AirLight™ Installation and User Manual

Millimeter-wave Radio Communication System

AirLight™

71~76/81~86GHz Series – NTE1GQ

COMMUNICATION MOTIVITY

COMOTECH CORPORATION

AirLight ™

71~76/81~86GHz Series – NTE1GQ

FCC ID : RL3NTE1GQ

Warning : This device is a high powered transceiver that operates at frequencies that

Could be potentially harmful to human tissue if the following precautions are not taken,

(1) Minimum safe operating distance of 3.0meters must be observed at all times

Between unit and users*

(2) Unit shall be mounted so that minimum operating distance is not inadvertently

Impinged by the general public, or non user personnel.

*Please see exposure limits listed in FCC §1.1310

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1. Introduction

1-1. AirLight™ Family

AirLight™ applies the original Comotech technology to millimeter-wave as 70/80GHz licensed frequency band and 60GHz unlicensed, and provides the system which supports wireless transmission of various types of digital signals, such as 1.25Gbps, 2.5Gbps gigabit Ethernet as well as 2.4576Gbps CPRI. Especially, product flexibility is provided to determine the desired standards depending on user requirements.

1-2. Advantages of AirLight™ Series

√ Full-duplex 1Gbps FDD

√ Link Distance – Up to 16 miles (26km)

√ Forward Error Correction

√ Easy Antenna/ODU Assembly – Field detachable ODU by using catch clip.

√ High Data Transmission Speed – The systems with various speeds 300Mbps to 1Gbps according to its modulation can be serviced and supported in accordance with application.

√ High Security and Frequency Reuse – Good security is guaranteed by high directivity, and the reuse of frequency in the unit of small-cell is possible due to the frequency characteristics of the millimeter wave.

NTE1GQ-24   NTE1GQ-12

Figure 1-1 AirLight™ ODU

1-3. AirLight™ Features

AirLight™ has the following features.

▶ **Next Generation Communication Technology**

√　Integration of high tech

√　Digital direct conversion

√　Good security

√　Data acceptance capability with high capacity

√　Low power consumption

▶ **Wireless and Fiber Distributed Network Configuration**

√　Possible to connect to the system using binary digital signals

√　Support up to 1Gbps speed

√　Support of various interfaces: FDDI, UTP, etc.

√　Possible to design in compliance with the communication regulation of each country (FCC, TELEC, ITU-R)

▶ **Low Cost and High Efficiency**

√　Possible to configure very high speed network with the low cost

√　Low maintenance and repair cost without laying

√　Possible to install/operate with the small number of persons (1 or 2 persons)

√　Possible to send the data with high capacity, flexibly connect to another system

√　Possible to connect to IP network

√　The same transmission efficiency as the wired one

▶ **Efficient Network Management**

√　Provision of the efficient network management program

√　Support of network management to check the AirLight™ state

1-4. AirLight™ Application

AirLight™ is an ultra high speed wireless LAN communication product. Configuring the wireless network with Point-to-Point among large buildings makes it possible to communicate the data with the adjacent system through the wireless network. This configuration can replace the area difficult to lay the optical cables and communication facilities requiring high security. The wired and wireless double security management system, Using both network among banks in the neighborhood, and the regional administration network can be immediately configured. When LAN is configured in the area where buildings such as schools are stand close together, capability expansion is needed, or the current communication network is to be repaired, use it for a temporary installment to provide the stable communication service.

-- **Low Cost for Maintenance and Repair** --

AirLight™ can be installed by only a few workers one or two. The maintenance cost during line operation is extremely low compared to the optical cable, so there is an economical aspect of saving the cost. Furthermore, when the construction of the optical communication network in communication service isn't provided due to the man-made or natural disaster, the service can be seamlessly provided using AirLight™ during the recovery of the optical communication network.

-- **Large Capability of Data Transmission** --

The current communication market requires more data transmission capability. The network configuration between cities can be achieved by laying the optical cable, but laying the optical cable in the city requires a lot of cost and time.

Using AirLight™, there all the problems can be solved in the place that needs LAN communication with large capacity of transmission in the downtown area.

-- **Easy to Expand the Capacity** --

When additional lines are needed due to the increase of subscribers in the specific area or data processing capacity needs to be expanded, setting up AirLight™ can make the communication service quality improved and the capacity expanded.

▶ **Financial Network**

Financial networks require very high reliability and very low propagation delay for real time trading process.

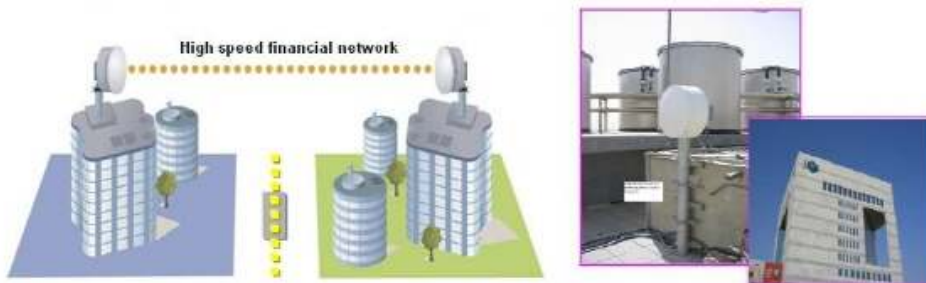AirLight™ series are proven in the field for a long time.

Figure 1-2 Financial Network

▶ **Hospital Campus Network**

The AirLight™ series provide high capacity point-to-point service to hospital and campus networks which connect existing local building and newly built remote building
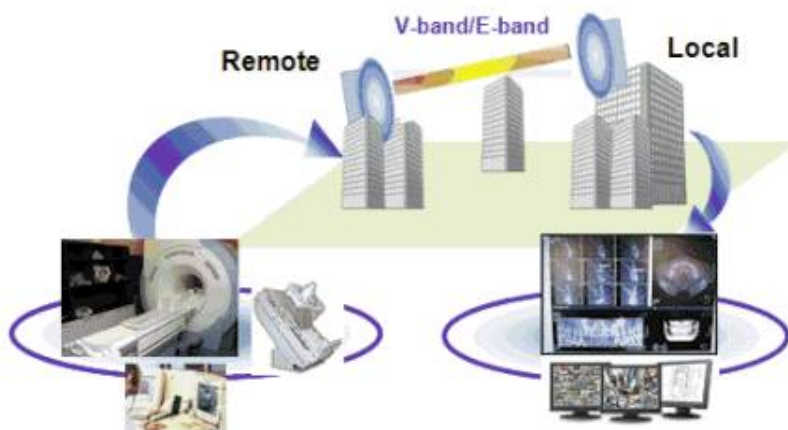
Figure 1-3 Hospital Campus Network

▶ **FWA (Fixed Wireless Access)**

Sharing various communication systems, which are separated from each network, through AirLight™ is available. A network which consists of telephones, cameras, PC's can be connected to another network through AirLight™. Therefore, the two networks can construct a separate private network.

