



**EtherHaul™ - Gigabit Ethernet Radio**

**Siklu**

**EtherHaul 1200™**

**Gigabit Ethernet Wireless Solution**

**Quick Installation & Setup Guide**

**EH-QINST-01**

**June 2012**



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This Quick Guide is intended as a handy reference for setting up the EtherHaul 1200™ 1ft Antenna. This guide does not replace the full manual; please refer to the “EH-1200 Install and User Manual” for full installation and setup details.

## Safety Notices

Do not install or operate this System in the presence of flammable gases or fumes. Operating any electrical instrument in such an environment is a safety hazard.

This apparatus is intended to be accessible only to authorized personnel. Failure to prevent access by unauthorized personnel will invalidate any approval given to this apparatus.

The installation and maintenance of the EtherHaul 1200 link should only be done by service personnel who are properly trained and certified to carry out such activities.

Make sure to disconnect all power cables before service!

This equipment must be permanently earthed for protection and functional purposes. Use a minimum amount of 16AWG grounding cable or according to local electrical code.

For DC (21 ÷ 57 VDC) connection use a 2-wire cable (14-18 AWG).

When connecting the ODU to a MAINS DC distribution system, 2 Ampere circuit breaker should be used to enable the central DC system to isolate the ODU in an emergency case.

One poly circuit breaker should be used and should be connected on the live voltage: (+) or (-). The other poly should be grounded.



