

INSTALLATION AND MAINTENANCE GUIDE

N.A.A.W. XTEND



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1. VERIFICATION SECTION

1.1 Approval

APPROVED BY	POSITION	DATE
Nicola De Carne	Wireless Networking Director - Wi-Next S.r.l.	30th May 2011

1.2 Revision history

REV.	AUTHOR	DESCRIPTION	DATE
0	Wi -Next S.r.l.	First draft	15th Jun 2008
1	Wi-Next S.r.l.	Revision	9th Mar 2010
2	Wi-Next S.r.l.	Revision	30th May 2011

Further updates and related revisions of the present manual are available on-line at the following address: www.winext.eu/wiki.

1. VERIFICATION SECTION

1.4 Versioni

N.A.A.W. Xtend

Thanks to the two radio a/b/g/n and to the integrated antenna it is able both to realize a middle-range link to the wireless signal origin and to locally distribute it with a hot spot coverage:

- middle-range backbone link on 5 GHz
- hot spot coverage on 2,4 GHz

2 Radio 21 dBm
(aggregated channels)

N.A.A.W. Xtend Long Range

The radio for the connection on 5 GHz has an aggregated power 28dBm (aggregated channels) to realize stable and reliavble long-range links up to 10 km toward the origin of the signal. The second radio always assures the creation of local hot spot coverage:

- long-range backbone link on 5GHz
- hot spot coverage on 2,4 GHz

1 Radio 28 dBm
(aggregated channels)

1 Radio 21 dBm
(aggregated channels)

N.A.A.W. Xtend Triradio

The presence of the third radio a/b/g/n allows a big use flexibility both to realize redundant or multiple backbone connections and to upgrade the hot spot local coverage:

- middle-range backbone link on 5 GHz
- hot spot coverage on 2,4 GHz
- possibility to use the other radio for the backbone middle range link on 5 GHz or hot spot coverage on 2,4 GHz

3 Radio da 21 dBm
(aggregated channels)

N.A.A.W. Xtend Triradio Long Range

The radio 28 dBm on 5 GHz allows to realize long-range links up to 20 km (with the use of the external antenna) and it is bound to the several use opportunity offered by the two radio of 21 dBm (aggregated channels) by offering big flexibility in the creation of the wireless network:

- long-range backbone link on 5GHz
- dorsal middle-range backbone link on 5GHz
- hot spot coverage on 2,4 GHz

1 Radio 28 dBm
(aggregated channels)

2 Radio 21 dBm
(aggregated channels)

Thank you for purchasing this N.A.A.W. product. This document contains full documentation relating to the product, including the declaration of conformity. The user's guide gives all the information regarding installation and testing of the N.A.A.W. Connect, and its subsequent periodic maintenance.

2.1 Compliance with R&TTE directives

Wi-Next S.r.l. declares that the N.A.A.W. Xtend complies with the essential requirements and relevant provisions of Directive 1999/5/EC.

2.2 Restrictions of use: ministerial regulations

Please note that the use of this device is regulated by:

- 1 Legislative Decree 08/01/2003 N.259, Articles 104 (activity subject to general authorisation) and 105 (free use for personal use);
- 2 Ministerial Decree 28/05/2003 and subsequent amendments to the provision of private and public access to networks and telecommunications services.

2.3 Warnings

This manual sets out information to anyone in charge of:

- installation
- maintenance
- network administration or anyone employed in a technical capacity - provided they are informed about the risks and safety standards regarding the installation, operation and maintenance of electric radio communications equipment.

When carrying out the installation you must check the functionality of the N.A.A.W. Enterprise.

Do not take any corrective action unless you are certain about the result.

Do not dismantle the device. Taking apart the device will invalidate the warranty. In case of doubt, please contact our technical support section (e-mail: assistenza@winext.eu).

2. INTRODUCTION

The manufacturer will not be liable for any damage to property or injuries in case of:

- improper use of the device,
- use of the device by untrained staff,
- improper installation,
- faulty or inadequate materials used for the installation,
- unauthorised modifications,
- use of non genuine spare parts,
- non-compliance with the recommendations contained in this document.

The manual covers only the use of the application provided by the manufacturer and under existing legislation relating to data transmission by radio.

3. DESCRIPTION OF N.A.A.W Xtend

3.1 Intended purpose of use by the manufacturer

The N.A.A.W.Xtend in all its versions, is a radio device for outdoor wireless data transmission operating on 2.4 GHz or 5.4 GHz frequency.

3.2 Package Content

- outdoor unit (ODU) with integrated antenna and mounting brackets.
- indoor unit (IDU): 230V/30W adapter with POE switch.
- user manual on CD-ROM.

The product consists of two units:

- The plastic outdoor unit (ODU) which contains the control card and the transceiver unit which is directly connected to the antenna.
- The indoor unit (IDU) which can be connected to the local ethernet and is connected to the external unit via UTP multicore CAT5 cable.



ODU is powered with 48V/30W, ensuring the safety of those who carry out the installation.

3. DESCRIPTION OF N.A.A.W XTEND

3.3 Outdoor Unit (ODU) - Indoor Unit (IDU)



Fig. 1 Detail: Power adapter with POE



Fig. 2 ODU

3.4 Technical specification of N.A.A.W. Xtend Features

NAAW Mesh Built-in DHCP Server + DNS Forwarder SNMPv2 e SNMPv3 Support for standard protocol routing QoS Definition of groups, available bandwidth and traffic prioritization (No GUI) Advanced Firewall (No GUI) Full packet inspection layer 3 + layer 7 (No GUI) Tunneling Layer 2 Support for IPSEC (No GUI) VPN (No GUI) Address type: Static IP Dynamic IP PPPoE NAAW mesh Management: Web GUI Telnet or SSH	Wireless Features: Supports up to 4 virtual access points (VAP) per radio. Traffic from each VAP can be tagged to a unique VLAN and /or bridged if required. Each VAP will be able to configure their own security (WEP, TKIP, and AES). WDS Support Security: • Mac Filtering (accept/deny list) • WEP • WPA/WPA2 • 802.1x Wireless advanced features: Transmission Power Control Hide SSID Rate Control IEEE 802.11h (DFS & TPC) DFS • DFS = Dynamic Frequency Selection • TPC = Transmission Power Control Antenna alignment graph WMM - Wireless Multimedia
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Technical specs N.A.A.W. Enterprise

Dimension (external antennas excluded) 219mm x 173mm x 308mm Weight : 1kg Hardware features Linux OS CPU XScale X425-533 Mhz 128Mb SDRAM - 16 Mb FLASH RAM 1 Ethernet Port 10/100 Base-TX (with Auto MDI/MDIX) PoE IEEE 802.3af Standard PoE Compatible (High Power) 2 N connector for external antennas (triradio version)	Integrated Antennas Dual Polarization Antenna 5 Ghz 16 dBi -16° dual polarization Antenna 2.4 Ghz 8 dBi - 90° dual polarization External Antennas (optional) 2,4 Ghz - 5 Ghz Power Supply 120/240 V autosensing 48 V DC output Environment Operating temperature : from -20°C to +55°C Humidity : from 5% to 95%
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4. SETTING UP OF THE DEVICE