Figure 1-5 FWA (Fixed Wireless Access)

▶ **Security & Internet**

In case of implementing the centralized management by grouping CCTV security systems in a company, a new transmission line is needed. AirLight™ can handle all of these matters. In case of using the current wired network and the wireless network with AirLight™, the stability of the security system can be enhanced.
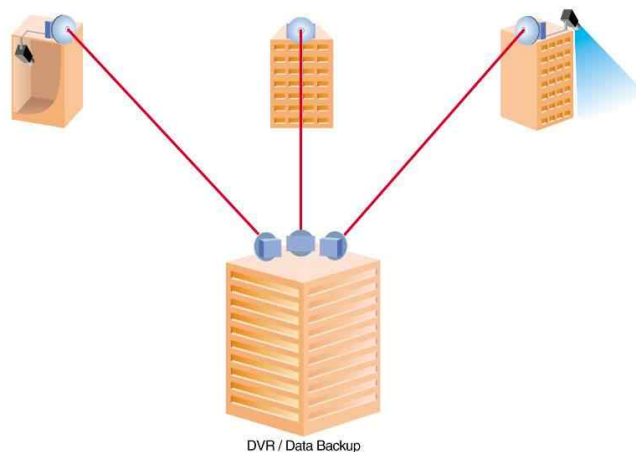
Figure 1-6 Security & Internet

2. Description

AirLight™ consists of a wireless transceiver, management software (ALMP for low latency version) and a manual. The wirel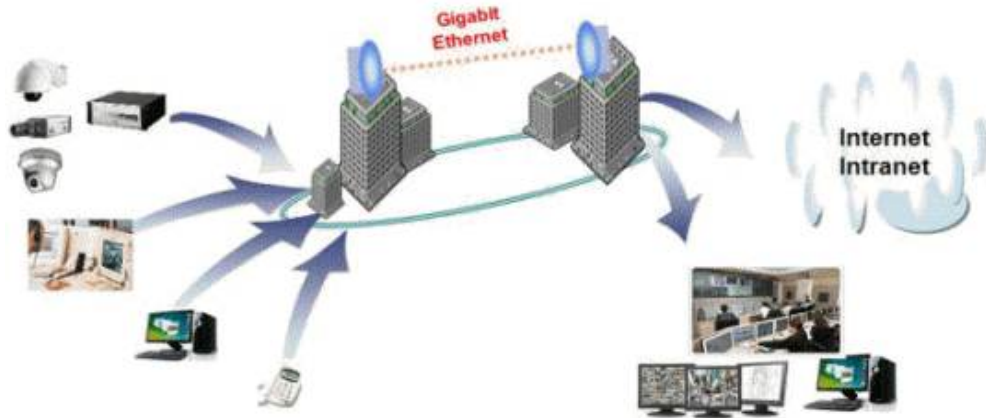ess transmitter and receiver device are physically composed of RF main unit, O/E converting board for Low latency optional and system protection case with antenna and alignment bracket.

2-1. General Equipment

Main parts of AirLight™ are basically as follow.

Antenna   **System Body**

Antenna   **System Body**

NTE1GQ-24   NTE1GQ-12
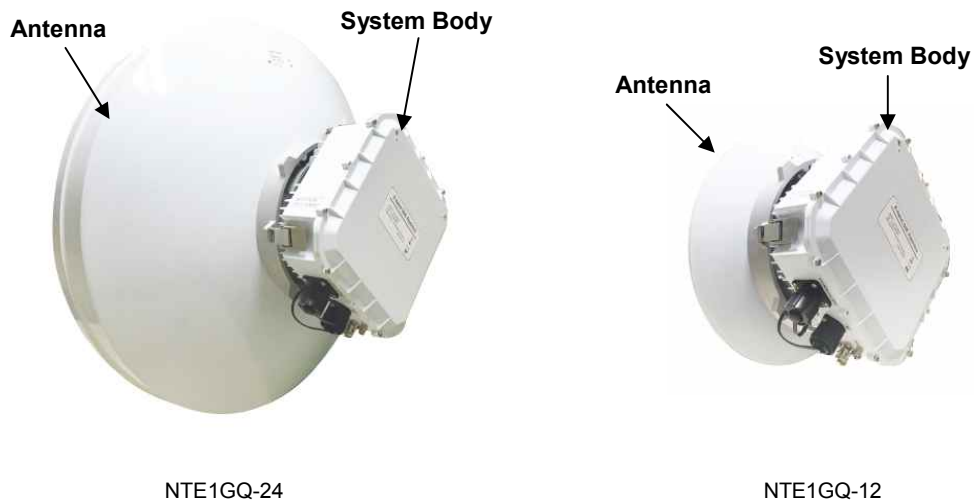
Figure 2-1 AirLight™ Part-Name

▶ **Antenna**

Antenna is directly related to the transmission distance of AirLight™. The Fig. 2-1 shows the 24 inch and 12 inch Cassegrain parabolic antenna. Various sizes of antennas are available to provide the optimal solution depending on user needs.

▶ **System Body**

It is the part the wireless communication system is mounted to. To support stable performance from severe weather condition such as heavy rainfall and heat radiation, an excellent aluminum case is used and the external surface is coated with powder to protect from corrosion. It is also easy detachable for rotating polarization or exchanging RF module in all weather conditions.
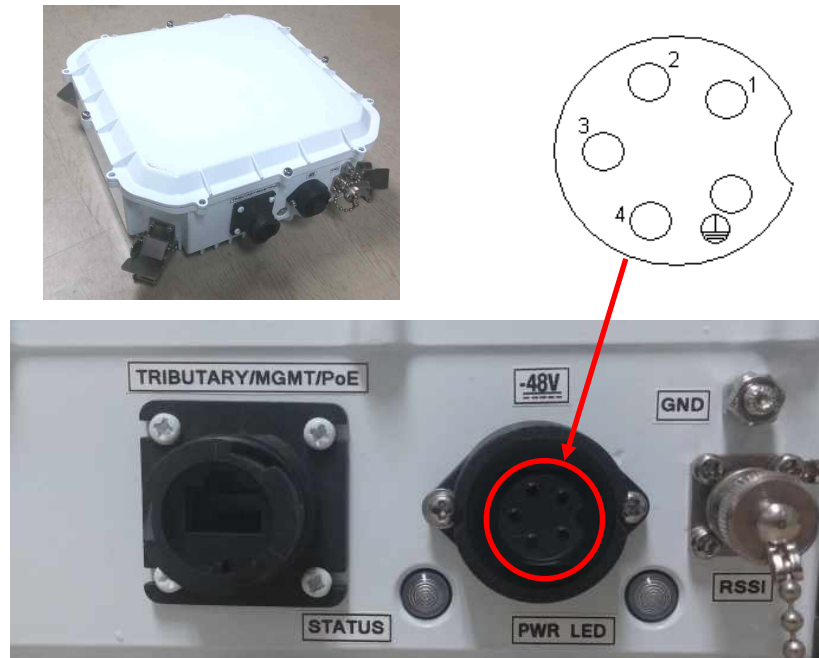

Figure 2-2 System Connector & LED Information

Indication	Color	Pattern
Tributary OK/BER OK	Green	2 seconds ON/ 2 seconds OFF
Tributary OK/BER Alarm	Red	½ seconds ON/ ½ seconds OFF
Tributary Alarm/BER OK	Red	2 seconds ON/ 2 seconds OFF
Tributary Alarm/BER Alarm	Red	2 seconds ON/ 1/2 seconds OFF/ ½ second ON/ ½ seconds OFF
Power ON	Red	Stay ON

Table 2.1 System Status / Power LED indicator

Note :	**TRIBUTARY port (RJ45) supports PoE.** **Power connector port information** **1. DC (-) – '-48V' suggested** **2. DC (+) – '0V' suggested** **3. RS485 (+) - ALMP monitoring for low latency version** **4. RS485 (-) - ALMP monitoring for low latency version** ⏚ **Frame Ground – NC(No connect)** *** Item 1 & 2 values can be changed, as long as the voltage difference (48V) is kept. (ex. 1 = 0V, 2 = +48V)**

▶ **Alignment Bracket**

The antenna provided by AirLight™ has usually narrow beam width, because of the high frequency range of millimeter-wave of 71~76/81~86GHz. Alignment bracket makes installation easy.