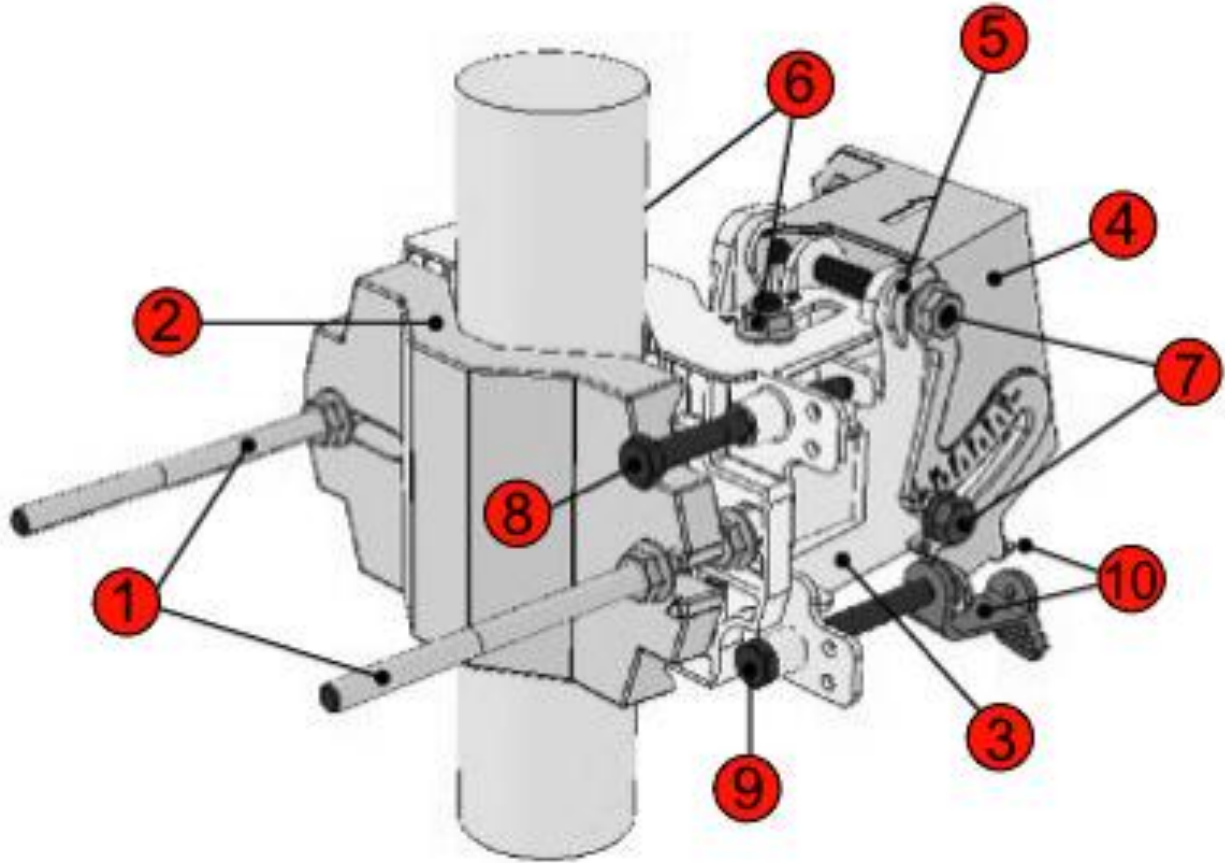
## 1. Installation Requirements

- Clear, unobstructed line-of-sight.
- The ODU must be mounted on a fixed, stable, permanent structure. A reinforced steel mounting pole is required, with a diameter measuring from 2-4 inches.
- All cabling connected to the ODU should be outdoor-grade, with UV protection.
- Shielded outdoor Cat5e cables terminated with metallic RJ45 connectors should be used.
- EtherHaul units must be installed in pairs, with installers at each end of the link aligning the antennas.

## 2. Required Tools

- Standard handheld digital voltage meter (DVM) with probes
- Standard open-end wrench, 13 millimeter
- Philips screwdriver (medium size head for grounding connection)
- Flat-head screwdriver (small size for DC connector)
- 8mm Allen key for ODU installation with 2ft antenna
- Cable ties (for securing network and optional power cables)
- Cutter
- Cable labelling

## 3. Mounting 1ft Antenna ODU



- |  |   |
|--|---|
| 1. Unit Mounting Screws and Bolts        | 6. Azimuth Adjustment Lock Bolts                      |
| 2. Back Mounting Bracket                 | 7. Elevation Adjustment Lock Bolts                    |
| 3. Front Mounting Bracket                | 8. Azimuth Fine Adjustment Screw ( $\pm 8^\circ$ )    |
| 4. Quick Release Plate (Attached to ODU) | 9. Elevation Fine Adjustment Screw ( $\pm 16^\circ$ ) |
| 5. Quick Release Hooks                   | 10. Elevation Screw Tension Band and Pin              |

Figure 1 - EtherHaul 1200 1ft ODU Mounting Assembly

1. Assemble the Mounting Bracket and attach it to the pole according to *Figure 1 - EtherHaul 1200 1ft ODU Mounting Assembly*.
2. Ensure that both Front and Back Mounting Brackets are attached evenly to the pole, and are completely level.
3. Use the 13mm open wrench to tighten the nuts on both Unit Mounting Bolts. Temporarily tighten the Unit Mounting Bolts at this stage to keep the unit from moving freely.

4. Unpack the ODU, being very **careful not to touch or scratch the Radome**. Do not rest the ODU face down!
5. By default, the ODU is delivered with the Quick Release Plate (❹) securely attached in a vertical polarization. If necessary, change the ODU polarization position to match the orientation of the remote ODU by removing the Quick Release Plate, changing its orientation, and reattaching. For ease of reference, the markings “V” (vertical) and “H” (horizontal) are engraved on the back side of the ODU.
6. Examine the position scales of both the Azimuth Adjustment Lock Bolts (❺) and the Elevation Adjustment Lock Bolts (❻), found on the Front Mounting Bracket, and ensure that they are positioned at 0 degrees (in the middle of the scale).
7. Position the Quick Release Hooks (❸) onto the top Elevation Adjustment Lock Bolt (❻) and carefully set the ODU in place on the Front Mounting Bracket.
8. Unlock the Azimuth Adjustment Lock Bolts (❺) and the Elevation Adjustment Lock Bolts (❻).
9. Stretch the Elevation Screw Tension Band (❿) slightly and connect it to its mating Tension Pin, located on the Quick Release Plate.