4.1 Installation and inter-connection

N.A.A.W. Xtend is equipped with safety features for the protection against direct and indirect contact. **However, the installation must be carried out by appropriately qualified personnel who must observe the following precautions:**

- check the package and promptly notify the supplier in case of damage;
- make sure access points, antennas and support structures are properly installed to avoid health hazards;
- make sure that installation of the access point, antennas and cables is made in accordance with local regulations regarding safety;
- even if earthing is not mandatory by local regulation, it is strongly recommended that all outdoor units have an appropriate earth connection and that they are adequately protected from possible lightning or electrical discharges;
- mount the ODU using the support and the metal clamps provided;
- connect the IDU to the ODU with ethernet cable type CAT5 UTP; Maximum recommended length for CAT5 UTP cable is 90m.

4.2 Preparing and switching on the device

To set up the device:

- fix the support stirrup to the plastic case with screws supplied
- fix the ODU unit with the support and the metallic small band supplied. (see the image)



- connect the power supply to a light socket 220/230V and insert the wrist pin into the socket of the POE switch supplied
 - connect a UTP CAT5 cable to the exit "OUT" of the switch PoE and to the socket RJ-45 of the device
 - close the RJ-45 connector of the device with the cable cover supplied.
- The device start up and became available after almost 60 seconds

4. SETTING UP OF THE DEVICE

4.3 Antenna Pointing

The installation of the ODU and the orientation of the antenna must be executed by qualified operator, according to the current safety regulations for external environment, on rooftops or on telecommunication towers.

Wi-Next will not be held responsible for damage to people or property resulting from installation of outdoor unit and relative antennas external to the ODU.

We suggest:

- place the antenna as high as possible to get a more efficient connection.
- position the ODU as near as possible to the eventual external antennas where use the shortest coaxial cables and with less loss (models with external antenna).
- check the visibility with the antenna to be connected with.
- check the presence of vegetation which can obstruct the propagation of the radio signal between different points.
- optimize direction pointing with the utilization of the signal graph illustrated in the next section.

5.1 N.A.A.W. control panel

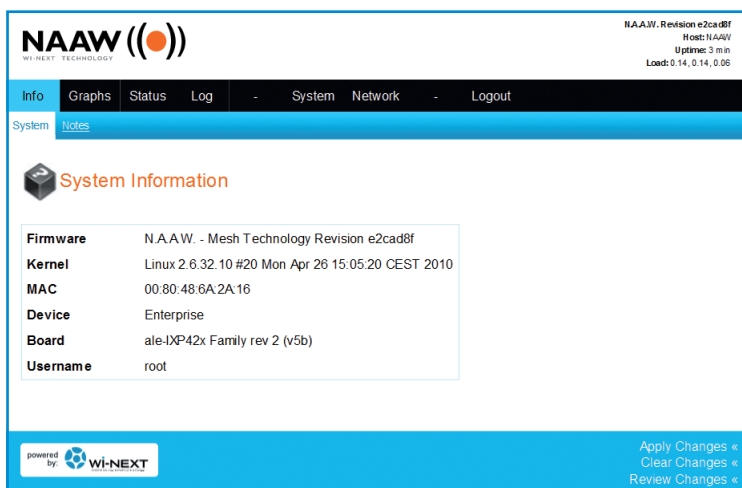
The N.A.A.W. control panel is a Web application that resides on the device and it is easily accessible by pointing the browser to one of the IP addresses of the device, either by wireless or by cable.

If you want to configure your PC manually, you must know the address of the N.A.A.W. interface to which you are connected (the default is 192.168.1.1/24 on Ethernet ports and wireless network in AP mode). Or you can follow the discovery procedure outlined in section 5.11 “Troubleshooting – N.A.A.W. can’t be reached at the assigned IP address.

5.2 First access

To accede to the panel control of the device you need to connect it to a pc, to open the Internet browser and to insert the default address **192.168.1.1**.

During the first access you will be asked to insert the control password; the username is **ROOT** always.



On the Manual CD included in the package you can find a ".bin" file containing the firmware of the device to be used to restore it, if needed, following the procedure reported in section 5.5

5.3 Modification, save and application of changes

The control panel is administered through configuration pages which allow the working parameters of the device to be modified.

When you make modifications to the parameters of one of them, it is necessary to save them in each single page using the button “Save the changes” which is on the bottom of the pages.

In the footer of each page there is a taskbar with the commands related to the changes made:

- Apply changes - to activate all changes saved previously
- Delete changes -to delete all changes saved previously
- Check changes – to check the accuracy of changes saved previously

Working on the device configuration, the normal procedure is to do the following passages:

- Modification and save of the parameters in the different pages with the button “Save changes”
- Application of the changes saved with link “Apply changes”
- Restart of the device (see chapter “5.4 System”)



After the restart of the device it is possible to reach the control panel to the IP address which was settled up by administrator during the configuration.

5.4 Main menu

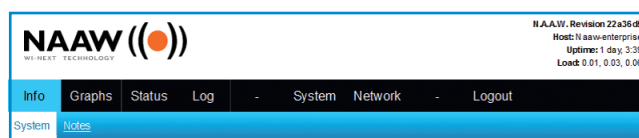
You can accede the different configuration pages through 6 areas (each of these present several detail sections).

Two areas are used to configure the device:

- System
- Network

Besides four areas present the information about the state of working of the device:

- Info
- Graphs
- State
- Log



In the following sections we present different configuration areas. Inside of them often you could insert commands or configurations which can cause the incorrect working of the device and they have to be used only by competent staff.

5.5 System

The page shows 8 section:

1. Configuration

Basic Parameters of the system.

Host name: device's name

Time settings: parameters related to the system time

N.A.A.W. GUI settings: menu in the language of configuration interface

http Port: configuration of the port on which you can make the web configuration interface available via http (the standard port 80 if it is not settled).

2. Start up

This section contains a textual box in which is possible to add Linux commands to be executed at the boot of the device.

3. Crontabs

In this section is possible to add, modify, remove Linux commands to be periodically executed; the configuration interface allows to define the periodicity (in minutes, hours, days, months).

4. Services

This section presents all services available in the N.A.A.W device with their current condition.

The first icon reports the state (enabled, disabled).

For each service there are 5 options:

- Enable – it enables the service at next restart of the device (without activate it immediately)
- Disable – it disables the service at next restart of the device (without disabling it immediately)
- Start – it starts the service immediately (without modifying the setup – enabled/disabled – at the next restart).
- Restart - it stops and immediately restart the service (without modifying the setup – enabled/disabled – at next restart).
- Stop – it stops the service immediately (without modifying the setup –enabled/disabled – at next restart).

