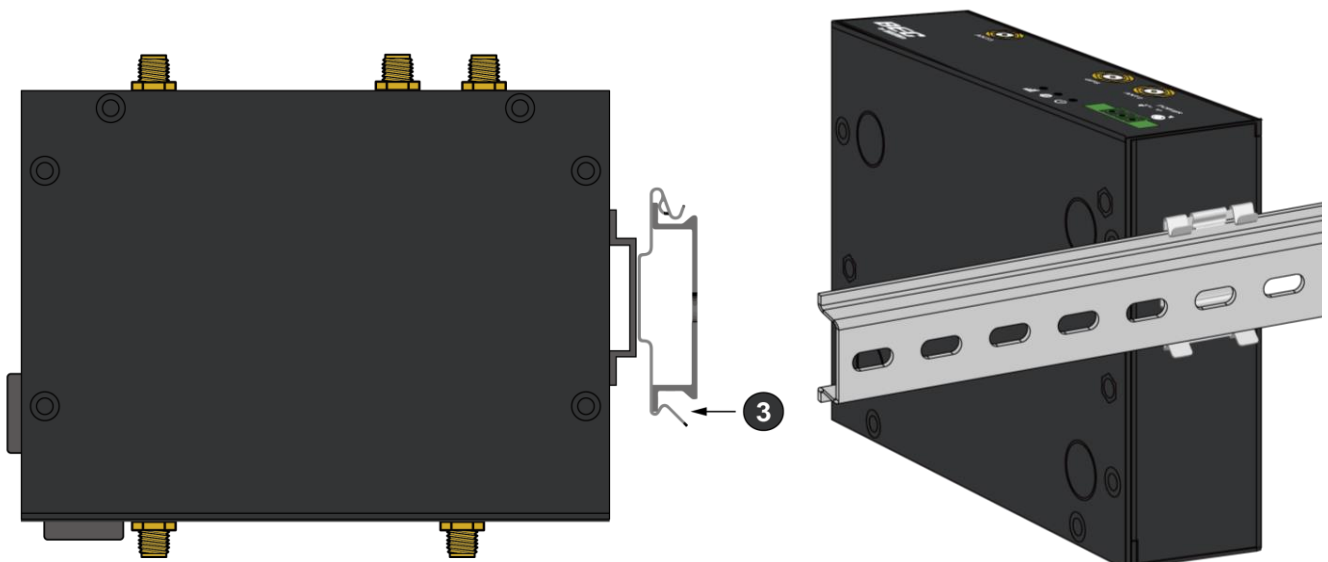
Removing from a DIN rail

❶ ❷ Remove MX-220-UT-5G-B from the DIN Rail. Push down the MX-220-UT-5G-B to free the bottom of the clip from the DIN Rail.
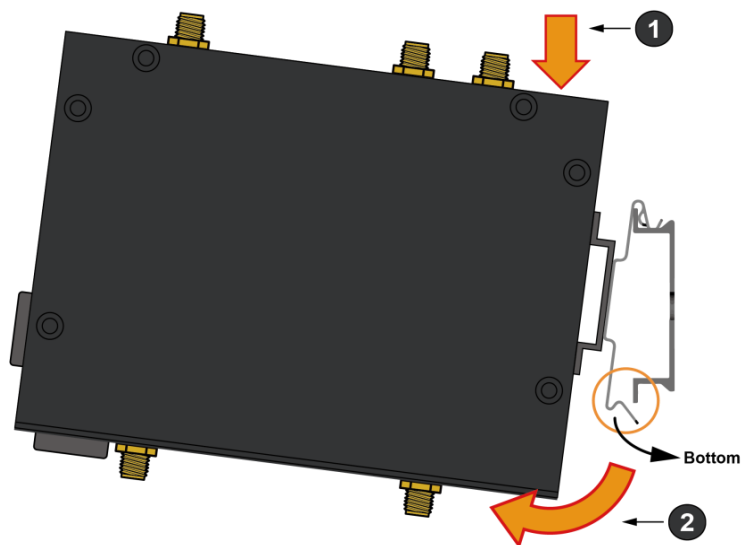
❸ ❹ Unhook the top of the clip and pull the MX-220-UT-5G-B away from the DIN Rail.
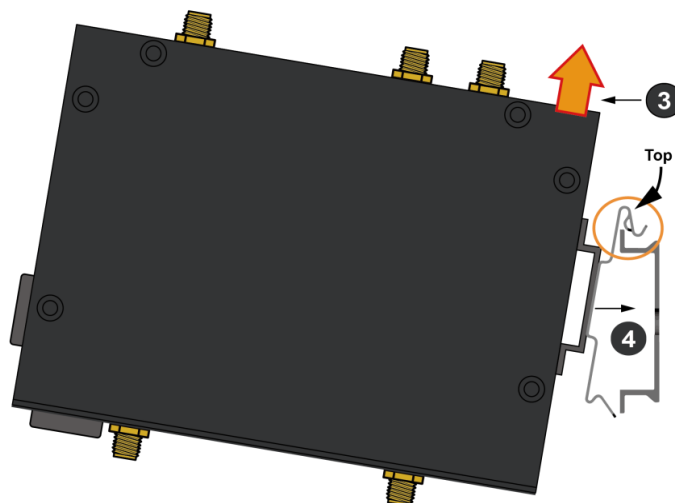
Connecting to the Router

1. Open the web browser and type **http://192.168.1.254** in the browser's address box. This number is the default IP address for this router. Press **Enter.**
2. A username and password window will appear. **The default username is "admin", and password is "admin"**. Press **OK** to proceed.
3. You will get a status report web page and main menu screen.