## 4. Mounting 2ft Antenna ODU

1. Install the two foot antenna according to the antenna mounting kit installation instructions available inside the 2ft antenna mounting kit package.
2. Remove the protective tape on the antenna feed.

The 2ft ODU is shipped with External ODU adapter attached as presented in Figure 2.



Figure 2 EtherHaul 1200 2ft ODU

3. Unpack the 2ft ODU and remove the protective cap.
4. Attach the ODU to the antenna and tight the 4 locking bolts using 8mm Allen key.
5. Make sure you install the ODU with the required polarization (note the polarization arrow on the back of the ODU) as presented in Figure 3.

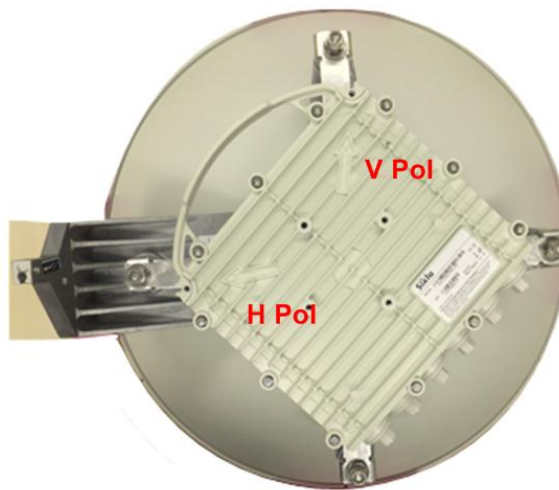
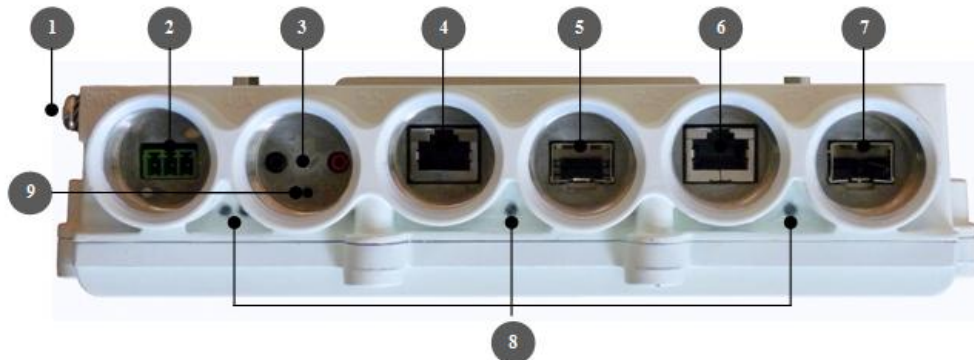


Figure 3 EtherHaul 1200 2ft ODU mounted on 2ft Antenna

## 5. Connecting the Cables

Figure 4 shows the ODU interfaces. There are two Ethernet interfaces, Eth1 and Eth2. For each of these interfaces, you can choose between an optical (Fiber Cable SFP) and electrical (Ethernet Cable RJ45) physical interface. A power over Ethernet (PoE) connection can only be made via the first Ethernet RJ45 interface (RJ1).



- |  |   |
|--|---|
| 1. Electrical Ground Outlet (GND)      | 6. Ethernet Cable RJ45 Interface (RJ2)                                      |
| 2. Power Connector Interface (PWR)     | 7. Fiber Cable SFP Interface (SFP2)   |
| 3. DVM Probe Interface (AUX)           | 8. System LEDs  |
| 4. Ethernet Cable RJ45 Interface (RJ1) | 9. Reset Button (press for more than 5 seconds to restore factory defaults) |
| 5. Fiber Cable SFP Interface (SFP1)    |   |

Figure 4 EtherHaul 1200 Connection Panel Details

1. Connect one end of the Grounding Cable to the Ground Outlet on the left side of the ODU using the Grounding Cable Lug and tighten it securely in place.

