

## DG-WM500-I3R2

# Indoor 802.11ac Wave2 Enterprise AP



### Product Overview

DG-WM500-I3R2 is a high performance cost effective enterprise Wi-Fi AP (Access Point) introduced by DIGISOL. This AP supports both 802.11ac Wave2 and 802.11n standard with Gigabit Ethernet upstream connectivity. The maximum system combined throughput can be up to 2.9Gbps. This AP supports three bands, the first band is 2.4GHz with 2x2:2 MIMO, the second band is configurable, could work in 2.4GHz or 5GHz with 2x2:2 MIMO, the third band is 5GHz with 4x4:4 MU-MIMO. The 2.4GHz radio supports 802.11n standard with up to 300Mbps throughput; the 5GHz radio supports 802.11ac wave2 standard with up to 2.6Gbps throughput.

DG-WM500-I3R2 is based on 802.11ac wave2 standard with MU-MIMO technology, it greatly improved system performance because MU-MIMO can simultaneously transmit to multiple Wi-Fi clients compared with legacy technology can only transmit to a single client at any single point of time. With improved system capacity, 802.11 wave2 AP is expected to have better client connectivity therefore deliver better Wi-Fi user experience.

DG-WM500-I3R2 is designed to use internal antenna, provide 1 Gigabit Ethernet port with PoE(Power over Ethernet) 1 USB 2.0 port; or can be power by DC 12v power adaptor. The mechanical design of this AP enable it can be deployed at multiple scenario like ceiling mount, wall mount or simply desktop deployment.

DG-WM500-I3R2 provides versatile functionality of radio, mobile, security and traffic engineering etc., can work with physical, virtual or cloud AC (Access Controller) to provide enterprise, campus Wi-Fi network access as well as digital class room, commercial Wi-Fi or hotel Wi-Fi coverage etc., is a versatile high performance Wi-Fi Access Point with designed-in owner cost reduction.

## Highlights

### High-Performance and High-Reliability Wireless Network

- **High-speed wireless broadband access**

The DG-WM500-I3R2 supports the 802.11a/b/g/n/ac standard, operates in a 2.4 GHz or 5 GHz band, and provides an access bandwidth up to 2.9Gbps.

- **Flexible installation**

The DG-WM500-I3R2 supports wall mounting, ceiling mounting, T-keel mounting, desktop mounting, you can deploy it almost everywhere that you want.

- **Dual GE ports**

Dual GE ports are used as uplink ports for access, which break through the limitations of conventional FE ports, while meet the backup link, which can effectively solve the physical isolation of network access.

- **Best solution for high density scene**

The DG-WM500-I3R2 support tri-band, could work in dual 2.4GHz and 5GHz or 2.4GHz and dual 5GHz, it could access much more clients simultaneously. MU-MIMO technology could support 4 terminals' communication simultaneously, whole AP support 6 terminals simultaneously, greatly improve the overall throughput of the WiFi network.

- **High-performance RF characteristics**

Professional optimized design is employed for the RF module of the DG-WM500-I3R2, so that a single antenna port supports 20 dB transit power at all rate levels, thereby improving wireless coverage in high-rate access scenarios.

- **Automatic emergency mechanism of APs**

In a centralized network architecture where fit APs and a wireless AC are deployed, the APs will be unable to operate normally when the wireless AC is down and then the entire wireless network will crash. DIGISOL wireless APs support an automatic emergency mechanism. This mechanism enables an AP to intelligently detect links. When detecting that the wireless AC is down, the AP quickly switches its operating mode so that it may continue to forward data while enabling new users to access the network. This mechanism attains high availability in the entire wireless network and really helps wireless users to be always online.

- **Broad operating temperature range**

Thanks to deliberate hardware design and the selection of dedicated components operating in a broad temperature range, DIGISOL smart APs may operate in an environment with its temperature ranging from 0°C to +50°C.

- **Dual-OS backup mechanism**

DIGISOL smart APs support a dual-OS backup mechanism. When an AP fails to start from the active OS, it can immediately start from a standby OS, thereby improving the long-term running reliability of equipment in an adverse environment.

## **Wireless Network of Intelligent Control and Automatic Perception**

- **Support 802.11ac standard**

Downward compatible with the 802.11a/b/g/n protocol, Perfect to existing and future Wi-Fi devices. Can support data transmission rate up to 1.3Gbps\* and simultaneous dual-band technology.

- **Intelligent RF management**

DIGISOL smart APs may be used with a wireless AC to perform automatic power and channel adjustment. They employ particular RF detection and management algorithms to attain a better RF coverage effect. When the signals of an AP are interfered by strong external signals, the AP may automatically switch to an appropriate operating channel under the control of the AC to avoid such interference, thereby guaranteeing wireless network communications. The system also supports wireless network blackhole compensation. When an AP on the network accidentally stops operating, the RF management function of the AC compensates the resulting blind area of signals so that the wireless network can still operate normally.