▶ **Monitoring Program GUI**

Figure 2-3 Monitoring Program GUI

3. Installation
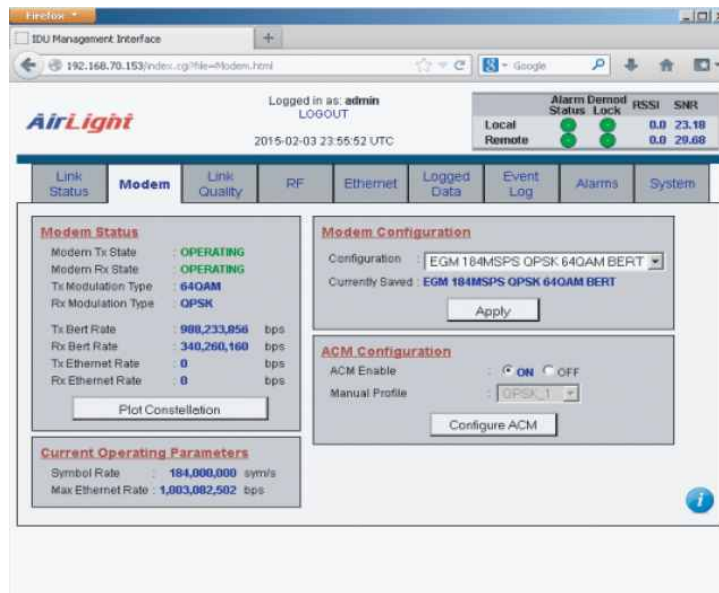
3-1. Pre-Installation Notice

Workers installing AirLight™ should check the following before installing it.

√   Is the space for installation sufficient and are there any dangerous facilities nearby?

   - The location should be selected to safely install and maintain, and suitably manage it.

√   Are things and tools needed for installation secured? (Refer to section 3-4.)

   - Thoroughly prepare the things needed for fast installation.

√   Is the structure (ex. mast) suitable to fix the equipment appropriately?

   (Refer to section 3-5.)

   - It should be possible to firmly fix it to get the best communication quality.

⚠ **WARNING**	**Workers installing the equipment should check the above matters before installation to prevent any accident that may occur during installation.**

3-2. Install-Location Notice

The following matters should be considered to install AirLight™.

√   **Line of Sight**

As for the installation conditions of AirLight, buildings, pylons, or trees should not be in the line of sight from another AirLight, and it should be installed fairly high enough from the floor.

√   **Mast**

The mast for AirLight installation must be stably fixed not to be vibrated by gales or rain. Vibration may degrade communication quality.

√   **Permission**

Installation location should be approved by the building owner or superintendent. Installation methods and other matters meet local requirements.

3-3. Safety Notice

AirLight™ is designed to operate against severe environment, but the following matters should be attended to use it safely for a long time.

▶ **Installation**

√　Putting inflammable materials beside the product may cause a fire.

√　Installing it in the unstable or vibrating place or in the place right ahead of the wall may degrade communication quality.

√　Dropping or putting too much impact on it may cause the product break down.

√　Even though the product is turned off, it shouldn't contact the electric wire. It is good to take a necessary safety action during installation.

√　If the product is not installed in accordance with its operating instructions, it may impede wireless communication.

√　Installation and repair need technicality and experience, so the after sales service center or sales store can safely handle it at user request. There is no part a user can fix inside, so if arbitrarily disassembled, it may cause a breakdown or degrade communication quality.

▶ **Power**

√　The power terminal should be securely fixed not to be vibrated. If the connection is unstable, it may cause a fire.

√　Do not put heavy things on the power cord, or do not let the cord pressed under the device so that it should not be damaged. Otherwise it may cause an electric shock and a fire.

√　Do not let the water inside through the power cord protection tube to avoid the electric shock.

√　Beware that putting the power cord beside the heating device may cause melting the coating of the cord.

√　The working voltage must be checked before using the product. Wrong or not connect power source and voltage cause a failure.

▶ **Caution**

√   This product consists of precise parts, so any disassembling or remodeling the product by user may cause a fatal breakdown. If a failure occurs because of it, the manufacturer is not responsible for product quality.

√   If the antenna is covered with a lot of filth, get it off with the smooth cloth stained with the neutral detergent and rub. Then, rub it off again with the clean cloth. Using chemicals such as organic solvents, alcohol, and benzene may damage the product. Never use them.

√   Do not use the product in the state of failure such as reverse power input. Immediately turn off the power switch and separate the power source, and contact the after sales service center or sales store for safe handling.

√   Turning off the power source reduces the risk of an electric leakage or a fire, when the product is not used for a long time.

3-4. Tools and Equipment

The following tools and equipment are needed to install AirLight™. Workers installing the device should check the following things.

▶ **Things Needed for Installation**

√   Power cables – PoE(Default): UTP Cat 6, DC(Optional): 48V

√   Communication cable

   UTP: Cat 6

√   Other tools (Cabling tools, DVMs for RSSI checking, M10 spanner for bracket assembly, etc.)

3-5. How to Connect AirLight™

Fully understand the following matters before setting up AirLight™ and install it.

⚠ WARNING	AirLight™ uses two types of models using AC 100 ~ 240V (50/60Hz) or DC (+/-) 48V as the input power source. Before connecting it to the power source, be sure to check if the purchased product operates with AC or DC.

3-5-1. Connection Terminals of AirLight™

1.   The Power Input Terminals

There is a power input terminal for 48V power source for DC. PoE is also available.

Note :	PoE is default for Power input. If DC power is used, connect the power cables to the to the power input terminal by using provided connector.

2.   Communication Terminals (RJ-45)

The terminal connecting to the external network uses UTP cable.

Note :	Users must use cat 6(or above) UTP cable to operate the system properly.

3.   Connector Information

All connectors are located at the bottom of the housing. Please see below connector information.

3-5-2. Power Input

There is a 5 pin external connector at the bottom of housing which is located in between communication connector and RSSI connector.

Pin 1 & 2 are reserved for power source. In case of DC power, pin 1 is (-) and pin 2 is (+). Voltage difference between pin 1 & 2 must be 48V.

As for the electric wire, use the wire with the diameter of 0.75mm or larger to stably supply the electricity.

Figure 3-1 Power Input Connector

3-5-3. Communication Terminals (Signal I/O Ports)

NTE1GQ basically supports UTP. The following table 3-1 shows the specification of standard UTP terminals. The communication terminals of NTE1GQ are connected as shown in Fig. 3-2.

Figure 3-2 Communication Connector

The fiber optic type of AirLight™ is shown in Table 3-1. Connecting to network equipments, refer to the standards of Table 3-1.

Table 3-1 Fiber optic type

Model Type	NTE1GQ
I/O Terminal	UTP Cat 6 (RJ-45)

3-6. Cabling Check

√   Check if the correct power source is used.

  → Check if it is PoE or DC 48V

√   Check the connected conditions of the power cable.

  → Check if the power cable is correctly connected to the power source.

  → If the separate power switch is set up, turn it "ON".

√   After the power is rightly supplied, check the "PWR LED" is "ON".

  → If it is not lighted, check the connection of power source terminal.

√   Check if the communication connector is connected properly.

  → Check if the communication cable is OK.

√   Check the RSSI level through DVM. Readjust it if needed.

  → Align the link in accordance with provided RSSI chart.

3-7. Field installation

3-7-1. Deployment

Deploy the radios on the poles, and cabling

- Align them approximately to see each other. (Even 5km distance, the radios can be seen under clear weather condition)

- Telescope will be useful for the first step.

- Power and signal cablings must be done before the alignment process.

Note :	**There are polarization mark 'H'(Horizontal) and 'V'(Vertical) on the radio. Make sure both radios are deployed as the same polarization.**

3-7-2. Alignment

Fix one of the radios (let's say 'A') and start aligning the other side (let's say 'B') by reading Digital Voltage Meter. (A sheet of voltage levels is provided with the radios)

- 'A' must not move at this point, and 'B' should find the best point.

- Full scanning will be necessary for the first time. (Below is a way of full scanning)

- There could be no movement on voltage level at first time.

Fix the 'B' at the best point and start aligning 'A'.

- Do the same procedure as No. 2.

3-7-3. Fine tuning

When the point of level movement is found, start fine tuning one side by one side.

- Tune the radios one by one until the voltage level reading gets to similar value to the provided chart at the distance.

