# LigoWave

# DLB 2-9B

Outdoor Wireless Device

# DLB 2-9B

The DLB 2-9B is a versatile, very efficient, and stable 2.4 GHz CPE. This product is equipped with an high output power (up to 28 dBm) 802.11n MIMO radio wrapped securely inside a robust, well designed and a small form factor enclosure. The robust hardware is coupled with a 9 dBi directional panel antenna; ideal for short to medium range applications.

Smart dynamic polling based protocol (iPoll 2) ensures reliable communication even in congested areas with 64 client devices connected to a base-station.

Equipped with LigoWave's dual firmware image feature, remote software upgrades are assured even if a power failure interrupts the process. The device will restart using the prior firmware in the event of an upgrade failure.

The enclosure is made of polycarbonate plastic with UV inhibitors to provide years of outdoor exposure in direct sunlight without cracking. Tested to meet vibration, temperature, drop, salt, fog, and electrical surge standards to ensure a high level of reliability and backed by a two-year warranty.   It is equipped with a grounding lug and a grounded 24-volt PoE to allow a professional installation, resistant to electrical surges.

# OS

The DLB OS is a highly functional and easy to use operating system. This powerful and flexible operating system ensures flawless operation of all DLB hardware devices and effortless setup for those deploying the networks.

- Smart polling data transmission protocol (iPoll 2)
- Dual-firmware image support
- Responsive HTML 5 based GUI
- 170 Mbps capacity
- 80,000 PPS rate
- IPv6 support
- WNMS compatible
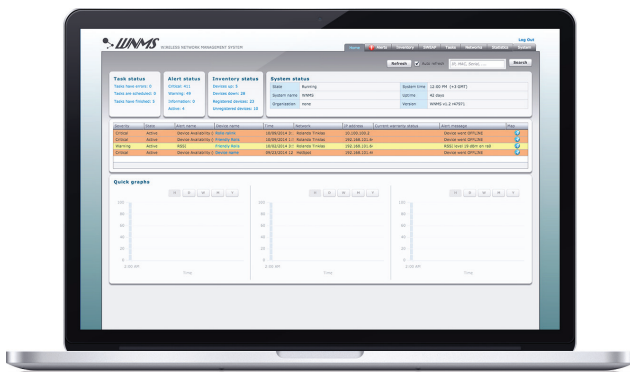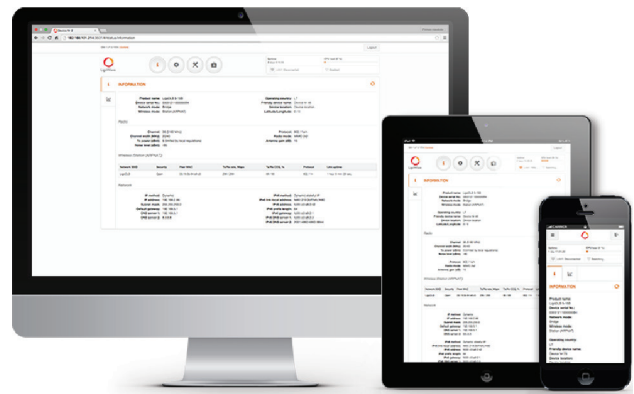
# WNMS

WNMS is a FREE enterprise grade Wireless Network Management System. A single software solution simplifies a large number of management and monitoring tasks for network administrators. LigoWave's comprehensive network management system supports several thousands of nodes. Multiple networks may be maintained and monitored using one server. A rich feature set helps to diagnose network problems effectively, visualize networks on a map, perform scheduled firmware upgrades automatically, track states of devices, get failure alerts, and collect statistics. The Web-based system environment supports multi-user accounts. Several administrators may manage different networks on the same server, without having access to each other's equipment. WNMS is available as a stand-alone version for Linux and Windows servers, as a cloud-based system and as a mobile application for Android devices.

# Specifications

| Product/ distance recomendation | PTMP mode | PTP mode | PTP mode (full capacity) |
|---|---|---|---|
| DLB 2-9B | 3,5 km/ 2.17 mi | 5,5 km/ 3.42 mi | 2,5 km/ 1.55 mi |

## Wireless

| | |
|---|---|
| WLAN standard | IEEE 802.11 b/g/n, iPoll (proprietary) |
| Radio mode | MIMO 2x2 |
| Radio frequency band | 2.402 - 2.492 GHz (FCC 2.412 - 2.462 GHz) |
| Transmit power | Up to 31 dBm (country dependent) |
| Receive sensitivity | Varying between -96 and -74 dBm depending on modulation |
| Channel size | 5,10, 20, 40 MHz |
| Modulation schemes | 802.11 g/n: OFDM (64-QAM, 16-QAM, QPSK, BPSK) |
| | 802.11 b: DSS (CCK, DQPSK, DBPSK) |
| Data rates | 802.11 n: 300, 270, 240, 180, 120, 90, 60, 30 Mbps |
| | 802.11 g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps |
| | 802.11 b: 11, 5.5, 2, 1 Mbps |
| Error correction | FEC, Selective ARQ |
| Duplexing scheme | Time division duplex |