- **Intelligent control of terminals based on airtime fair**

When some outdated 802.11b and 802.11g terminals are used on a wireless network or some terminals are far way from APs, negotiation rates will be low, causing a large number of users to experience a long WLAN access delay, low rates, or poor overall AP performance. The AP performance problem in a low-rate terminal access environment, however, cannot be resolved by simply employing rate control and traffic shaping. DIGISOL smart APs have essentially resolved this problem by using intelligent control of terminals based on airtime fairness, ensuring that a user can always enjoy the same joyful WLAN experience in the same location, no matter what type of the terminal the user is holding.

The intelligent control of terminals based on airtime fairness greatly improves the performance of both the client and the entire network. It enables all clients with high data transmission rates to attain strikingly higher performance while low-rate clients are almost not affected at all. The performance will be even more obviously higher on an open wireless network. Once high-rate clients finish data transmission, fewer clients will be transmitting data on the wireless network. In this case, there will be less contention and retry on the network, thereby greatly improving overall AP performance.

- **Intelligent load balancing mechanism**

In general, a wireless client will select an AP according to the signal strength of APs. When this uncontrolled access mode is applied, however, a large number of clients could be connected to the same AP simply because the AP provides strong signals. As more clients are connected to an AP, the bandwidth available to each client will be smaller, thereby greatly affecting user experience of the clients. DIGISOL wireless products support diversified intelligent load balancing means:

- AP load balancing based on traffic
- AP load balancing based on the number of users
- AP load balancing based on frequency bands
- Access control based on signal strength of terminals
- Call admission control (CAC) based on the number of users to well guarantee the access performance and bandwidths of terminals with high-priority applications
- Mandatory roaming control of terminals to direct terminals to APs with stronger signals

- **Intelligent identification of terminals**

DIGISOL smart APs may be used with DIGISOL wireless ACs and a unified authentication platform to intelligently identify the size, system type, and type of each terminal; and comprehensively support mainstream smart terminal operating systems, such as Apple iOS, Android, and Windows. They intelligently identify the size of a terminal and adaptively present a portal authentication page of the corresponding size and page pattern, freeing users from multiple times of dragging to adjust the screen and enabling users to enjoy more intelligent wireless experience. They can also intelligently identify the system type of each terminal and present the system type of each terminal such as Windows, MAC OS, or Android on the unified authentication platform, exhibiting every detail of intelligence to users. In addition, they can intelligently identify the type of each terminal such as the mobile phone, tablet, or PC, and implement dynamic policy control of terminals according to different types of the terminals, making possible more intelligent user control at a finer granularity.

- **Comprehensive support for IPv4/v6 dual-stack networks**

Powered by DIGISOL cutting-edge IPv6 technology, DIGISOL smart APs may be deployed on an IPv6 network, with IPv6 tunnels established through auto negotiation between a wireless AC and an AP. When the wireless AC and the AP completely operate in IPv6 mode, the wireless AC can still correctly identify IPv4 terminals and process IPv4 packets from wireless clients. Featuring flexible adaptability to IPv4/6, DIGISOL smart APs cater to complex applications involved in migration from an IPv4 network to an IPv6 network. They not only provide IPv4 service to customers on an IPv6 network, but also enable users on an IPv4 network to log in to the network through the IPv6 protocol at ease.

- **Network-wide seamless roaming**

DIGISOL wireless ACs support an advanced wireless AC cluster technology to support network-wide seamless roaming, the continuity of real-time mobile services is well guaranteed.

- **Support WDS mode**

Support WDS mode under fit AP mode. Use 2.4GHz and 5GHz achieve wireless bridging function.

## **Secure and Controllable Wireless Network**

- **User isolation policy**

DIGISOL wireless APs support the isolation of wireless users from one another. If this user isolation function is enabled, two wireless clients cannot directly communicate with each other but can only access an upstream wired network. This further guarantees the security of wireless network applications.

- **Wireless intrusion detection and intrusion defense**

DIGISOL wireless APs support wireless intrusion detection and intrusion defense features, such as detection of unauthorized wireless devices, intrusion detection, blacklist, and white list, thereby greatly improving security management of an entire wireless network.

- **Wireless user management at a fine granularity**

Each AP supports a maximum of 32 WLANs to implement multi-layer multi-service management of wireless users at a fine granularity. Each WLAN supports access control and uplink/downlink rate limit based on MAC or IP addresses. These WLANs may be bound to virtual local area networks (VLANs). In addition, different authentication and accounting policies can be implemented. This feature is practically significant in a multi-WLAN environment.