Note :	DO NOT ALIGN BOTH RADIOS AT THE SAME TIME. IT MAY CAUSE CONFUSION. ONE OF THEM MUST BE FIXED DURING THE ALIGNMENT.

When the radios reach certain levels, carefully fix them.

- Try not to make any movement during the fixing job.

** NOTE: Get information about altitudes of both radios from GPS before starting alignment. It's hard to recognize where the 2ft antenna is facing, especially vertical. Use angle meters to make sure they are not heading to the sky or the ground.

4. Web-based GUI (Management)

4-1. Introduction

NTE1GQ serves as the fully integrated modem module of a point-to-point radio system designed for millimeter band operation. Key features and functions are as follows:

▶ Major Functions

√ Ethernet transport via standard 1000BaseT RJ-45 user port

√ Configurable BERT mode operation

√ Configurable QPSK, 16-QAM, 32-QAM, 64-QAM modulation

√ Configurable Forward Error Correction Modes (heavy and light) allows trade-off between capacity and link sensitivity

√ Automated Coding and Modulation for maximum throughput given available conditions

√ Total capacity (Ethernet + BERT channel) up to 1 Gbps

√ Web GUI management

√ In-band management channel allows web GUI management of far-side terminal

√ PoE^{+} 802.3at compliant DC power interface

4-2. Setup and Operation

To setup a link for operation, proceed with the following steps at each terminal:

1. Connect the power connector to an external DC power supply (or alternatively connect an external PoE injector to the ODU's RJ-45 jack) to energize the ODU system. Boot-up takes about 90 seconds.

      a. DC supply voltage range in -42.5 to -57V

      b. Power Connector is keyed, as shown in Figure 2-2. Ensure that the minus (-) terminal of the power supply is connected to the pin on Figure 2-2 as shown. Reverse polarity protection circuitry is present.

2. Connect the RJ-45 network port (or PoE injector data port) to a host computer (laptop or desktop) or to a LAN switch. Make sure that the computer's network settings are consistent with the default network settings of the ODU's system. The default ODU network settings as shipped from the factory are as follows:

- IP Address : 192.168.70.98 (Unit-A), 192.168.70.99 (Unit-B)
- Mask : 255.255.255.0
- Gateway : 192.168.70.1

It will in general be necessary to change the ODU's network setting from their default before proceeding to establishing a ODU Link.

If the management computer and ODU are to be connected directly (not over a routed network), refer to Section 4-3 for specific instructions on properly configuring the ODU and the computer network settings.

3. Start a browser on the laptop or computer and enter the IP address of the ODU into the URL field.

- Factory default ODU IP address is: 192.168.70.98 (Unit-A), 192.168.70.99 (Unit-B)

When both ends of the link have been configured with compatible configurations, acquisition is automatic on both sides.

4. Login to ODU

- User ID (admin) / Password (admin)

5. Select the Transmitter Power and Frequency Channel in GUI RF Tab

6. To run the modem transmit I/Q offset calibration click the "**Run Calibration Procedure**" link and follow the instructions. Proper calibration is required to obtain the best possible link performance.

4-3. Management Interface Network Configuration

4-3-1. ODU Network Configurations

The ODU supports manual (static) network configuration settings (DHCP is not supported at this time). All ODU are factory configured with default static network settings as stated in Section "Setup and Operation". These static Network settings can be changed by modifying the Network Configuration field on the Ethernet tab of the GUI interface. If the ODU is to be connected to a LAN or routed network, the installer should take care to ensure (e.g., via PING) that no other node exists on the network with the same IP address.

4-3-2. Management Computer Configuration

The appropriate network configuration settings of the management computer depend on the network environment. If both ODU and host computer exist on a routed network supported by a DHCP server, the laptop may be configured to obtain an IP address automatically, as shown in Figure 4-1 below
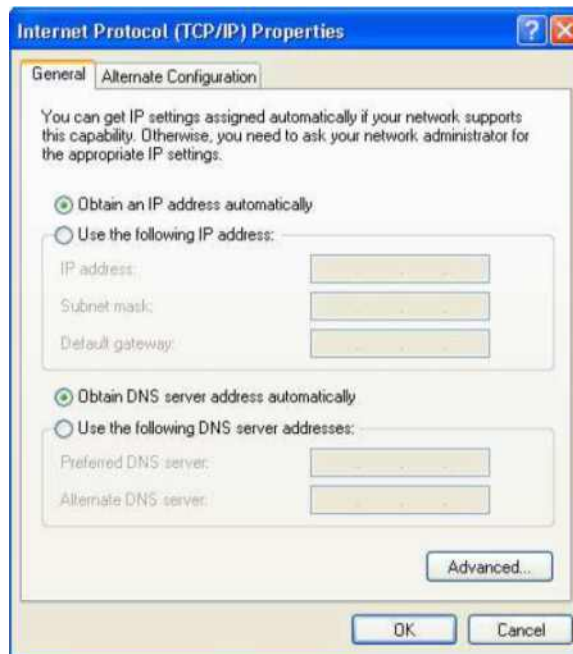

Figure 4-1 Obtaining an IP Address

If the ODU and host computer are connected directly or locally through a simple LAN or un-routed network, the host computer's Network Settings will need to be configured manually, as shown in Figure 4-2 below
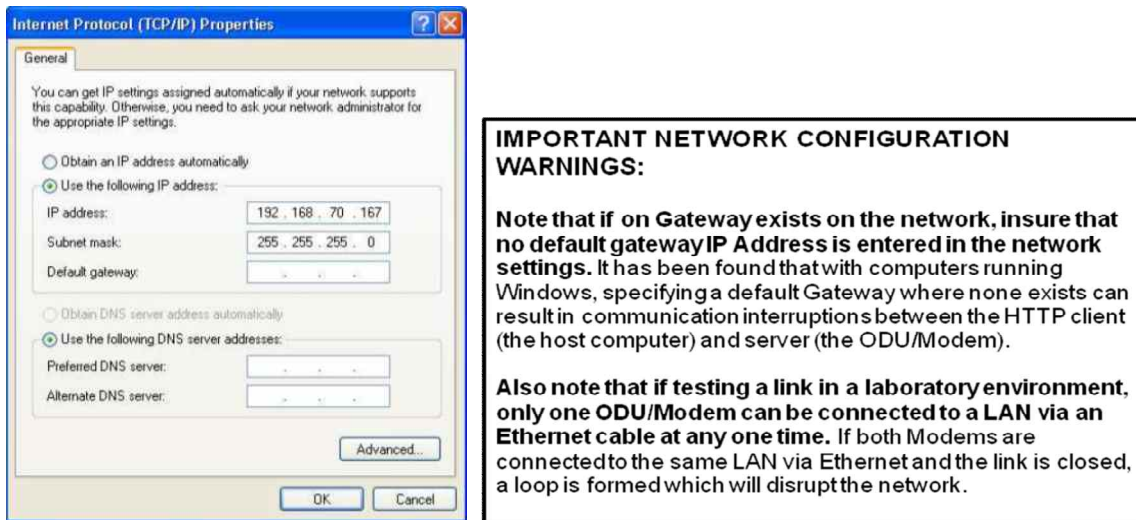

Figure 4-2 Configuring an IP Address

4-4. Terminal Management Interface

- The ODU supports management over a TCP/IP network via a web GUI.

- Network Settings must first be properly configured by means of the Ethernet/Network Configuration page described in "Ethernet Tab" part. Once a link is established between two terminals, both terminals may be managed over TCP/IP from one side of the link, provided that the ODU Configuration (discussed in "Modem Tap" part) includes allocation of Ethernet capacity over the link.

- Note that all ODUs are shipped from Factory with default IP address 192.168.70.98 (Unit-A), 192.168.70.99 (Unit-B). The IP address of the ODU – along with other network settings – can be modified from the Ethernet/Network Configuration page of the web GUI (see "Ethernet Tab" part). Configure each ODU to a unique IP address before connecting to a network.