If you want to enable and to be start sudden a service disabled at the moment, you should both to push the button “enable” (to activate the service at next restart) and to push the button “start” (to start of the service immediately).

Services

Available services

❌ avahi-daemon	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop
✅ boot	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop
✅ cron	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop
✅ crontab	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop
✅ dmesgbackup	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop
✅ dnsmasq	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop
✅ done	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop
✅ dropbear	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop
✅ firewall	🟢 Enable	🔴 Disable	🟢 Start	🔄 Restart	🔴 Stop

🟢 Service Enabled
 🔴 Service Disabled

5. Password

This section allows to reset the access password to the device.

6. Configuration management

This section allows you to manage the configuration profiles of the device. This section contains:

- Configuration profile

In this area you can select one of the profiles or to create a new profile as a copy of the current one.

When a new profile is selected, it is possible to restart the device immediately (with the application of all parameters of the same profile) or it is possible to restart the device subsequently in order to modify the parameters first.

- Backup of the configuration

This area allows you to export a copy of the profile used for backup and/or to be reused on other devices (such as to accelerate the configuration activities of the devices which use similar profiles).

- Load configuration

This area allows you to load a configuration saved locally; if a configuration with the same name of one of already existing configurations is loaded, the system overwrites the new configuration.

To activate the loaded configuration it is necessary to select it in the drop-down menu in the area "Configuration profile".

- Restore factory configurations

This option allows you to restore the factory configurations of the device whit the deletion of all made modifications.

7. Update

This section allows to load the firmware updates of the device.

8. Restart

This section allows to restart the device.

5.6 Network

The page includes 9 sections where it is possible to make the main device configurations:

- 1) Network
- 2) Ethernet
- 3) Wireless
- 4) Firewall
- 5) DHCP
- 6) Tunnels
- 7) Routes
- 8) DynDNS
- 9) Tweaks

For the configuration of the device it is first necessary to define the networks; the configuration of the networks is, in this first phase, totally unconnected from physical interfaces (radio or Ethernet) to which the same networks are associated. In succession there are in detail the different sections of menu.

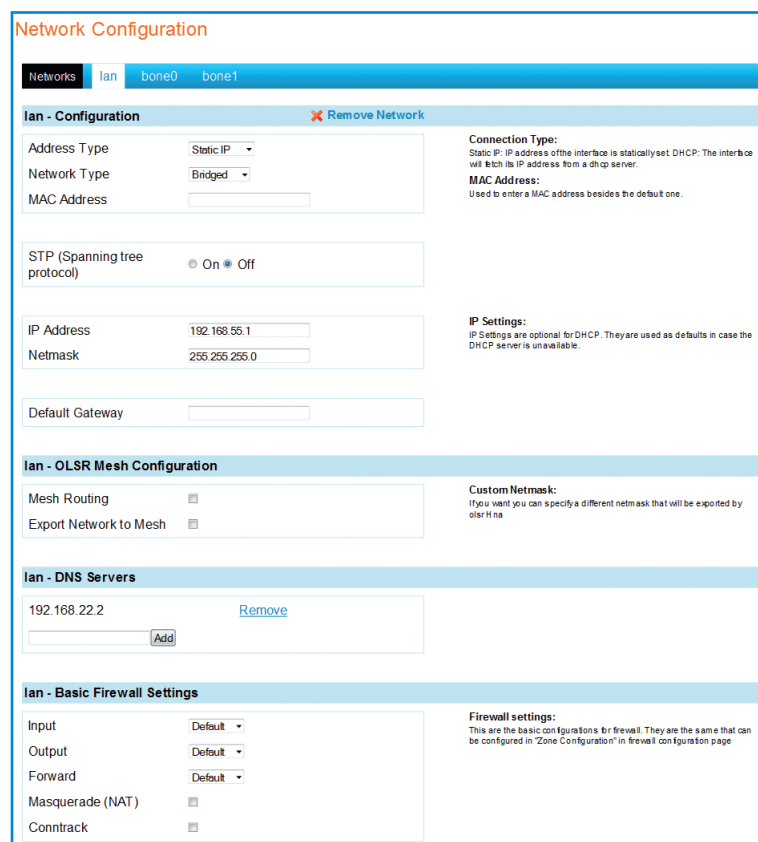
5.6.1 Network

This page shows the main information about the configured networks.

In the upper bar there is the list of available networks.

In succession there are the main information about each of the configured networks on the device and on the side of each one name there is the link “Configure” to reach relative detail section of the configuration.

At the bottom of the page there is a box which allows you to add a new network (to be configured) to existing ones; to add it, you simply have to insert the desired name and push on the button “Add network”. By selecting the link “Configure” you can enter in detail page of the selected network.



The screenshot shows the 'Network Configuration' page for the 'lan' network. The page is divided into several sections:

- Networks:** A bar at the top showing 'lan', 'bone0', and 'bone1'.
- lan - Configuration:**
 - Address Type:** Static IP (selected).
 - Network Type:** Bridged (selected).
 - MAC Address:** A text input field.
 - STP (Spanning tree protocol):** On (selected) / Off.
 - IP Address:** 192.168.55.1
 - Netmask:** 255.255.255.0
 - Default Gateway:** A text input field.
- lan - OLSR Mesh Configuration:**
 - Mesh Routing:** ☐
 - Export Network to Mesh:** ☐
- lan - DNS Servers:**
 - 192.168.22.2 (with a 'Remove' link)
 - An 'Add' button.
- lan - Basic Firewall Settings:**
 - Input:** Default (selected)
 - Output:** Default (selected)
 - Forward:** Default (selected)
 - Masquerade (NAT):** ☐
 - Conntrack:** ☐

On the right side of the configuration sections, there are explanatory notes:

- Connection Type:** Static IP: IP address of the interface is statically set. DHCP: The interface will fetch its IP address from a dhcp server.
- MAC Address:** Used to enter a MAC address besides the default one.
- IP Settings:** IP Settings are optional for DHCP. They are used as defaults in case the DHCP server is unavailable.
- Custom Netmask:** If you want you can specify a different netmask that will be exported by olsr. It is.
- Firewall settings:** These are the basic configurations for firewall. They are the same that can be configured in "Zone Configuration" in firewall configuration page.

For each network there are four sections:

1) Configuration

In this section the basic parameters of the IP configuration are defined.

The first group of options defines the address type to be used; the other options in the first group change on the base of address type selected.