- **Secure user admission**

DIGISOL smart APs may be used with wireless ACs to provide multiple secure access, authentication, and accounting mechanisms for various application environments. These mechanisms include:

- 802.1x authentication
- Captive portal authentication, including built-in portal, external portal, and custom portal authentication modes
- MAC address authentication
- LDAP authentication
- WAPI encryption and authentication
- Wired/wireless integrated authentication and accounting

- **Wireless SAVI**

DIGISOL wireless network products support a source address validation (SAVI) technology to deal with spoofed packet attacks that keep emerging on today's campus networks. As users' IP addresses are obtained through an address allocation protocol, users access the Internet using correct addresses in subsequent applications and cannot spoof others' IP addresses, thereby guaranteeing

the reliability of source addresses. In addition, the SAVI technology is combined with a portal technology to further guarantee the authenticity and security of packets of all users accessing the Internet.

- **PEAP user authentication**

With the popularization and application of smart terminals, wireless terminal users require authentication mechanisms of higher usability and convenience. Using a mechanism that combines portal authentication and MAC address authentication, DIGISOL wireless network products support Protected Extensible Authentication Protocol (PEAP) authentication to attain better user experience. Initially a user needs to manually perform portal authentication and later the user gets authenticated through PEAP in automatic mode. DIGISOL wireless network products feature high terminal adaptation and provide good authentication compatibility. They adapt to the majority of WLAN terminals and do not need to adapt to clients. DIGISOL wireless network products are compatible with existing portal authentication modes.

- **Secure access mechanism**

An AP is usually deployed in a public area and therefore requires a strict security mechanism to guarantee the legality of access devices. The following secure access mechanisms may be applied between a DIGISOL smart AP and a wireless AC:

- AP MAC address authentication
- AP password authentication
- Bidirectional digital certificate authentication

## **Easy-to-Manage Wireless Network**

- **Plug-and-play**

DIGISOL smart APs are able to automatically discover DIGISOL wireless ACs. A wireless network function can be enabled on an AP without performing any configuration on the AP at all. The AP can be seamlessly integrated with existing switches, firewalls, authentication servers, and other network devices without changing existing network architecture.

When used with a DIGISOL wireless AC, DIGISOL smart APs support plug-and-play and zero configuration. The wireless AC undertakes all the management, control, and configuration of the APs. Network administrators do not need to separately manage or maintain a huge number of wireless APs. All actions, such as configuration, firmware upgrade, and security policy updating, are performed uniformly under the control of the wireless AC.

- **Fit and Fat modes**

DIGISOL smart APs may work in fit or fat mode and can flexibly switch between the fit mode and the fat mode according to network planning requirements. Users may also flexibly choose an ex-factory device version according to specific application requirements. APs working in fit mode are managed by a wireless AC in a centralized manner. System administrators may easily manage the entire network as the states of all the APs are clear at a glance.

- **Remote probe analysis**

DIGISOL smart APs support a remote probe analysis function, which listens to and captures Wi-Fi packets in the coverage and mirrors them to a local analysis device in real time to help network administrators better perform troubleshooting or optimization analysis. The remote probe analysis function can perform non-convergence mirroring of a working channel and sampling of all channels in polling mode as well to flexibly meet various wireless network monitoring, operation, and maintenance requirements.

- **Energy efficiency mode**

Support U-APSD power saving mode, can flexibly control USB and Ethernet port and a second spatial MIMO stream.

DG-WM500-I3R2 80% of the material can be recycled to achieve real environmental protection.

## Product Specifications

### Hardware Specifications

Item	DG-WM500-I3R2
Dimensions (mm)	247 x 153 x 30
10/100 /1000Base-T port	2
Console port (RJ-45)	1
USB 2.0 port	1
PoE	802.3at
Local	External power adapter Input: 100 ~ 240V AC , Output: 12 V DC
Maximum power consumption	<18W
RF port	Built-in 2.4 GHz 4 dBi antenna and 5 GHz 5 dBi antenna
Working frequency band	802.11a/n : 5.150 GHz to 5.850 GHz 802.11b/g/n : 2.4 GHz to 2.483 GHz 802.11ac: 5.150GHz to 5.250GHz 5.250GHz to 5.350GHz 5.725GHz to 5.850GHz

<b>Modulation technology</b>	802.11b : BPSK , QPSK , CCK 802.11a/g/n:BPSK , QPSK , 16-QAM , 64-QAM 802.11ac : BPSK , QPSK , 16-QAM , 64-QAM , 256-QAM
<b>Transmit power</b>	2.4G : 23dBm ( Per Chain ) 5G : 23dBm ( Per Chain ) <i>(Note : final output power comply to deployment regulation might be different)</i>
<b>Power adjustment granularity</b>	1 dBm
<b>Working/Storage temperature</b>	-0°C to +50°C -40°C to +70°C
<b>Working/Storage RH</b>	5% to 95% (non-condensing)
<b>Protection level</b>	IP41