4-4-1. Web GUI and SNMP Interface

- The ODU includes an HTTP server that supports full management via a web GUI. The ODU web GUI has been tested with internet Explorer and Mozilla Firefox, is recommended. To access the ODU, start a browser window, and enter the ODU's IP address in the URL window. If the IP address for the terminal is unknown, it can be determined by accessing the serial console port as described in Section 2.2.

- **Note: Although the ODU supports multiple browser sessions, it is strongly recommended that the maximum number of simultaneous browser sessions be limited to 2 or 3. An excessive number of browser sessions can result in sluggish response times under certain conditions.**

- Once a session is established, after 30 minutes of inactivity, the session is automatically terminated. This feature increases security, and limits the number of active sessions that can potentially overload the Modem CPU leading to sluggish response.
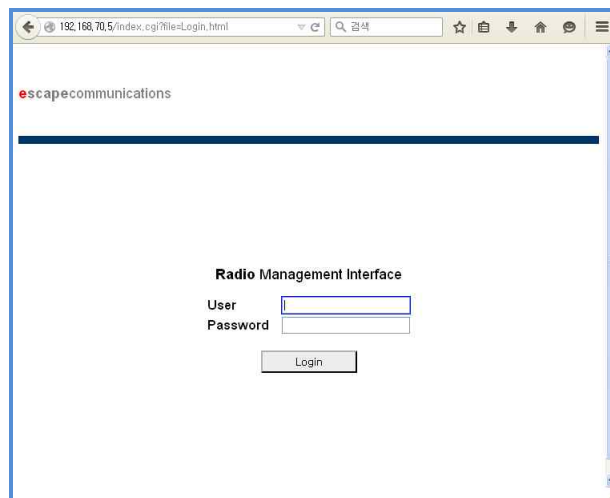
4-4-2. Login

Figure 4-3 Login Page

User Name	Password	Access
admin	Unless specified by an OEM, the default password is "admin" and can be changed when logged in as "admin" via the System Tab . Admin access level is intended for use only by the OEM, not the end customer/operator.	All functions are accessible.
Tech	Default password is "tech" and can be changed by either an "admin" or "tech" level operator via the System tab.	Operator has access to all configuration options and most status features. Some diagnostic and status features are hidden.
public	Default password is "public" and can be changed by either "admin" or "tech" level operator via the System tab.	Operator has access to status information only; no terminal configuration change is allowed.

Table 4-1 User Authentication Level

4-4-3. Common Page Areas

Each UI is sub-divided three distinct areas (Frame)

√   Main Status Bar
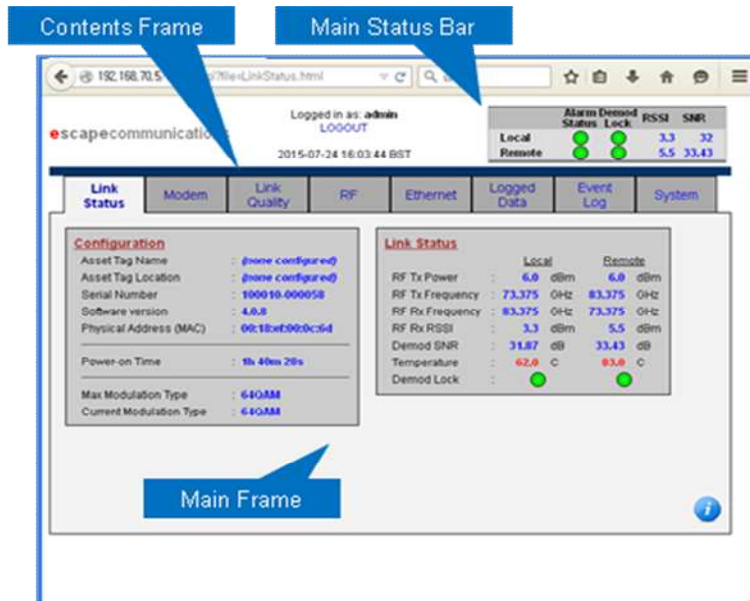
√   Contents

√   Main

Figure 4-4 Web GUI Layout

4-4-4. Link Status Tab

The Link Status Tab, shown in Figure 4-5, presents configuration status data for the near-side terminals, and link status   information for both near-side and far-side terminals. Link Status data are dynamically updated. Link status parameter definitions are as follows:

- RF Tx Power: Currently configured RF transmit power

- RF Tx Frequency: Currently configured RF transmit frequency

- RF Rx Frequency: Currently configured RF receive frequency

- RF Rx RSSI: Received Signal Strength indicator(RF received signal power)

- Demod   SNR: Demodulator received signal-to-noise ratio

- Temperature: Temperature telemetry data

- Demode Lock: Green status indicates demodulator is correctly locked onto the received signal; red indicates unlocked state.

Configuration parameters are provided in the left pane and are derived either from mainboard configuration or by user entries under the System tab.
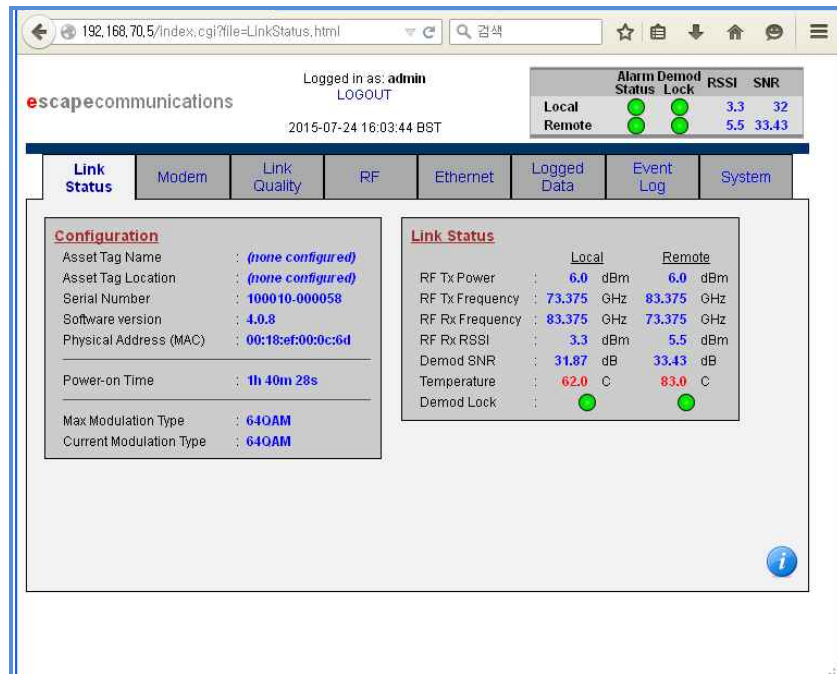
Figure 4-5 Web GUI Main Status Bar and Link Status Tab

4-4-5. Modem Tab

- The Modem Tab, shown in Figure 4-6, presents a modem status and configuration interface. To change the **Modem Configuration**, select one of the available modem configuration profile sets. Configurations identified with the word "BERT" offer 100% allocation of the channel to BERT traffic. Configurations identified with the word "EHT" offer minimal allocation (<~0.5Mbps) to the BERT channel with most capacity allocated to Ethernet transport.

- The selected configuration is enabled and saved to the Modem's non-volatile memory and by clicking "Apply".

- Warning: do not refresh the browser or click on any buttons or link until the configuration operation has completed. **Always change the far side of a link first**. The link will drop when the configuration is changed, and in cases when the near-side configuration is changed, the far-side will be unreachable until the link is re-established. If the near-side configuration is changed first, restore it to the prior configuration to re-establish the link, and then change the far side configuration first per the normal process.