Connect the opposite end of the Grounding Cable to the earth connection, typically located on the mounting pole.

Use a minimum amount of 16AWG grounding cable or according to local electrical code.
2. Use a 2-wire cable (14-18 AWG) to connect the power supply to the ODU. On the ODU DC terminal, connect only the (+) and (-) wires. Do not connect to the ODU's GND input.

The DC power input range of the ODU is 21 ÷ 57 VDC.

The DC supply should be limited to 2 Ampere to avoid surges and possible damage to the ODU. For that, limited power supply or circuit breaker should be used (fast-blow fuse). The circuit-breaker is the disconnecting device, and should be readily accessible.

**Note:** When connecting the ODU to a MAINS DC distribution system, 2 Ampere circuit breaker should be used to enable the central DC system to isolate the ODU in an emergency case.

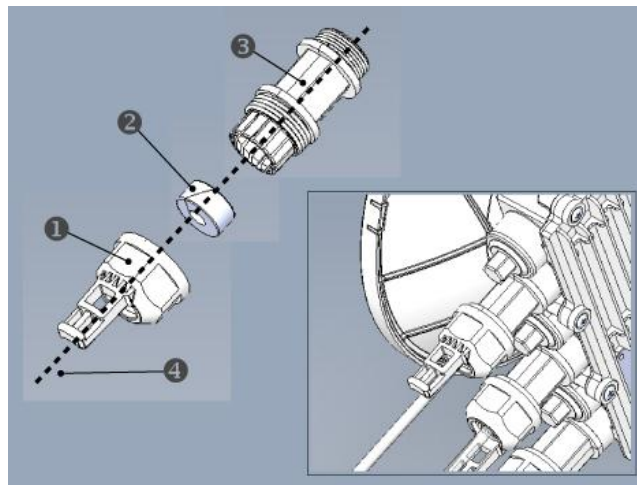


One poly circuit breaker should be used and should be connected on the live voltage: (+) or (-). The other poly should be grounded.

The circuit breaker should be connected to the (+) or (-) live voltage.

The DC input is floating, so either (+) or (-) can be connected to the GND on the power supply side. For the sake of consistency with other systems, Siklu recommends that you connect the (+) to the GND.

3. Before inserting a cable connector into the ODU, you must first enclose the cable connector in a protective All-Weather Shell as described in Figure 5. A kit with 3 sets of All-Weather Shells are provided with the ODU for the ODU interfaces.



- |                         |                             |
|-------------------------|-----------------------------|
| 1. Cable Inlet Portion  | 3. Connector Outlet Portion |
| 2. Rubber Gasket Insert | 4. Cable                    |

Figure 5 All-Weather Connecting Cable Shell Assembly

Three sets of Rubber Gasket Insert are provided for different cable diameters, from 3.5mm to 9.0mm cables.

4. For each ODU cable connection, perform the following procedure:
  - a. Disassemble a protective shell by unscrewing its parts and carefully removing the Rubber Gasket Insert (❷) from the Cable Inlet Portion (❶) of the shells
  - b. Thread the cable connector through the Cable Inlet Portion (❶) of the shell, through the Rubber Gasket Insert (❷) and through the Connector Outlet Portion (❸).
  - c. Connect the cable connector to the ODU interface.



- d. Screw the Connector Outlet Portion (③) to the ODU firmly by hand (do not use tools).
- e. Insert the Rubber Gasket Insert snugly into the Connector Outlet Portion (③) of the shell.
- f. Screw the Cable Inlet Portion (①) to the Connector Outlet Portion (③) firmly by hand (do not use tools).
- g. When removing All-Weather Shell, make sure to unscrew the Cable Inlet Portion (①) first, making sure the Connector Outlet Portion (③) does not move and only then remove the Connector Outlet Portion (③) from its ODU port.