| Receive sensitivity (dBm) | 802.11N/ iPoll (20/ 40 MHz) | 15 Mbps | 30 Mbps | 45 Mbps | 60 Mbps | 90 Mbps | 120 Mbps | 135 Mbps | 150 Mbps |
|---|---|---|---|---|---|---|---|---|---|
| | | -95 | -93 | -91 | -88 | -83 | -80 | -78 | -77 |
| | | 30 Mbps | 60 Mbps | 90 Mbps | 120 Mbps | 180 Mbps | 240 Mbps | 270 Mbps | 300 Mbps |
| | | -92 | -90 | -87 | -84 | -81 | -77 | -76 | -74 |
| | 802.11g | 6 Mbps | 9 Mbps | 12 Mbps | 18 Mbps | 24 Mbps | 36 Mbps | 48 Mbps | 54 Mbps |
| | | -96 | -95 | -94 | -92 | -89 | -85 | -81 | -79 |
| Output power (dBm - combined) | 802.11N/ iPoll (20/ 40 MHz) | 15 Mbps | 30 Mbps | 45 Mbps | 60 Mbps | 90 Mbps | 120 Mbps | 135 Mbps | 150 Mbps |
| | | 31 | 30 | 29 | 28 | 27 | 27 | 26 | 25 |
| | | 30 Mbps | 60 Mbps | 90 Mbps | 120 Mbps | 180 Mbps | 240 Mbps | 270 Mbps | 300 Mbps |
| | | 30 | 29 | 28 | 27 | 27 | 26 | 25 | 24 |
| | 802.11g | 6 Mbps | 9 Mbps | 12 Mbps | 18 Mbps | 24 Mbps | 36 Mbps | 48 Mbps | 54 Mbps |
| | | 31 | 30 | 29 | 28 | 27 | 27 | 26 | 26 |

## Antenna

| | |
|---|---|
| Type | Integrated directional panel antenna |
| Gain | 9 dBi |

## Wired

| | |
|---|---|
| Interface | 10/100 Base-T, RJ45 |

## Software

| | |
|---|---|
| Wireless operating modes | Access point (auto WDS), access point (iPoll 2), station (WDS, iPoll 2), station (ARP NAT) |
| Wireless techniques | Smart station polling, smart auto-channel, adaptive auto modulation, automatic transmit power control (ATPC) |
| Wireless security | WPA/WPA2 personal, WPA/WPA2 enterprise, WACL, user isolation |
| Wireless QoS | 4 queues prioritization on iPoll 2 |
| Network operating modes | Bridge, router iPv4, router IPv6 |
| Network techniques | Routing with and without NAT, VLAN |
| WAN protocols | Static IP, DHCP client, PPPoE client |
| Services | DHCP server, SNMP server, NTP client, router advertisement daemon, ping watchdog |
| Management | HTTP(S) GUI, SSH, SNMP read, WNMS, Telnet |
| Tools | Site survey, link test, antenna alignment |

## Physical

| | |
|---|---|
| Dimensions | Length 150 mm (5.9 ''), width 115 mm (4.5 ''), height 55 mm (2.1 '') |
| Weight | 450 g (16.2 oz) |
| Mounting | Combination wall / pole mount with quick swap bracket included |

## Power

| | |
|---|---|
| Power supply | 12 - 24 VDC passive PoE (24 V passive PoE adapter is included in the package) |
| Power source | 100 – 240 VAC |
| Power consumption (max) | 6 W |

## Environmental

| | |
|---|---|
| Operating temperature | -40°C (-40 F) ~ +65°C (+149 F) |
| Humidity | 0 ~ 90 % (non-condensing) |

## Management

| | |
|---|---|
| System monitoring | SNMP v1 server, Syslogs, system alerts via e-mail and SNMP trap |

## Regulatory

| | |
|---|---|
| Certification | FCC/IC/CE |

# Antenna specifications

### V Pol

Azimuth

Elevation

### H Pol
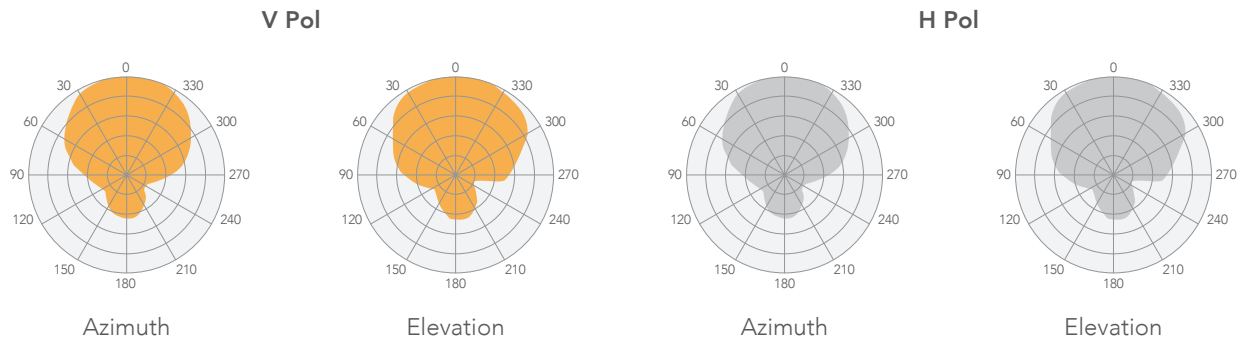
Azimuth

Elevation

## Internal antenna

| | |
|---|---|
| **Frequency range** | 2.4 - 2.5 GHz |
| **Gain** | 9 dBi |
| **Polarization** | Dual linear |
| **Cross-pol Isolation** | 23 dBi |
| **VSWR** | <1.5 |
| **Azimuth beamwidth (H pol)** | 60 deg |
| **Azimuth beamwidth (V pol)** | 60 deg |
| **Elevation beamwidth** | 60 deg |

**DLB 2-9B**