

# Outdoor 5G MIMO-OFDM Radio Series

## User Manual

Model Number :

EL-N-1 / EL-N-2 / EL-N-3 / ML-N-1 / ML-N-2 / ML-N-3



### FCC Notices

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

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 by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### CAUTION:

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

### RF exposure warning:

The equipment complies with FCC RF exposure limits set forth for an uncontrolled environment.

The equipment must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator and your body. It could be removed.

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## 一、Introduction

EUBO' s Outdoor 5G MIMO-OFDM Radio, including single radio(EL-N-1 / ML-N-1)、 dual radios(EL-N-2 / ML-N-2) and triple radios(EL-N-3 / ML-N-3) series products, to provide high-performance, high stability of outdoor wireless connectivity.

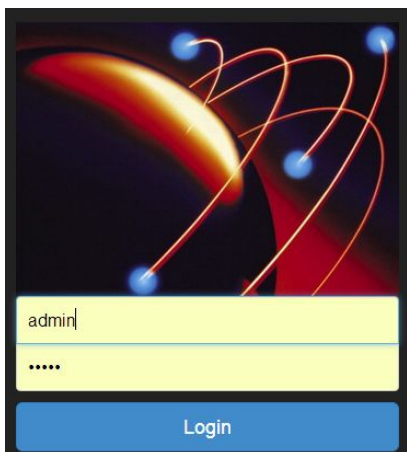
EL(ML)-N Features:

- Frequency: 5.745GHz ~ 5.825GHz (IEEE 802.11n channel 149 ~ channel 165)
- 2x2 MIMO Antenna System (Total 6 antenna ports for EL-N-3, three of 2x2 MIMO)
  - single radio、 dual radios and triple radios models
  - Up to three independent Access Points simultaneously
  - 20MHz or 40MHz channel bandwidth
  - Up to 200Mbps real TCP throughput
  - Provides AES high security for wireless encryption
  - IGMP Snooping(v2/v3) (Not available at ML series)
  - 15 sets of VLAN-QoS mapping (Not available at ML series)
  - Simple, clear and convenient WEB user interface

## 二、Login

Setup your PC' s IP to the same network subnet segment as the EL (ML) -N device. Open the web browser to connect to EL (ML) -N device.

■ The default EL(ML)-N IP address is: 192.168.1.1. Connect to: <http://192.168.1.1> to login the device.