The parameters configurable are the following:

- IP address used by the network; it can assume the following values:
 - Disabled – any IP address is associated to the network
 - N.A.A.W. – N.A.A.W. address is associated to the network and it is calculate automatically on the base of the template settled by the administrator.
 - Static IP – a static IP address is associated to the network (the address is defined by the administrator subsequently)
 - DHCP – an address released by a DHCP server connected to the interface associated to the network (typically the Ethernet interface) is associated to the network
- PPPOE – a PPPOE address released by a PPPOE server on the base of the authentication parameters inserted by the administrator is associated to the networkType of network – this parameter can assume three values and it is bound to the settled address:
 - No one – any typology is associated to the network (this option has to be selected if a N.A.A.W. network is set up)
 - Bridged – the network made is a bridge with all the interfaces associated to it into a single bridge (this option has to be selected by default if you want to set up one of the other address type with the exception of N.A.A.W.)
 - Bonding – the network made is bonding type with the association of several physical interfaces distinguished into a single virtual interface; this type of network is used to aggregate several radio interface with an unique link in order to increase the band width of the single link and it has to be used only by expert users
- MAC address – in this area (optional) you can add an additional MAC address to the default one
- STP (Spanning Tree Protocol) – activation option of the Spanning Tree Protocol.

The following options depend on the type of the selected address.

If you select “Disabled” there aren’t additional options.

If you select “N.A.A.W.” there are the following options:

- IP Template – template of four octet used as reference for the generation of the IP address
- IP Template Mask – mask of reference used for the auto generation of the IP address in combination with the IP template field
- Netmask – Subnet mask used by the network; normally this field can be leaved empty because it is determined automatically by the device on the base of reference template; anyway it is possible to identify a specific subnet mask.

Generation of N.A.A.W address

To calculate its address, the device compares the IP template values with the IP template mask; by translating the numbers of the relative four octets in binary notation, the system considers the values of IP template field which correspond to the value 1 fixed, and the values which correspond to the value 0 changeable; on the base of the mac address of the device the system will calculate automatically an IP address congruent with fixed template .

For a detailed explanation of the construction logic of the N.A.A.W address, it is possible to consult the wiki on the wi-next website at the following address (text in Italian):

<http://www.winext.eu>

After inserting the IP Template values and IP Template Mask and saving the data, the page itself is updated and on the side of the box of IP template, the address which the device automatically calculated appears.

If "IP static" is selected there are the following options:

- IP address- address assigned to the network
- Netmask – Subnet mask used by the network
- Default Gateway – default gateway associated to the network; if in this field there is an IP address, the device presents itself as a "gateway" in the networks that are created.

If "DHCP" is selected, there are the same options used for static IP: these options are used for recovery in the case that the device cannot receive an IP address from the DHCP server which is connected.

If "PPPOE" is selected, there are the classic options of this type of authentication:

- User
- Password
- Reconnection (on request or permanent)
- maximum inactivity time (in seconds)
- MTU (package size)
- default route (to use the PPPOE connection as default gateway)

2) Mesh OLSR configuration

In this section there are two parameters:

- Mesh routing – when this option the OLSR mesh routing daemon is activated and in this way the N.A.A.W mesh network can work properly; this parameter has to be activated only when the mesh network is configured with N.A.A.W. address type.
- export the network on the mesh – with this option the subnet created is "presented" to the mesh networks (such as if a network with 192.168.2.x addresses is created, by activating this option all devices inside the subnet identified and connected to the device – via Ethernet or Wi-Fi – is "presented" to the rest of the mesh network and in this way the device became a router through networks).

When the option "Export the network on mesh" is activated you can find a field for the insertion of a specific netmask (if it is empty, the system uses the default netmask for the network)

3) DNS server

In this section you can add one or more DNS server.

4) Configuration basic Firewall

In this section you can setup the basic rules of the firewall on the device (for the advanced options you can consult the following section 5.6.4).

In the section you can define the firewall rules for the packages in Input, Output or Forward.

There are two options too:

- Masquerade (NAT) – option to enable the NAT of the outgoing traffic from the network
- Conntrack – option to allow the network to operate through the NAT of one of the other (for instance: if you set up a network for doing the NAT of the traffic, it is necessary to activate the Conntrack option on all the other networks).

5.6.2 Ethernet

The page allows to associated the device Ethernet interface to one of the created networks.

The device Ethernet interface is “eth0” (it is the same physical interface present on the device and powered by PoE switch); the page also allows to configure the “eth1” interface by associating it to one of the networks, but this interface is not physical available on the device.

5.6.3 Wireless

The page allows to configure all radios of the device.

In the upper bar there is the list of the available radios.

On the right on the bar there is a menu which allows to visualize the basic information (default) of the virtual interfaces or the advanced ones.

Following there are the configuration parameters and the associated virtual interfaces for each radio.

For each radio in fact it is possible to associate several different virtual interfaces (for instance to use at the same time a radio in ad-hoc mode inside N.A.A.W. mesh network and as a standard access point for Wi-Fi client).

In connection with the type of the device which is used it is possible to advert to the schedule reported in appendix to verify the correlation between the radio and the integrated and/or external antenna.

For each radio there are two distinguished areas:

- Configuration of the wireless board (unique for each radio)
- Configuration of the virtual adapter for the wireless board (one or more for each radio)

5. CONFIGURATION

Wireless Configuration: Settings saved

Adapters **All** radio0 radio1 Configuration Type: Basic

radio0 - Wireless Adapter Configuration

Radio	☒ On ☐ Off
Country	EGYPT
Mode	802.11NG
Channel	1
Channel Width	20MHz
Max Associated Clients	
Wireless Distance (In Meters)	

[Add Virtual Interface](#)

Atheros Wireless Configuration:
 The router can be configured to handle multiple virtual interfaces which can be set to different modes and encryptions. Limitations are 1x sta, 0-4x ap or 1-4x ap or 1x adhoc

Channel Width:
 Width of channel

Max Associated Clients:
 Maximum number of associated clients that will be accepted by this wifi radio card.
 IEEE 802.11 has a limit of 2007 different association IDs, so this number should not be larger than that. (default 2007)

Wireless Distance:
 This is the distance of your longest link.

Wireless Virtual Adaptor Configuration for Wireless Card radio0

[Remove Virtual Interface](#)

Network	lan
Mode	Access Point
ESSID Broadcast	☒ On ☐ Off
ESSID	naawnt11n
Encryption Type	WPA+WPA2 (PSK)
WPA PSK	
MAC Filter	Disabled

Encryption Type:
 WPA (RADUIS) is only supported in Access Point mode. WPA (PSK) does not work in Ad-Hoc mode.

radio1 - Wireless Adapter Configuration

Radio	☒ On ☐ Off
Country	EGYPT
Mode	802.11NA
Channel	149
Channel Width	20MHz
Outdoor	On
Max Associated Clients	
Wireless Distance (In Meters)	

[Add Virtual Interface](#)

Atheros Wireless Configuration:
 The router can be configured to handle multiple virtual interfaces which can be set to different modes and encryptions. Limitations are 1x sta, 0-4x ap or 1-4x ap or 1x adhoc

Channel Width:
 Width of channel

Max Associated Clients:
 Maximum number of associated clients that will be accepted by this wifi radio card.
 IEEE 802.11 has a limit of 2007 different association IDs, so this number should not be larger than that. (default 2007)

Wireless Distance:
 This is the distance of your longest link.