### Software Specifications

Item	Feature	DG-WM500-I3R2
WLAN	<b>Product positioning</b>	Indoor tri-frequency
	<b>Working frequency band</b>	2.4 GHz, 5GHz and 5 GHz or 2.4GHz, 2.4GHz and 5GHz
	<b>Virtual AP (BSSID)</b>	48
	<b>Number of spatial streams</b>	2.4G:2 5G:4
	<b>Dynamic channel adjustment (DCA)</b>	Yes
	<b>Transmit power control (TPC)</b>	Yes
	<b>Blind area detection and repair</b>	Yes
	<b>SSID hiding</b>	Yes
	<b>RTS/CTS</b>	Yes
	<b>RF environment scanning</b>	Yes
	<b>Hybrid access</b>	Yes
	<b>Restriction on the number of access users</b>	Yes
<b>Link integrity check</b>	Yes	



Item	Feature	DG-WM500-I3R2
	Intelligent control of terminals based on airtime fairness	Yes
	High-density application optimization	Yes
11n enhancements	40 MHz bundling	Yes
	300 Mbps (PHY)	Yes
	Frame aggregation (A-MPDU)	Yes
	Maximum likelihood demodulation (MLD)	Yes
	Transmit beam forming (TxBF)	Yes
	Maximum ratio combining (MRC)	Yes
	Space-time block coding (STBC)	Yes
	Low-density parity-check code (LDPC)	Yes
Security	Encryption	64/128 WEP, TKIP, and CCMP encryption
	802.11i	Yes
	WAPI	Yes
	MAC address authentication	Yes
	LDAP authentication	Yes
	PEAP authentication	Yes
	WIDS/WIPS	Yes
	Protection against DoS attacks	Anti-DoS for wireless management packets
	Forwarding security	Frame filtering, white list, static blacklist, and dynamic blacklist
	User isolation	AP L2 forwarding suppression Isolation between virtual APs (multiple SSIDs)
	Periodic SSID enabling and disabling	Yes
	Access control of free resources	Yes
	Secure admission control of wireless terminals	Secure admission control of wireless terminals based on DCSM
Wireless SAVI	Yes	

Item	Feature	DG-WM500-I3R2
	ACL	Access control of various data packets such as MAC, IPv4, and IPv6 packets
	Secure access control of APs	Secure access control of APs, such as MAC authentication, password authentication, or digital certificate authentication between an AP and an AC
Forwarding	IP address setting	Static IP address configuration or dynamic DHCP address allocation
	IPv6 forwarding	Yes
	IPv6 portal	Yes
	Local forwarding	Yes
	Multicast	IGMP Snooping
	Roaming	Yes
	AP switching reference	Signal strength, bit error rate, RSSI, S/N, whether neighboring APs are normally operating, etc.
QoS	WMM	Yes
	Priority mapping	Ethernet port 802.1P identification and marking Mapping from wireless priorities to wired priorities
	QoS policy mapping	Mapping of different SSIDs/VLANs to different QoS policies Mapping of data streams that match with different packet fields to different QoS policies
	L2-L4 packet filtering and flow classification	Yes: MAC, IPv4, and IPv6 packets
	Load balancing	Load balancing based on the number of users Load balancing based on user traffic Load balancing based on frequency bands
	Bandwidth limit	Bandwidth limit based on APs Bandwidth limit based on SSIDs Bandwidth limit based on terminals Bandwidth limit based on specific data streams
	Call admission control (CAC)	CAC based on the number of users
	Power saving mode	Yes

Item	Feature	DG-WM500-I3R2
	<b>Automatic emergency mechanism of APs</b>	Yes
	<b>Intelligent identification of terminals</b>	Yes
	<b>Multicast enhancement</b>	Multicast to unicast
<b>Management</b>	<b>Network management</b>	Centralized management through an AC; both fit and fat modes
	<b>Maintenance mode</b>	Both local and remote maintenance
	<b>Log function</b>	Local logs, Syslog, and log file export
	<b>Alarm</b>	Yes
	<b>Fault detection</b>	Yes
	<b>Statistics</b>	Yes
	<b>Switching between the fat and fit modes</b>	An AP working in fit mode can switch to the fat mode through a wireless AC; An AP working in fat mode can switch to the fit mode through a local control port or Telnet.
	<b>Remote probe analysis</b>	Yes
	<b>Dual-image (dual-OS) backup mechanism</b>	Yes
	<b>Watchdog</b>	Yes