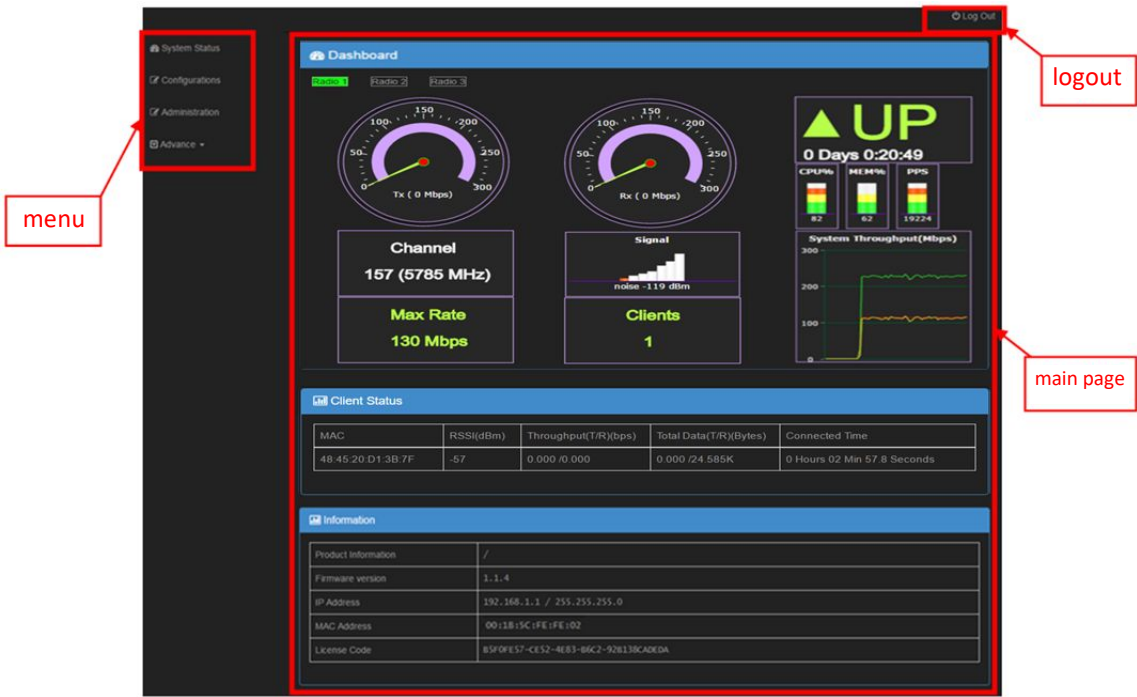


■ The default EL(ML)-N login account and password is: admin / admin

### 三、Home

EL(ML)-N’ s easy operation, simple and clear WEB GUI interface allows you to quickly and easily set up a wireless access system.

The EL(ML)-N home’ s page:



Or when you shrink the browser :



## 四、System Status

There are three parts in system status: Dashboard、Client Status and Information.

Dashboard: To provide the real-time system information



Client Status: To show connected clients

Client Status				
MAC	RSSI(dBm)	Throughput(T/R)(bps)	Total Data(T/R)(Bytes)	Connected Time
48:45:20:D1:3B:7F	-57	0.000 /0.000	0.000 /24.585K	0 Hours 02 Min 57.8 Seconds

- MAC : Client MAC Address
- RSSI : Client Signal Level (dBm)
- Throughput : Real-time Tx/Rx throughput
- Total Data : Total Tx/Rx data bytes
- Connected Time : Client' s Online Time

Information: Basic System Information

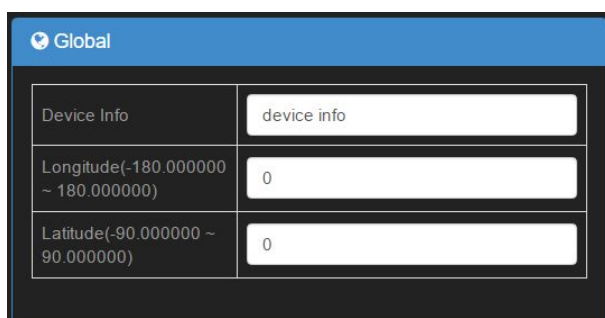
Information	
Product Information	Company Name / Product Name
Firmware version	1.0.1a
IP Address	192.168.1.45 / 255.255.255.0
MAC Address	00:AA:BB:F9:F9:64
License Code	FDFE8D72-E33B-4489-897D-8CB7534C6FBE

- Product Information : Vendor Name / Product Name
- Firmware version : Device' s Firmware Version
- IP Address : Device' s IP Address / Subnet
- MAC Address : Device' s MAC Address
- License Code : License Code

## 五、Configuration

Three parts of configurations are : Global、Network and Radio。

Global: System parameters



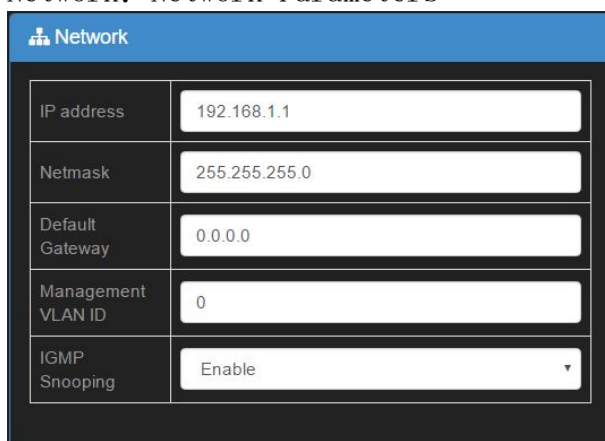
Global	
Device Info	device info
Longitude(-180.000000 ~ 180.000000)	0
Latitude(-90.000000 ~ 90.000000)	0