Wireless Virtual Adaptor Configuration for Wireless Card radio1

[Remove Virtual Interface](#)

Network	bone0
Mode	Ad-Hoc
ESSID Broadcast	☒ On ☐ Off
ESSID	mesh.naaw
BSSID	ca:15:e2:87:35:2d
Encryption Type	Disabled
MAC Filter	Disabled

Encryption Type:
 WPA (RADUIS) is only supported in Access Point mode. WPA (PSK) does not work in Ad-Hoc mode.

The configuration parameters of the wireless board are the following:

- Radio activation – allows to turn on/off the selected radio
- Country – menu of choice between the different countries to activate the specific limitations in the use of channel radio according to the local regulations
- Mode choice – menu of choice between the usable modes for the radio (802.11NA, 802.11A, 802.11NG and 802.11G according to the radio typology)

5. CONFIGURATION

- Channel – menu of choice between the radio channel available for the selected mode.
- Channel width – select the channel width to be used in 802.11 N mode
 - 20 MHz . single channel
 - 40 MHz (lower channel) – aggregation with the lower channel with the selected one
 - 40 MHz (upper channel) – aggregation with the upper channel with the selected one
- Outdoor – option to activate the outdoor mode related to the radio channels/usable powers (this option is visualized only when the regulation entails differences between outdoor and indoor use of the frequencies).
- maximum number of associated client – maximum number of wireless client accepted at the same time from the radio board
- Distance – distance in meters of the further radio connection realized by the device; the parameter serves to optimize the radio transmission and it is better that it is rounded up.

The standard parameters of the virtual adapter configuration are the following:

- Network – network which is associated to the radio board (it is selected between the networks available in the page “networks”)
- WLAN mode – working mode of the virtual interface; the selectable options are the following (in connection with selected mode some of subsequent options change):
 - access point – the radio works as a wireless access point
 - WDS – the radio works in WDS mode
 - Client – the radio works as Wi-Fi client for a wireless access point
 - ad hoc - the radio works in ad-hoc mode (this mode has to be used when the virtual adapter is set up to work within a N.A.A.W. mesh mode network).
 - Pseudo ad Hoc (Ahdemo) – it is the same of the previous one, but it is characterized by the absence of wireless control packages between the nodes.
- WDS – option for the WDS activation
- Broadcast ESSID – option to enable the ESSID broadcast
- Tx Power – menu to set up the power level of radio transmission
- ESSID – wireless network name of virtual adapter
- BSSID – in ad hoc mode (it is used for mesh networks) it is an obligatory identification used by the devices to connect among each other; by setting up the same BSSID and the same radio channel the devices are connected even if they have different SSID (this characteristic can be used for instance to give different identifications to devices installed in distinguished sites) – the BSSID has to have the MAC address format (6 couple of hexadecimal values separated from this symbol “:”); using the Client mode it is the mac address of the access point to which you want to connect the radio interface (if the field is empty the connection happens on the base of ESSID)
- Type of encryption– selection menu of the signal cipher coding type; by activating the cipher coding mode appears a box for the insertion of protection key.
- MAC filter – filter of connections realized on the base of MAC address of the devices; the option can be disabled (no block on the MAC address), in “authorize” mode (only the MAC address inserted in the list can connect itself) or in “Deny” mode (the MAC inserted in the list cannot connect itself)

The advanced parameters of configurations are the following:

- AP Isolation
- WMM (Wireless Multimedia)
- RTS
- Fragmentation

5.6.4 Firewall

The page allows to configure all the parameters of the firewall present on the device and it is divided in two sections: in the first part of the page there is a summary of basic settings of single networks presented also in the configuration pages of the same networks and in the second part there are the settings related to the traffic forward.

In the section with the basic configurations there are the same parameters saw previously and for each network there is the possibility to enable the MTU system.

In the section related to the forward there are 3 areas:

Forward configuration – section for the definition of the rules about acceptance of the traffic between the different networks

Forward rules – section of the definition of the forward rules between the networks by indicating:

- name of the rule
- network of origin
- network of destination
- protocol and door of destination
- activated rule (accept, discard, refuse)

Port forwarding – section for the definition of port forwarding rules and it is indicated:

- name of the rule
- network of origin
- protocol to be used
- IP of origin
- Port of destination
- IP to which the forward is done
- Protocol and port to the forward is done

Forwarding Rules							
Name	Source	Destination	Protocol	Source IP	Destination IP	Port	
bone1	lan	lan	TCP			Custom	Accept

Port Forwarding						
Name	Source	Protocol	Source IP	Destination Port	To IP Address	To Port
	lan	TCP				Custom

5.6.5 DHCP

The page allows the configuration of the DHCP service and it is subdivided into several parts:

- In the first section it is possible to activate or deactivate the service working
- In the second section it is possible to modify the generic working parameters of DHCP
- In the third section there is the list of the different networks created with the possibility of enabling the service (a specific area for each network) with the possibility to set up the following parameters:
 - DHCP active or inactive
 - Start – first address assigned in DHCP
 - Maximum number – maximum number of address assignable in DHCP simultaneously
 - Netmask – subnet used by DHCP service (if the field is empty the default netmask of the network on which you work is used)
 - Duration of the lease (in minutes) – necessary time for the release of assigned IP address in case of client inactivity
- Additional options
- In the fourth there are the configuration parameters of static IP address with the possibility to define the name, the MAC address and IP address
- In the fifth there is a summary of static address and of DHCP lease active with the relative information

5.6.6 Tunnels

The page allows to activate virtual tunnel on the device.

The first section allows to enable the service by defining the port and the timeout time for the client.

Then there is a box to add a new section; by inserting the name and selecting the button “add session” the system presents the configurations parameters:

- button of section qualification
- network – menu of choice of the network on which the tunnel has to be done
- Mode – way of use of the tunnel (server or client)
- type of tunnel – option for the choice of the tunnel typology which has to be realized (“tun” – IP tunnel, “ether” – Ethernet tunnel, “tty” – serial tunnel, “pipe” – pipe tunnel)
- Protocol used by the tunnel (UDC and TPC)
- Keepalive Server – option to enable the “Keepalive” on the server
- Multiple Connections – possibility to enable multiple connections
- Password – password used by tunnel

5.6.7 Routes

The page allows to define additional static routes to those created by the device automatically.

To create a new static route you should define:

- Destination
- Gateway
- Netmask
- Metrics
- Network with which the route is used (loopback or one of the created networks)
- Name of route

After the insertion of the parameters it is necessary to push the button “add” to activate the new route in the routing list.

In the page it is also reported the routing list with all information about route used by the device.