- The **Modem Status** panel displays the operational status of the Modem transmitter and receiver. Nominal operation is indicated by **OPERATING**. **ACQUIRING** is displayed immediately following link reconfiguration. Pressing the **Plot Constellation** button displays an ASCII plot of the Demod Symbol constellation in the modem.

- The **Current Tx Operating Parameters** pane displays details of the current Profile of the current Modem configuration. If ACM is enabled and the link is operating normally, the Profile with the highest throughput will be displayed. If ACM is enabled and there is no link

established, the most robust Profile will be displayed.

- The **ACM Configuration** pane allows the user to set ACM (Adaptive Coding and Modulation) to be enabled, or a specific Profile can be selected. Figure 5 shows various modulation types and coding levels available for an example modem configuration. Note that disabling ACM is a persistent setting that will be retained after a power cycle and applied at next start up.

Figure 4-6 Web GUI ModemTab

4-4-6. Link Quality Tab

The Link Quality Tab, shown in Figure 4-7, presents key link quality metrics.

Item	Description
Error Frame	Cumulative number of errored received frames/total cumulative received frames (a frame consists of a number of interleaved FEC codewords)
Link Up Time	Cumulative link uptime
Link Down Time	Cumulative link downtime
Error Free Seconds (EFS)	Cumulative count of error free operation (per ITU G.826 definition)
Errored Seconds (ES)	Cumulative count of error free operation (per ITU G.826 definition)
Severely Errored Seconds (SES)	Cumulative count of severely errored seconds (per ITU G.826 definition)
Unavailable Seconds (UAS)	Cumulative count of unavailable seconds (per ITU G.826 definition)
Block Error Rate	Cumulative number of errored received FEC code blocks/total cumulative received code blocks

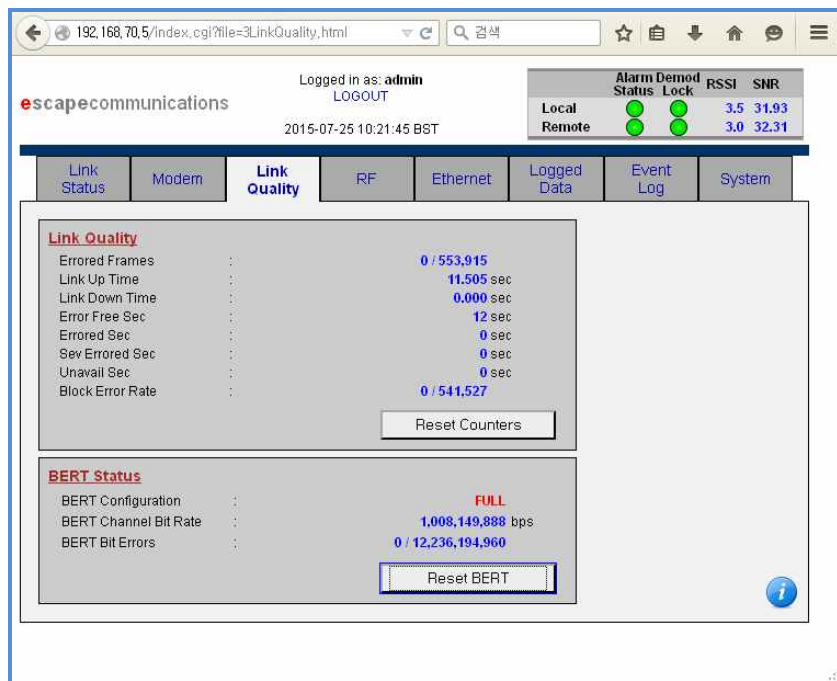**Table 3. Link Quality Definitions**

Figure 4-7. Web GUI Link Quality Tab

4-4-7. RF Tab

The RF Tab, shown in Figure 4-8 below, presents key RF status and configuration information. The selected configuration settings are applied and saved to the modem's non-volatile memory by clicking the "apply" button.

To run the modem transmit I/Q offset calibration click the "Run Calibration Procedure" link and follow the instructions. Proper calibration is required to obtain the best possible link performance.
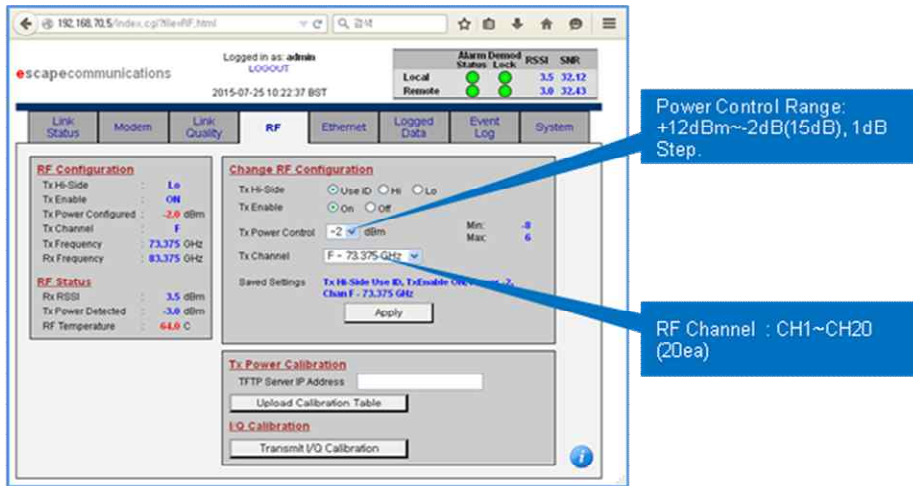

Figure 4-8. Web GUI RF Tab

Channel	Lower/Upper band Center Frequency(GHz)	Channel	Lower/Upper band Center Frequency(GHz)
CH1	71.125/81.125	CH11	73.625/83.625
CH2	71.375/81.375	CH12	73.875/83.875
CH3	71.625/81.625	CH13	74.125/84.125
CH4	71.875/81.875	CH14	74.375/84.375
CH5	72.125/82.125	CH15	74.625/84.625
CH6	72.375/82.375	CH16	74.875/84.875
CH7	72.625/82.625	CH17	75.125/85.125
CH8	72.875/82.875	CH18	75.375/85.375
CH9	73.125/83.125	CH19	75.625/85.625
CH10	73.375/83.375	CH20	75.875/85.875

Table 4. RF Channel Chart

4-4-8. Ethernet Tab

The Ethernet Tab, shown in Figure 4-9, presents key status and configuration control interface for the internal Ethernet interface, including network configuration information, Ethernet switch status, and Ethernet traffic and errors counters.

Network configuration (IP Address, Netmask (subset), and Gateway) may be changed by entering desired values under Network Configuration, then clicking Apply & Save Network.
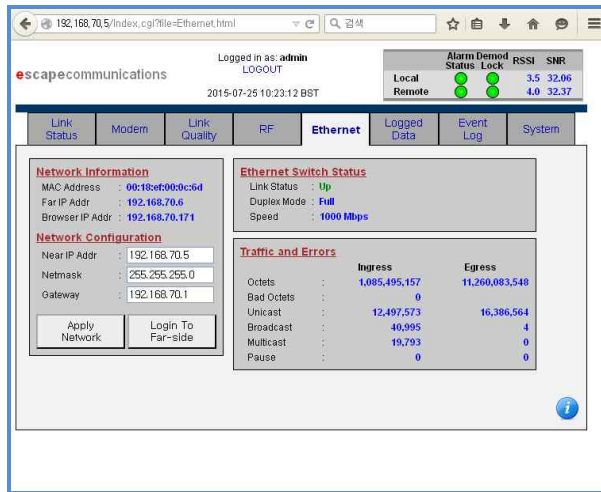