Device Info : Up to 128 characters

Longitude : WGS84 format

Latitude : WGS84 format

Network: Network Parameters



Network	
IP address	192.168.1.1
Netmask	255.255.255.0
Default Gateway	0.0.0.0
Management VLAN ID	0
IGMP Snooping	Enable

IP address : Device IP

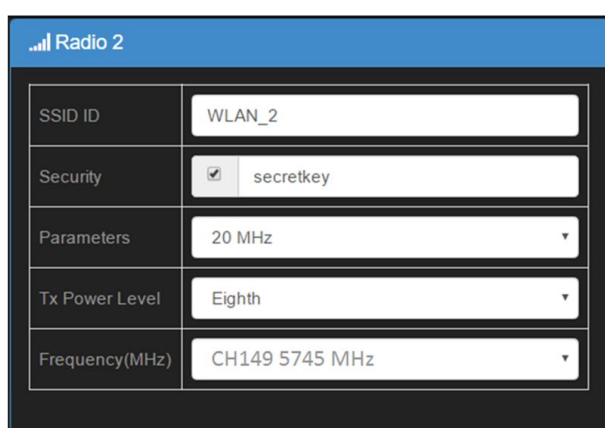
Netmask : Network Subnet

Default Gateway : Gateway IP

Management VLAN ID : For management use

IGMP Snooping : Enable / Disable(Not available at ML)

Radio: Radio Parameters



Radio 2	
SSID ID	WLAN_2
Security	<input checked="" type="checkbox"/> secretkey
Parameters	20 MHz
Tx Power Level	Eighth
Frequency(MHz)	CH149 5745 MHz

SSID ID : AP SSID

Security : Enable / Disable, and Security Key

Parameters : Radio channel bandwidth to 20MHz or 40MHz

Tx Power Level : Transmit Power

Frequency(MHz) : Channel Selection

## 六、Management

Management: Provide several management utilities

The screenshot displays a management interface with six utility cards arranged in a 3x2 grid. The top row contains 'Firmware Upgrade' and 'License Upgrade', both with file selection buttons and 'Upgrade'/'Upload' buttons. The middle row contains 'Change Password' with input fields for current, new, and verify passwords, and a 'Change password' button; next to it is 'Reboot' with a 'Reboot' button. The bottom row contains 'Config Backup' with a 'Backup' button and 'Config Restore' with a file selection button and a 'Restore' button. The 'Change Password' card is highlighted with a red border.

- Firmware upgrade : To upgrade/downgrade firmware
- License upgrade : To change device' s license
- Change Password : To change default login password
- Reboot : To reboot device
- Reset Config : To reset device to factory default configuration
- Config Backup : To backup device configuration file
- Config Restore : To upload a configuration file to device



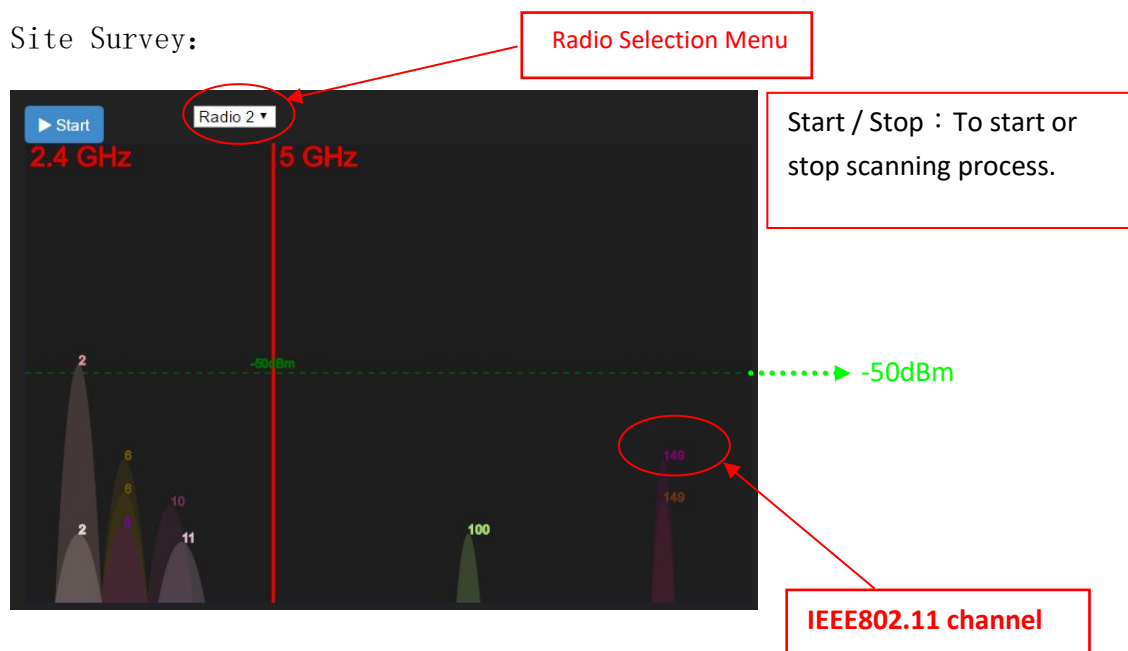
Notes: The system may reboot automatically after item changed!!