5.6.8 DynDNS

The page allows to set up the working parameters of dynamic DNS and it is divided into three areas:

- Choice of the type of service which has to be enabled (with activation button of dynamic DNS)
- Account settings (username and password)
- Hostname setting

5.6.9 Tweaks

This page allows to set up the functioning parameters of the conntrack. The configurable parameters are the followings:

- Maximum number of simultaneous connection allowed
- Timeout of generic closure
- Timeout for ICMP connections
- Timeout for Established TCP connections
- Timeout for UDP connections
- Timeout for UDP connections in streaming

For the modified parameters near to the relative voice appears an “X” button which allows to reset the default value.

At the end of the list there is a field to reset all parameters to default value.

5.7 Info

The page shows two sections:

- System – is presents the main information about the device (firmware version, used Kernel, MAC address, type of device, type of board, username of administrator)
- Notes – page in which it is possible to memorize endorsements on the device

5.8 Graphs

The page shows the working graphs of the device.

In particular there are 3 graphs typologies:

1) Graphs of the CPU

It presents the percentage usage of the device's CPU

2) Graphs of the traffic

These graphs represent the incoming and outbound traffic of the all interfaces presented on the device

3) Graphs of radio signals

These graphics represent the signal quality of radio connection towards the different interfaces connected with the specific radio.

In the upper part of the page there is a menu and it is possible to select the MAC address of the connected interface of which you want to visualize the signal.

The graph of the signal is a very useful device for the antenna ending pointing.

5.9 State

This page shows the information about the working state of the device and some of its feature.

There are 10 sections:

- System
- Interfaces
- Mesh
- DHCP Clients
- Tunnel
- Conntrack
- Iptables
- Site Survey
- Diagnostics

System

In this section you can find information about:

- Use of memory
- Traced connections
- Use of partitions

Interfaces

This section presents the information related to all of device's interfaces (the different networks and radio too).

For each interface there are the mac address and the main information; for the radio interfaces there is the level of the signal too and it is useful to verify , in combination with the graph of the radio, the link quality.

In the bottom of the page there is a button ("Show raw statistics") which allows to visualize all information in not formatted mode.

Mesh

This section presents the working graph of mesh network within which the device works in real time.

The image presents all nodes with the link between them and a parameter about the quality of link radio; the color of the link is associated to the quality (green – good quality; orange – middle quality; red – low quality; grey – no quality); the link quality is automatically calculated by the system on the base of a parameter analyzed in the course of time (so when a link is not available anymore – for instance because a device is disconnected – the relative value grows gradually up to reach the infinite value with the disappearance of the link).

In the upper of the graph there are the following options:

- Zoom (+and-) – allows the map with nodes to be enlarged/reduced
- Metric (+and -) – allows to increase or decrease the hop number visualized in the map starting from the node to which is connected
- Optimization – button which allows the graph to dynamically modify itself by moving the nodes automatically
- Hostnames – button which allows to show the hostnames of the nodes connected within the network
- Save – button for saving (in a cookie) the configuration settings of the graph
- Reset – button to restore the starting settings of graph configuration

By disabling the button “optimization” it is possible to move the nodes inside the map by clicking on them and dragging them with the mouse.

The represented nodes can assume two different colors:

- blue for mesh nodes operating as gateway
- orange for mesh nodes not operating as gateway

DHCP clients

The section presents the information about client connected in DHCP to the device with the relative deadlines of the respective lease.

Besides it presents some additional information related to ARP cache and to the connections between MAC address and IP address

Tunnels

This section report information related to active tunnels.

For each tunnel the following information are available:

- Session identifier
- Used mode
- Used Interface
- Tunnel state
- MAC address
- Bytes received
- Bytes transmitted

Netstats

The section presents the information about network detail distinguished into:

- Physical connections
- Routing schedule
- Listen ports
- Router connections

5. CONFIGURATION

Conntrack

This section presents the schedule of traced connections; in the upper side there is a box through which it is possible to filter the presented record (with the exclusion or inclusion of the inserted text).

Iptables

The section presents the information about the iptables status.

Site Survey

In this section it is possible to verify the signal tacked down by the all device's radios with the main information.

The information are separately presented for each radio; in particular for each taken down network you can find the following information:

- Signal level – graph that indicates the signal level taken down on scale of 5 nocks (the scale uses different colors on the base of measured intensity)
- Noise level – graph that indicates the noise level on scale of 5 nocks
- State – indication about the possible protection of the network (closed padlock – protected network/ opened padlock – open network)
- SSID – name of the network
- MAC – mac address of radio interface
- Channel – used radio channel
- Network – speed of network connection
- Button “Connect” – button which allows the selected interface to be directly connected to the found network

Interface: wlan1									
Signal	Noise	Status	Mode	SSID	MAC	Channel	Rate		
			Ad-Hoc	meekunhew***	06:15:6D:53:C9:FD	1	(?)	Join	
			Ad-Hoc	meekunhew***	CA:15:E2:87:35:2D	1	(?)	Join	
			Master	meekunhew***	00:80:48:5F:A2:35	1	(?)	Join	
			Master	igo*****	00:80:48:50:C4:67	1	(?)	Join	
			Master	meekunhew***	00:80:48:68:E5:78	11	(?)	Join	
			Master	ap:meekunhew***	00:0B:6B:57:04:72	6	(?)	Join	
			Master	meekunhew***	06:80:48:50:CC:5F	11	(?)	Join	
			Master	meekunhew***	00:80:48:68:E5:75	11	(?)	Join	
			Master	meekunhew***	00:0D:54:A0:B7:79	11	(?)	Join	

The page also presents the button “rescan” which allows a new analysis of taken down radio signals to be made

Diagnostic

This section allows to make a ping or a trace route to specific IP address and/or to web address in order to check the effective connection with the destinations.

5.10 Log

This page shows the information logged automatically by the device.

There are 3 different sections:

- Log settings
- Syslog
- Kernel

Log settings

In this section it is possible to set up the generation and conservation parameters of the log.

There are 3 areas:

- Remote syslog – it allows a remote logging system to be activated with the setting of the IP address of server and the port to be used
- Local Log – it allows the generation typology of the log in local (circular or on file) and the maximum size of the log in Kb
- Kernel Log – it allows to set up the priority level of Kernel messages which have to be traced in the log (the default is 7 – debug) and the circular buffer size in kb

Syslog

The section presents the content of the system log: in the upper side of the page there is a box with the content of the log and in the bottom of the page there is a textual filter to include/exclude from the visualization the log which contain the text string inserted by the user.

Kernel

The section presents the log of kernel messages distinguished into current messages and starting messages, in this section too there is a textual filter to include/exclude from the visualization the log which contain the text string inserted by user.