Figure 4-9. Web GUI Ethernet Tab

4-4-9. Logged Data Tab

The Logged Data Tab, shown in Figure 4-10, presents history of logged data, along with the ability to export the logged data table as a CSV file. Entries are updated every 15 minutes by recording the minimum, maximum and average value within the 15 minute interval. Individual data fields may be added or removed by means of the Data checkboxes. To specify the length of the historical record, select one of the Period ODU buttons. Press the Update button to activate selections.
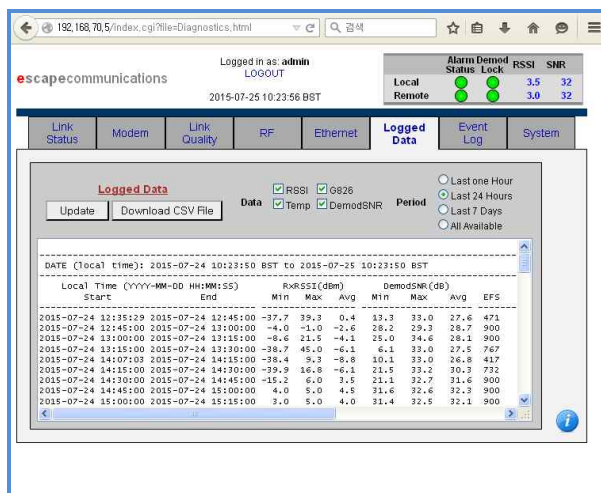

Figure 4-10. Web GUI Logged Data Tab

4-4-10. Event Log Tab

A history of system event log messages is available via the Event Log Tab, as shown in Figure 4-11. The messages that appear in the log are listed in Table 5. Pressing the Clear System Log button results in the permanent deletion of existing log entries. (NOTE: not all of these events are activated, no Modem configured, no Demod Lock Acq/Lost, RF TxEn does not exist, log cleared in there)
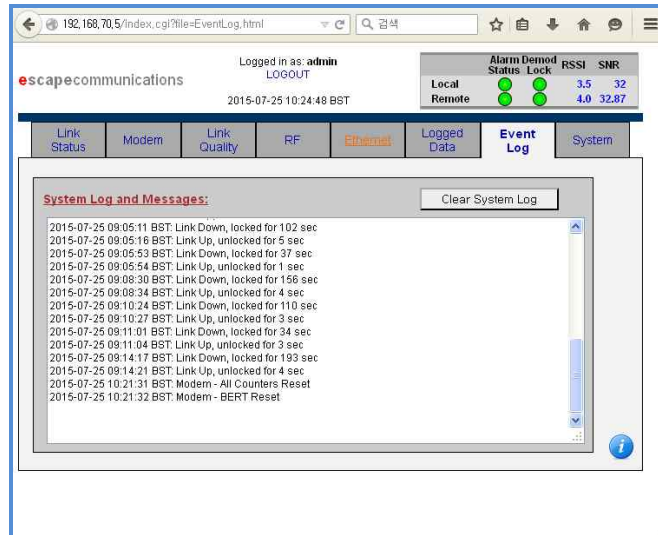

Figure 4-11. Web GUI Event Log Tab

Message	Caused By
Modem – All Counters Reset	User clicks on the Reset All button on Link Quality page
IP Address set to nnn.nnn.nnn.nnn	User changes IP Address or configuration is restored where IP is different from current
Modem configured to: nn MHz – nnnQAM – nE1	User configures modem or configuration restored
RF Tx Enable turned ON(OFF)	User sets TxEnable on(off) from ODU page, or configuration is restored that has it on (off)
Time changed to YYYYY-MM-DD HH:MM TZN	Modem web server detects time change of more than 10 seconds
Demod Lock ACQUIRED (nn MHz – nnnQAM – nE1)	Demod lock state changes from unlocked to locked
Demod Lock LOST (nn MHz – nnnQAM – nE1)	Demod lock state changes from locked to unlocked
System Rebooted	System reboot has occurred

Table 5. Event Log Message

4-4-11. System Tab

The System Tab provides access to a variety of System-related information, including software and FPGA version, clock setting interface, system user password setting, and firmware update interface as shown in Figure 4-12.

Figure 4-12. Web GUI System Tab

√   **Clock / Other Status**

Selecting Clock / Other Status on the System Tab, shown in Figure 4-13, provides display and setting capability for the IDU's (battery-powered) real-time clock, as well as system temperatures and IDU host processor software uptime and load information. The date and time as set here are used in Data and Event Logging. Changing the time during link operation may result in a discontinuity in logged data and events.

Nominal Mainboard Temperature readings are typically in the range of 20 to 30 degrees above the ambient air temperature around the IDU.
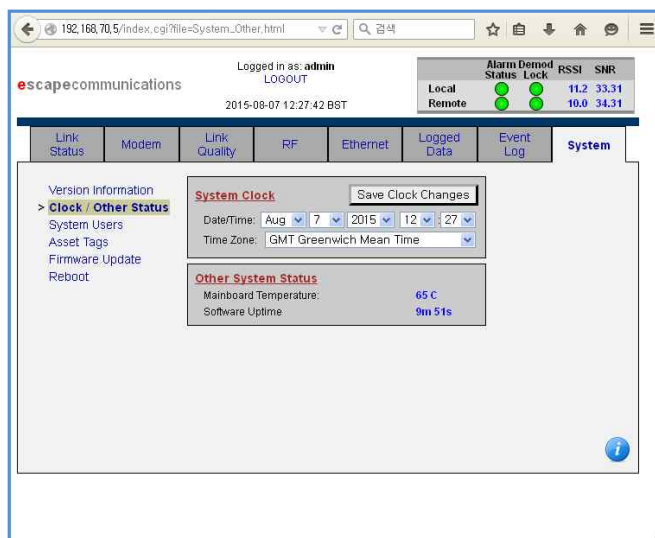

Figure 4-13. Web GUI System - Clock / Other Status sub-tab

√   **System Users**

Selecting System Users on the System Tab provides an interface allowing the operator to set user passwords, as shown in Figure 4-14. Access on this page is determined by login authentication level. Since the password display is hidden, it must be entered twice to ensure the intended value is captured. Press the Save Passwords button to apply and save changes. User "admin" may modify any of the passwords. User "tech" may not modify the "admin" password. User "public" cannot modify any password entries.
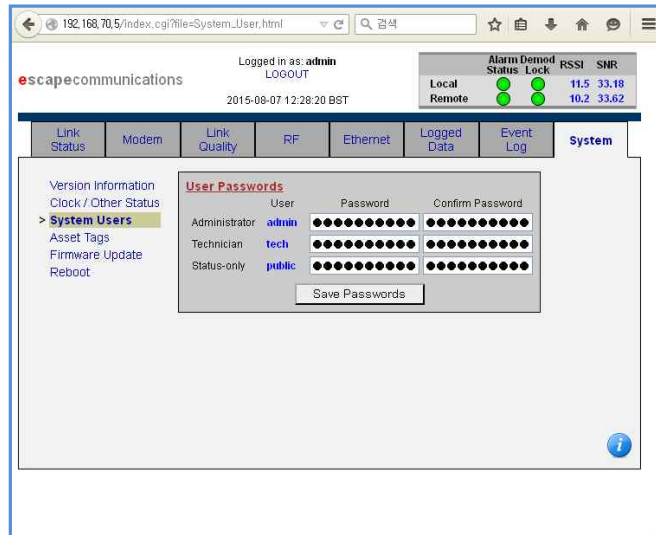