## 七、Advance

Advance parts provide “Site Survey” utility and “VLAN-QoS” mapping settings.

Site Survey:



### Notes:

1. 15 seconds scanning process after starting.
2. Will list IEEE802.11 channels after scanning.

VLAN-QoS mapping: 15 sets of VLAN-QoS mapping config.

### VLAN QoS

VLAN QoS

Disable

#	VLAN Id	Queue Priority
1	0	BE(default)
2	0	BE(default)
3	0	BE(default)
4	0	BE(default)
5	0	BE(default)
6	0	BE(default)
7	0	BE(default)
8	0	BE(default)
9	0	BE(default)
10	0	BE(default)
11	0	BE(default)
12	0	BE(default)
13	0	BE(default)
14	0	BE(default)
15	0	BE(default)

Enable / Disable  
VLAN-QoS mapping

VLAN Id : 1 ~ 4095

Queue Priority :

0 : BE(default)

1 : BK **(Lowest)**

2 : VI **(High)**

3 : VO **(Highest)**

Priority for wireless  
Tx is :

VO(3) > VI(2) > BE(0)  
> BK(1)



Notes: Not available at ML.

## 八、Specification

### Product Specification

CPU	Atheros AR7161 680MHz
Memory	16 MB Flash / 128MB SDRAM
Wireless	Atheros AR9220 miniPCI, IEEE 802.11 a/n, 2x2 MIMO(Total 6 antenna ports for EL-N-3, three of 2x2 MIMO)
Ethernet	10 / 100 / 1000M, Half / Full, Auto MDI/MDIX
Connector	N-Type Female
Power	48V Passive PoE

### Radio Specification

MCS Index	IEEE 802.11an /HT20		IEEE 802.11an /HT40	
	Output Power	Rx Sensitivity	Output Power	Rx Sensitivity
MCS8	23(±1.5) dBm	-93 dBm	22(±1.5) dBm	-90 dBm
MCS9	23(±1.5) dBm	-92 dBm	22(±1.5) dBm	-89 dBm
MCS10	23(±1.5) dBm	-89 dBm	22(±1.5) dBm	-86 dBm
MCS11	23(±1.5) dBm	-86 dBm	22(±1.5) dBm	-83 dBm
MCS12	23(±1.5) dBm	-83 dBm	22(±1.5) dBm	-80 dBm
MCS13	22(±1.5) dBm	-79 dBm	21(±1.5) dBm	-77 dBm
MCS14	21(±1.5) dBm	-78 dBm	20(±1.5) dBm	-75 dBm
MCS15	20(±1.5) dBm	-76 dBm	18(±1.5) dBm	-73 dBm

### Mechanism Specification

Size(mm)	<u>260</u> mm x <u>250</u> mm x <u>80</u> mm
Weight (g)	<u>2000</u> g

### Environment Specification

Temperature	- 40℃ ~ + 70℃
Humidity	0% ~ 95% Non-condensing