Upon connecting power (DC or PoE), the PWR LED color indicator will turn red for one second, then blinking green during power up. Wait for the PWR LED to turn steady green, indicating that the ODU is powered on.

Figure 6 shows an installed EH1200 ODU.



Figure 6 Installed EtherHaul ODU

## 6. System Leds

LED	Color	Description
PWR (Power)	Green – Power OK	Blink Green – Device boot
	Red – Power Failure	
	Off – No Alarms	
RF	Green – Link Up	Blink Green – RF activity
	Orange – Alignment Mode	
	Off – Link Down	
ETH1/2:	Green – Link 1G	Blink Green – 1G activity
	Orange – Link 10/100	Blink Orange – 10/100 activity
	Off – No Link (Carrier)	

## 7. Aligning the Antenna

The ODU antenna must be aligned on both local and remote ODUs. You must first perform coarse alignment on each ODU, followed by fine alignment. Accurate alignment of the ODU is critical for achieving the strongest possible receive signal.

In order to perform antenna alignment, the ODU must be in Alignment Mode.

Switch the EtherHaul ODUs to Alignment Mode by inserting the DVM probes into the DVM Probes at the AUX Interface. Following this action, the RF LED colour indicator will turn orange, indicating the ODU is in Alignment mode.

The ODU will remain in Alignment Mode even if the DVM probes are ejected, until the ODU is rebooted.

1. Loosen the Unit Mounting Bolts (❶ Figure 1) slightly in order to allow the ODU some freedom of movement.
2. Perform a coarse Azimuth alignment using a line-of-sight visual check with the remote EtherHaul ODU. Lock the Unit Mounting Bolts (❶) using the 13mm open wrench.
3. Connect the DVM to the ODU by inserting both red and black probes into their appropriate positions in the AUX port.
4. Read the receive level (RSSI) using the DVM. The voltage reading will be between 0 to 1V, indicating the RSSI in dBms. For example, a DVM reading of 0.45 V is equivalent to -45 dBm.
5. Align the fine azimuth axis. Use the 13mm wrench to adjust the Azimuth Fine Adjustment Screw (❷). Be sure to sweep the complete range of the azimuth in order to determine the maximum received signal strength position.

6. Align the fine elevation axis. Use the 13mm wrench to adjust the Elevation Fine Adjustment Screw (Ⓔ). Be sure to sweep the complete range of the elevation in order to determine the maximum received signal strength position.

**Note:** When aligning an antenna, the antenna in the remote node must remain completely stationary. Fine alignment is performed first on the local antenna, and only afterwards on the remote antenna.



The optimum alignment may require several adjustment iterations between the local and remote antennas.

7. Use the DVM to verify maximum received signal strength on both local and remote ODUs. For best performance, measured RSSI should be within  $\pm 4$  dB of the calculated value.
8. Once the optimum position has been achieved for the ODU pair, tighten the azimuth adjustment lock bolts (Ⓕ) on one ODU.
9. Tightening the azimuth adjustment lock bolts will tilt the ODU, so realign the elevation again for optimum position.
10. Once the optimum position has been achieved for the ODU pair, tighten the elevation adjustment lock bolts (Ⓖ) on the ODU, being very careful not to move the ODU when tightening.
11. Use the DVM to verify that the received signal strength has not changed on either the local or the remote ODU after final tightening of the brackets.

Antenna alignment is now complete.

## 8. Initial System Setup

1. Disconnect the DVM from the ODU by removing the probes from the AUX port.
2. Reboot both ODUs by gently pressing the ODU Reset Button. This returns the ODU to Adaptive Mode (ODU's default operational mode). Following this action, and after the ODU has finished rebooting, the RF LED color indicator on both ODUs will turn Green, indicating that the radio link is Up.
3. Carefully reinsert and tighten using the 13mm open wrench the AUX port protective seal.