Figure 4-14. Web GUI System – System Users sub-tab

√   **Asset Tags**

Selecting Asset Tags on the System Tab provides an interface allowing the operator to define Asset Tag Name and Location, as shown in Figure 4-15. Asset Tags are used solely at the discretion of the network operator to define and track network assets remotely. Also, Asset Tags can be used to assign characteristics at the unit level, such as internal inventory tracking ID, physical location, etc. Clicking on the Save Asset Tags button stores these fields in non-volatile memory on the Modem.
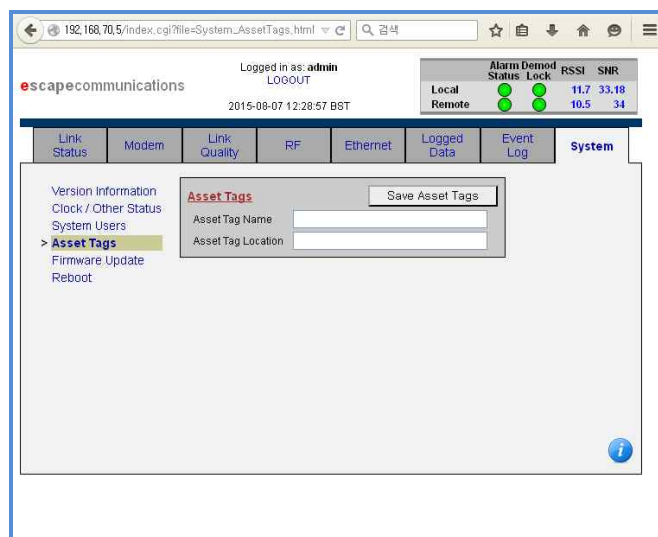

Figure 4-15. Web GUI System – Asset Tags sub-tab

√   **Firmware Update**
The Firmware Update option on the System Tab, as shown figure 4-16, provides an interface allowing the operator to perform IDU firmware updates. Note that following a firmware update, the IDU will automatically apply the Power-on settings previously saved for the modem configuration, ODU configuration, and Ethernet configuration, as well as retain terminal network settings and user passwords.

Note that a firmware update can include updated software (running on host processor) and/or an updated modem bitstream (running on configurable FPGA).
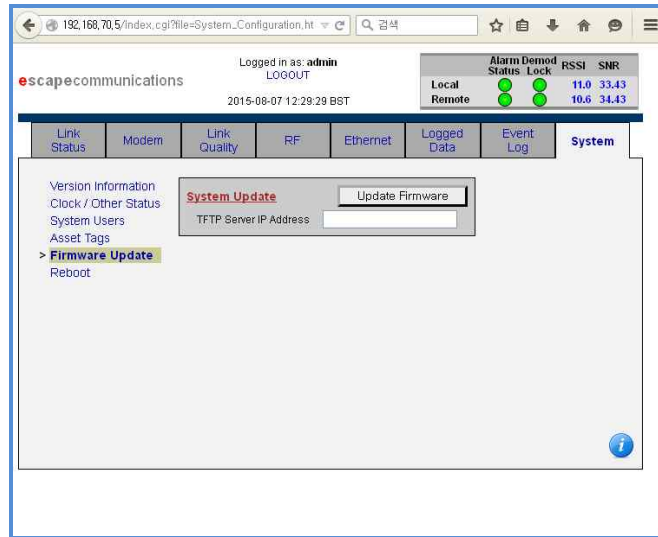

Figure 4-16. Web GUI System – Firmware Update sub-tab

√   **Reboot**
Selecting Reboot on the System Tab (see Figure 4-17) causes the management processor of the IDU to reboot. Before pressing the Reboot System button to reboot the Modem board, please heed the warnings in the System Reboot pane. Note that following a firmware update, the IDU will automatically apply the Power-on setting previously saved for the modem configuration and Ethernet configuration. Note that a reboot will result in a modem re-acquisition sequence, which will temporarily interrupt the link.
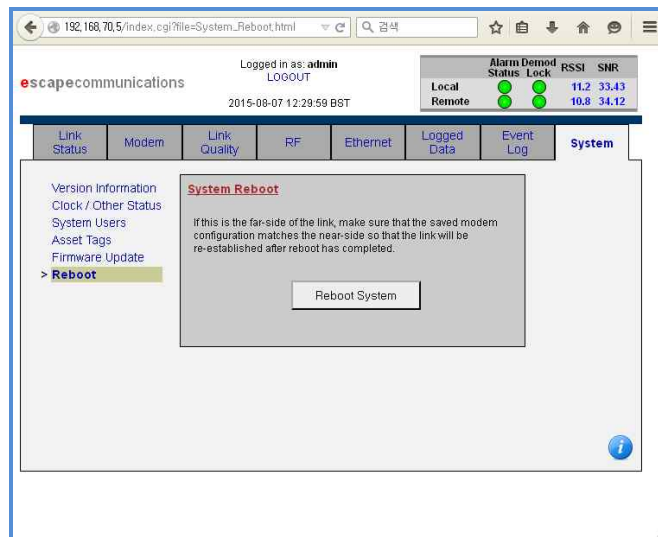

Figure 4-17. Web GUI System – Reboot sub-tab

5. Troubleshooting

The basic method to check the AirLight™ status is to use EMS program. If AirLight™ doesn't operate as it is supposed, execute EMS program to check the operation status of AirLight™.

5-1. General GUI Features

NTE1GQ supports management over a TCP/IP network via a web GUI. Once a link is established between two terminals, both terminals may be managed over TCP/IP from one side of the link

- √   Link status
- √   RF Receiving Power – The receiving power is displayed in real-time.
- √   Current of AirLight
- √   Internal Temperature of AirLight
- √   PLL-Lock checking

5-2. Problem Solving

Check the following before asking for after sales service center.

1. AirLight™ is not detected in EMS program

Problem	Cause	Action
Power Source	Power source terminal connection error	Check the connection method and connect it again.
	Cable disconnection	Replace it with a new cable
	Switch 'Off'	Switch 'On'.
Administration Communication	Terminal connection error	Check the connection method and connect it again.
	Cable disconnection	Replace it with a new cable
	A bad converter	Replace the converter with a new one. (Contact the vendor.)

2.   'RSSI' is out of threshold or Link is down.

Problem	Cause	Action
Power Source	The equipment power source on the other side is "Off".	Authorize the power source normally.
Setup	Wrong direction	Readjust the direction.
	Dirt or dust in the antenna	Clean the antenna.
	The setup distance between equipments is exceeded.	Set it up with less than the effective distance again.
	Rotate and install the equipment on the one side.	Reinstallation (Standardize the rotation direction.)
Environment	Attenuation due to heavy rain	Set it up again considering the local rainfall.
	Antenna burying due to snow fall	Snow removal operations

6. Specification

6-1. AirLight™ 71~76/81~86GHz Series Typical Specification

Parameter		NTE1GQ
Frequency Range		71~76GHz, 81~86GHz
Output Power		+12dBm typ.
Sensitivity		-70dBm typ @QPSK
		-64dBm typ @16QAM
		-56dBm typ @64QAM
Modulation		QPSK – 64QAM
Main Power		PoE(Default): UTP(RJ-45)
Network Interface		10/100/1000Base RJ-45
Data Rate		1Gbps
Management		Web-based GUI, SNMP II
Operation Temperature		-45°C ~ +65°C
Size (W x H x D) (mm)		620 x 620 x 360 (2ft), 328 x 328 x 243 (1ft)
Weight		12kg(26.5lbs, 2ft) / 6kg(13.2lbs, 1ft), w/o Bracket
Antenna	Type	Cassegrain
	Size	2ft(24") / 1ft(12")

7. Warranty

♦ Product Warranty

Family	AirLight™ 71~76/81~86GHz		
Model	NTE1GQ		
Serial Number			
Purchase Date		Warranty Period	18 months
Customer		Phone Number	
Address			
Manufacturer		Phone Number	
Address			

♦ Free charge repair

When the products breaks down during the warranty period after purchase upon normal operation conditions, repair of free charge shall offered.

♦ Exceptions of free charge repair

In case a product is arbitrarily disassembled

In case of any failure due to excessive impact

In case of any break down due to natural disaster, accident or calamity

In case supplies with accessories were assembled separately by customer arbitrary

Any trouble due to the use of non-standard or non-recommended products or parts

♦ Contact to Customer Service

908-6, UKIC,812-1, Hyomun-Dong, Buk-Gu,

Ulsan City, 683-360, South Korea

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