Contact Billion

WORLDWIDE
https://www.billion.com

BEC Technologiesn Inc. (U.S.A.)
https://bectechnologies.net

Federal Communication Commission Interference Statement

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.

CAUTION: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

FCC Caution:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1)This device may not cause harmful interference

(2)This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

RF Exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 35 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance..

Professional Installation Instructions

1. Installation Personal

This product is designed for specific application and needs to be installed by a qualified personal who has RF and related rule knowledge. The general user shall not attempt to install or change the setting.

2. Installation Location

The product shall be installed at a location where the radiating antenna can be kept 35cm from nearby person in normal operation condition to meet regulatory RF exposure requirement.

3. Antenna

Use only the antennas which have been approved by the applicant. The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power which may lead to the violation of FCC limit and is prohibited.

4. Installation Procedure

Please refer to user's manual for the detail.

5. Warning

Please carefully select the installation position and make sure that the final output power does not exceed the limit set force in relevant rules. The violation of the rule could lead to serious federal penalty.

CBSD Protocol

The SAS-CBSD protocol is based on the HTTPS (HTTP over TLS) protocol. The HTTPS protocol provides transport level assurance that a message has been received by the intended recipient. During discovery, the HTTPS protocol manages SAS-CBSD message delivery.

Communications between the CBSD and SAS are initiated by the CBSD when it is in an Unregistered state.
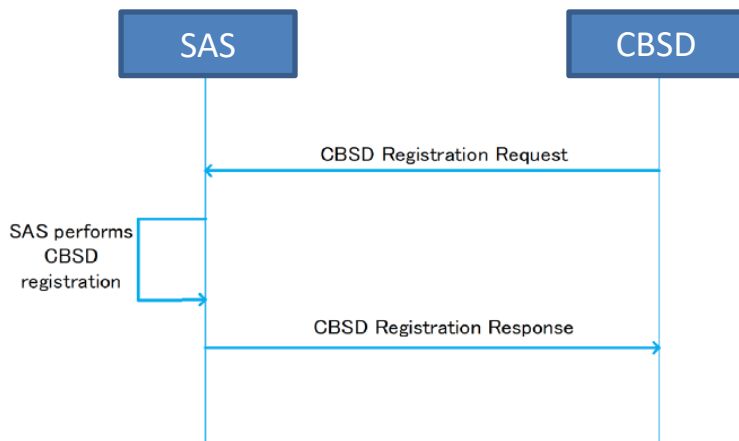
TLS mutual authentication shall be performed per whenever a CBSD communicates with a SAS. TLS-v1.2 shall be used to perform authentication. Previous versions of TLS (e.g., TLS-v1.1 per RFC-4346, TLS-v1.0 per RFC-2246 or SSL-v3.0) shall not be used. During the TLS exchange, mutual authentication shall be performed. The CBSD initiating the TLS connection shall authenticate the SAS, and the SAS shall authenticate the CBSD.

During the TLS message exchange, the CBSD shall authenticate a SAS. Server certificate validation shall be performed. A CBSD which is unable to successfully authenticate a SAS shall abort the TLS connection establishment procedure. It is implementation specific when the CBSD should re-attempt the TLS connection establishment procedure.

During the TLS message exchange, the CBSD provides its client certificate to the SAS. The SAS shall perform client certificate validation.

A SAS which is unable to successfully authenticate a CBSD shall abort the TLS connection establishment procedure. A CBSD which is unable to successfully setup such an encrypted connection with a SAS shall abort the TLS connection establishment procedure. It is implementation specific when the CBSD should re-attempt the TLS connection establishment procedure.

Subsequent to successful authentication, the CBSD and SAS shall negotiate a ciphersuite to use for encrypting all communications between the two entities. The ciphersuite shall be selected from the following list (ref. [n.1]):

• TLS RSA with AES 128 GCM SHA256

• TLS RSA with AES 256 GCM SHA384

• TLS ECDHE ECDSA with AES 128 GCM SHA 256

The CBSD first creates a secure association and then initiates the Registration procedure by sending a *RegistrationRequest* object to the SAS with parameters that identify the CBSD to the SAS, provide specific information on the CBSD equipment capabilities, and identifies the measurement reporting capabilities of the CBSD. Optionally the CBSD may request the SAS to enroll the CBSD as a member of one or more Groups. The SAS responds to the CBSD with parameters that indicate whether the registration succeeded or failed. If the CBSD has any existing Grants prior to sending the Registration Request, all Grants shall be deleted. If the SAS had any existing Grants assigned to the CBSD, upon receiving the Registration Request from the CBSD, all such Grants shall be deleted.