The EtherHaul 1200 link can now pass traffic and management between the ports and over the radio link.

For radio link configuration, connect to the ODU using Command Line Interface (CLI) or web-based management (Web EMS).

## 9. Performing Basic Configuration Using the Web EMS

**Note:**



The following section details the basic configuration steps and parameters only. For full screens and parameters description, refer to the “EH-1200 Install and User Manual”.

1. Launch an Internet browser and enter the ODU's IP address in the address bar. For the default IP address enter: <https://192.168.0.1>.
2. Wait for the Java Applet to load and enter the username and password (default read/write access: admin, admin). The Web EMS Main screen will be displayed.

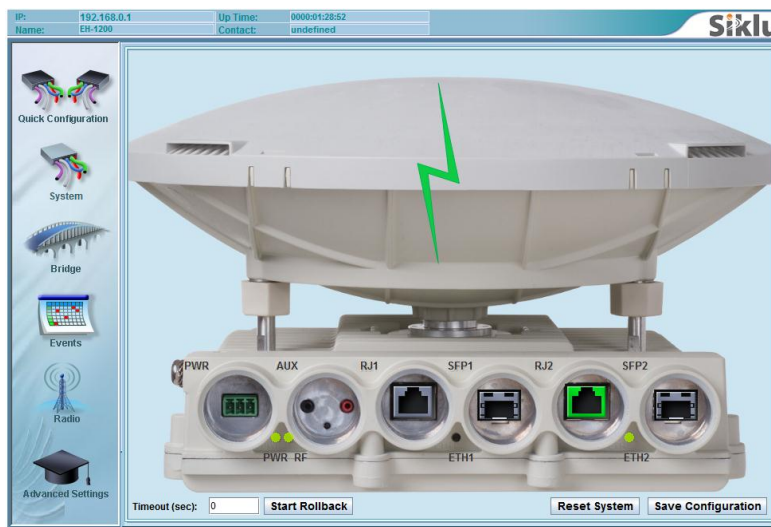


Figure 7 Web EMS Main Screen

**Note:**



Initial configuration can be done using the Quick Configuration screen, summarizing the basic configuration steps required upon installation of a new link. To view the ODU configuration, and to configure further parameters, use the specific configuration screens, as described hereunder.

3. To view and configure system information, click **System** on the Web EMS Main screen. The **System** screen is displayed. Select the **System Information** section and set the following parameters:
  - o Name – ODU name
  - o Date b– in YYYY.MM.DD format
  - o Time – in HH:MM:SS format

When you are finished, click **Apply**.

4. To view and configure IP address, select the **IP** section on the **System** screen and edit the default IP address:
  - o Index (#) – 1

- IP Address – for example 192.168.0.100
- Prefix Length – in mask bits (for example 24, equivalent to Mask 255.255.255.0)
- VLAN – 0 (not defined, meaning the IP is not associated with specific VLAN)

**Caution:**



If you change the default IP address, your connection to the ODU will be lost. To re-establish a connection, launch an Internet browser and connect using the new IP address.

When you are finished, click **Apply**.

5. To view and configure the IP default gateway and static routes, select the **Route** section on the **System** screen and add default gateway as static route (by default, no route is defined):
  - Index (#) – 1
  - Destination – 0.0.0.0
  - Prefix Length – 0
  - Next Hop – for example 192.168.0.254

When you are finished, click **Apply**.