5.11 Troubleshooting

5.11.1 The device can't be reached at the assigned IP address

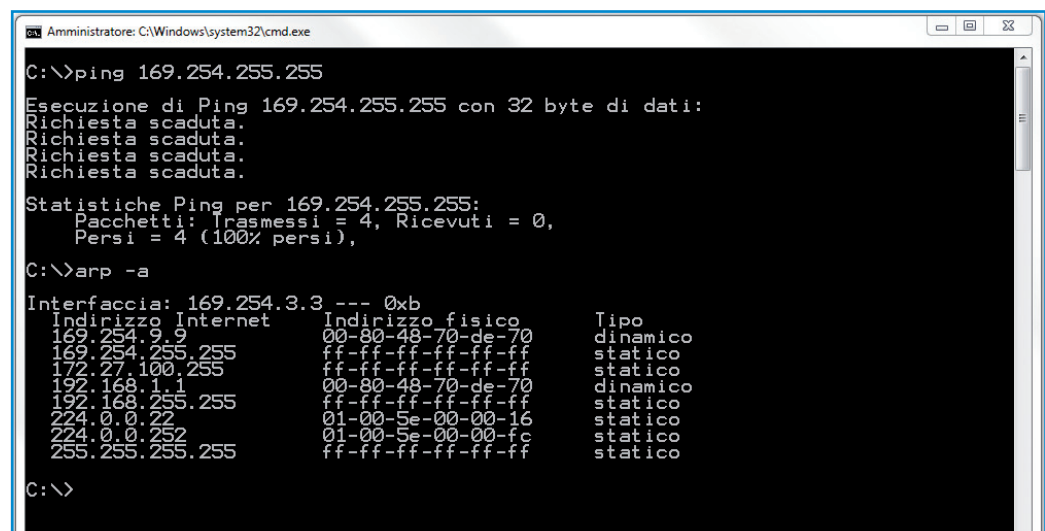
During the configuration of N.A.A.W. devices it is possible, for whatever reason, that you are unable to identify the IP address of the interface through which you are connected to the device.

This may occur because the interface is configured with N.A.A.W. protocol (which calculates the IP address starting from a MAC address), or because there is a duplication of the IP address or simply because of an oversight on the part of the administrator.

If this is the case, because every interface is configured with a link-local type IP address (169.254.0.0/16), N.A.A.W. provides a very simple solution

The procedure is as follows:

- configure the interface on the PC connected to NAAW with an address of the link-local type (e.g. 169.254.3.3/16))
- Open a terminal command
- ping address: 169,254,255,255:
 - o on Linux OS “ping-b 169 254 255 255”. All N.A.A.W. devices physically connected to the interface, will answer. At this point it is sufficient to identify, by repeated attempts if necessary, the unit in question by contacting it via the exposed link-local address.
 - o on Windows OS command “ping 169254255255” does not show responses by individual N.A.A.W. and to view addresses that have responded, use the command “arp-a”.



```

Administrator: C:\Windows\system32\cmd.exe

C:\>ping 169.254.255.255

Esecuzione di Ping 169.254.255.255 con 32 byte di dati:
Richiesta scaduta.
Richiesta scaduta.
Richiesta scaduta.
Richiesta scaduta.

Statistiche Ping per 169.254.255.255:
    Pacchetti: Trasmessi = 4, Ricevuti = 0,
    Persi = 4 (100% persi),

C:\>arp -a

Interfaccia: 169.254.3.3 --- 0xb
Indirizzo Internet      Indirizzo fisico        Tipo
169.254.9.9              00-80-48-70-de-70      dinamico
169.254.255.255          ff-ff-ff-ff-ff-ff      statico
172.27.100.255           ff-ff-ff-ff-ff-ff      statico
192.168.1.1              00-80-48-70-de-70      dinamico
192.168.255.255          ff-ff-ff-ff-ff-ff      statico
224.0.0.22               01-00-5e-00-00-16      statico
224.0.0.252              01-00-5e-00-00-fc      statico
255.255.255.255          ff-ff-ff-ff-ff-ff      statico

C:\>
  
```

6. MATERIAL DISPOSAL

6.1 Toxic substances (RoHS Compatibility)

The components used in the manufacturing of the N.A.A.W. device comply with the current regulations on protection of the environment. The assembly of components made by the manufacturer does not introduce risk factors for the operator or the environment. The device is not made with materials requiring sensitive handling such as asbestos, PCB-PCT, phosphorus, cadmium, or halogens (fluorine, chlorine, bromine, iodine).

7. DECLARATION OF CONFORMITY CE

The N.A.A.W. Xtend range of products complies with the legislation requirements of the following countries, for which a request for release on their markets was granted:

AT	DE	GB	IT	NO
BE	DK	GR	LT	RO
CH	EE	HU	LU	SE
CY	FI	IE	LV	SI
CZ	FR	IS	NL	SK

7.1 Restrictions of use for specific countries

This product can be used in all EU countries (and any other country in which the EU directive 1999/95/EC applies) with no restrictions, except for the countries listed below:

BELGIUM: you must send notification to the Institute for Postal Services and Telecommunications (BIPT) for each wireless device which covers more than 300 meters. For more information please visit: <http://www.bipt.be>.

FRANCE: you must partially reduce the power output as per the table below when using devices for outdoor use. For more information please visit: <http://www.arcep.fr>.

Table 1: Power applicable in France

ASSIGNED	FREQUENCY (MHz)	POWER EIRP
Indoor (no restrictions)	2400 - 2483.5	100 mW (20dBm)
Outdoor	2400 - 2454	100 mW (20dBm)
	2454 - 2483.5	10 mW (10dBm)

ITALY: This product complies with the specifications of National and Radio Interface and meets the requirements of the National Frequency Allocation Plan. However, if not installed for private use, the use of 2.4 GHz Wireless LAN products requires a "General Permission ". For more information see <http://www.comunicazioni.it>.

7. DECLARATION OF CONFORMITY CE

7.2 Restrictions of use of the device

This product has been designed to be used with integrated antenna and / or with dedicated external antenna, if included in the package.

If external antennas, connected through a special cable guide, are used please note that legislation stipulates the radiated power must not exceed 100 mW EIRP.

7.3 Power Output

In accordance with local regulations of the country where you install the NAAW, you need to adjust the transmission power according to the approved limits.