6. To view and configure the Ethernet ports parameters, click the icon of the interface you want to configure on the EMS Web Main screen. The **Interface** screen is displayed. In the Interface section, you may set the following parameters:
  - **Admin Status** – Determines whether the port is enabled (**up**) or disabled (**down**). Default value is **up**.
  - **Oper. Status** – Displays (read-only) the operational status of the port - **up** or **down**.
  - **Auto Negotiation** – Determines whether or not auto-negotiation is enabled (**enabled**) or disabled (**disabled**). Default value is **enabled**.
  - **Ethernet Type** – When Auto Negotiation is disabled, select the port's speed manually in this field (10/100/1000, HF/FD). When using the SFP physical port, set this field to **1000xfd**. Default value is **1000fd** (Electrical RJ45, 1000 Full-Duplex).
  - **Ethernet Actual Type** – Displays (read-only) the port's actual speed/duplex (after negotiation).

The EtherHaul system includes four Ethernet interfaces:

**Note:** Host – Management interface



Eth0 – Radio interface

Eth1 – ODU interface, port 1

Eth2 – ODU interface, port 2

User may configure only Eth1 and Eth2.

**Note:**



Auto-negotiation and Ethernet Speed/Duplex (in case Auto-neg disabled) must be identical on the ODU port and the end-equipment port.

When you are finished, click **Apply**.

7. To view and configure RF parameters, click **Radio** on the Web EMS Main screen. The **RF** screen is displayed. In the **Radio** section, you may set the following parameters:
  - **Frequency (MHz)** – Select a frequency from channel list (default values is 74375).
  - **Channel Width (MHz)** – 250MHz or 500MHz. Default value is **500**.
  - **Role** – Determines whether the ODU functions as a master or slave. In a link, one side must be set to **Master** and the other side must be set to **Slave** (required for link synchronization). Default value is **Auto**, meaning the role will be set automatically by the link. You can check the current set role in the **Role Status** field.

Manually setting the Role is possible but necessary only for asymmetric configurations.

- **Transmit Asymmetry** – Default value is symmetric configuration: 50% for Tx and Rx (**50tx-50rx**). For an asymmetric configuration (75%/25% or 90%/10%), you will have to manually configure the Role and set the Master unit to **75tx-25rx (or 90tx-10rx)** and the Slave unit to **25tx-75rx (or 10tx-90rx)**.
- **Mode** – Default value is **Adaptive** (Adaptive Bandwidth, Code and Modulation), meaning the ODU will switch to the highest modulation profile available by data-rate license and link condition.

The modulation profile the ODU has reached is available in the **Modulation, Sub-Channels, Repetitions** and **FEC** fields.

- **Operational Status** – Displays the radio link status (**Up** or **Down**).
- **RSSI (dBm)** – Displays the Receiver Signal Strength Indicator.
- **CINR (dB)** – Displays the Carrier to Interference + Noise ratio, which indicates the radio link's signal quality. In normal conditions,  $CINR \geq 17$  indicates a good signal quality.
- **Tx Power (dBm)** – ODU's transmit power (+5 to -35dBm).

## Caution:



Changing the Radio parameters cause radio link failure and loss of management to remote ODU. Make sure to change configuration at Remote ODU first.

When you are finished, click **Apply**.

8. To view the loaded license configuration, click **Advanced Settings** on the Web EMS Main screen. The **Advanced Settings** screen is displayed. Select the **Licensing** section to view the current enabled licenses (features-set and data-rate).
9. To save the ODU's configuration, click **Save Configuration** on the Web EMS Main screen.

## Note:



If you do not click **Save Configuration**, saving the currently running configuration to the startup configuration, all changes made will be lost upon the next ODU reset.

## 10. Link Verification and Commissioning

1. Physical installation verification
  - Antenna mount secured and lock bolts tightened
  - Connectors were properly sealed
  - ODU is grounded
2. RF link verification:
  - RF link is up (RF operational status in Web EMS is up)
  - Receive Signal Strength Indication (RSSI) achieved in Alignment Mode is within +/-4dB of the expected value
  - Carrier to Interference + Noise Ratio (CINR) is 17 or higher
  - Link's modulation is according to the data-rate license