7.4 N.A.A.W. Xtend - Declaration of conformity CE



DICHIARAZIONE DI CONFORMITA' CE

DICHIARIAMO SOTTO NOSTRA ESCLUSIVA RESPONSABILITA' CHE L'APPARATO PER
TELECOMUNICAZIONI QUI SOTTO DESCRITTO:

PRODUTTORE: **Wi-Next srl**
INDIRIZZO: Via Ferrero 10 – 10098 Cascine Vica Rivoli TO - Italia
Tel: 011/95.90.140 Fax: 011/95.90.200
PRODOTTO: **N.A.A.W. RB 524**
FAMIGLIA: **Xtend**
MODELLO: **Base**
MARCA: **Wi-Next**
FUNZIONE: **Apparato outdoor di ricetrasmisione dati IP nelle bande RLAN e HIPERLAN,
2,4 – 5,4 GHz, con ricetrasmittitore e processore di controllo**

**E' CONFORME
ALLA DIRETTIVA 1999/5/CE
ED ALLE SEGUENTI NORME ARMONIZZATE:**

Direttive Radio:

EN 301893 V1.5.1 (Art. 3 paragrafo 2- Funzionale Radio) **EN 300328 V1.7.1**

Compatibilità Elettromagnetica:

EN 301489-1 V1.8.1 e EN 301489-17 V2.1.1 (Art. 3 paragrafo 1, lettera b) - EMC)

Sicurezza elettrica:

EN 60950-1: 2001 (Art. 3 paragrafo 1, lettera a) - Sicurezza Elettrica)

Luogo: Rivoli
Data: Marzo 2010
Firma del responsabile: Nicola De Carne



7.5 N.A.A.W. Xtend Long Range - Declaration of conformity CE



DICHIARAZIONE DI CONFORMITA' CE

DICHIARIAMO SOTTO NOSTRA ESCLUSIVA RESPONSABILITA' CHE L'APPARATO PER
TELECOMUNICAZIONI QUI SOTTO DESCRITTO:

PRODUTTORE: **Wi-Next srl**
INDIRIZZO: Via Ferrero 10 – 10098 Cascine Vica Rivoli TO - Italia
Tel: 011/95.90.140 Fax: 011/95.90.200
PRODOTTO: **N.A.A.W. RB 524**
FAMIGLIA: **Xtend**
MODELLO: **Long Range**
MARCA: **Wi-Next**
FUNZIONE: **Apparato outdoor di ricetrasmissione dati IP nelle bande RLAN e HIPERLAN,
2,4 – 5,4 GHz, con ricetrasmittitore e processore di controllo**

**E' CONFORME
ALLA DIRETTIVA 1999/5/CE
ED ALLE SEGUENTI NORME ARMONIZZATE:**

Direttive Radio:

EN 301893 V1.5.1 (Art. 3 paragrafo 2- Funzionale Radio) **EN 300328 V1.7.1**

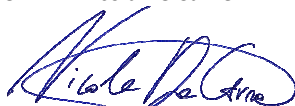
Compatibilità Elettromagnetica:

EN 301489-1 V1.8.1 e EN 301489-17 V2.1.1 (Art. 3 paragrafo 1, lettera b) - EMC)

Sicurezza elettrica:

EN 60950-1: 2001 (Art. 3 paragrafo 1, lettera a) - Sicurezza Elettrica)

Luogo: Rivoli
Data: Marzo 2010
Firma del responsabile: Nicola De Carne



7.6 N.A.A.W. Xtend Triradio - Declaration of conformity CE



DICHIARAZIONE DI CONFORMITA' CE

DICHIARIAMO SOTTO NOSTRA ESCLUSIVA RESPONSABILITA' CHE L'APPARATO PER
TELECOMUNICAZIONI QUI SOTTO DESCRITTO:

PRODUTTORE: **Wi-Next srl**
INDIRIZZO: Via Ferrero 10 – 10098 Cascine Vica Rivoli TO - Italia
Tel: 011/95.90.140 Fax: 011/95.90.200
PRODOTTO: **N.A.A.W. RB 524**
FAMIGLIA: **Xtend**
MODELLO: **Triradio**
MARCA: **Wi-Next**
FUNZIONE: **Apparato outdoor di ricetrasmisione dati IP nelle bande RLAN e HIPERLAN,
2,4 – 5,4 GHz, con ricetrasmittitore e processore di controllo**

**E' CONFORME
ALLA DIRETTIVA 1999/5/CE
ED ALLE SEGUENTI NORME ARMONIZZATE:**

Direttive Radio:

EN 301893 V1.5.1 (Art. 3 paragrafo 2- Funzionale Radio) **EN 300328 V1.7.1**

Compatibilità Elettromagnetica:

EN 301489-1 V1.8.1 e EN 301489-17 V2.1.1 (Art. 3 paragrafo 1, lettera b) - EMC)

Sicurezza elettrica:

EN 60950-1: 2001 (Art. 3 paragrafo 1, lettera a) - Sicurezza Elettrica)

Luogo: Rivoli
Data: Marzo 2010
Firma del responsabile: Nicola De Carne



7.7 N.A.A.W. Xtend Triradio Long Range Declaration of conformity CE



DICHIARAZIONE DI CONFORMITA' CE

DICHIARIAMO SOTTO NOSTRA ESCLUSIVA RESPONSABILITA' CHE L'APPARATO PER
TELECOMUNICAZIONI QUI SOTTO DESCRITTO:

PRODUTTORE: **Wi-Next srl**
INDIRIZZO: Via Ferrero 10 – 10098 Cascine Vica Rivoli TO - Italia
Tel: 011/95.90.140 Fax: 011/95.90.200
PRODOTTO: **N.A.A.W. RB 524**
FAMIGLIA: **Xtend**
MODELLO: **Triradio Long Range**
MARCA: **Wi-Next**
FUNZIONE: **Apparato outdoor di ricetrasmisione dati IP nelle bande RLAN e HIPERLAN,
2,4 – 5,4 GHz, con ricetrasmittitore e processore di controllo**

**E' CONFORME
ALLA DIRETTIVA 1999/5/CE
ED ALLE SEGUENTI NORME ARMONIZZATE:**

Direttive Radio:

EN 301893 V1.5.1 (Art. 3 paragrafo 2- Funzionale Radio) **EN 300328 V1.7.1**

Compatibilità Elettromagnetica:

EN 301489-1 V1.8.1 e EN 301489-17 V2.1.1 (Art. 3 paragrafo 1, lettera b) - EMC)

Sicurezza elettrica:

EN 60950-1: 2001 (Art. 3 paragrafo 1, lettera a) - Sicurezza Elettrica)

Luogo: Rivoli
Data: Marzo 2010
Firma del responsabile: Nicola De Carne



8.1 Radio tipology of the different models

Model	Radio0	Radio1	Radio2	Radio3
N.A.A.W. Enterprise	Integrated antenna 5 GHz	Integrated antenna 2.4 GHz	External antenna 2.4 GHz or 5 GHz	External antenna 2.4 GHz or 5 GHz
N.A.A.W. Enterprise 2x4	Integrated antenna 2.4 GHz	External antenna 5 GHz	Integrated antenna 5 GHz	External antenna 5 GHz
N.A.A.W. Enterprise 2x6	Integrated antenna 2.4 GHz or external antenna 2,4 Ghz or 5 Ghz	External antenna 5 GHz	Integrated antenna 5 GHz or external antenna 2,4 Ghz or 5 Ghz	External antenna 5 GHz