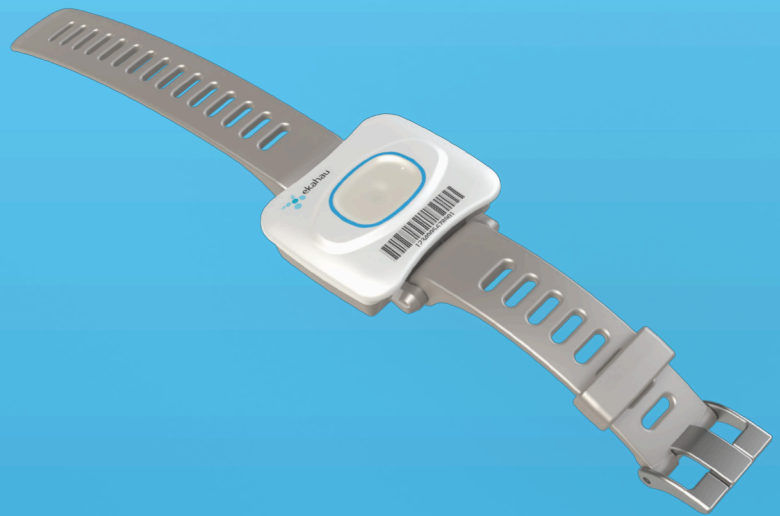


# W4 Wearable Tag



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Ekahau tags must always be used in compliance with the user environment and instructions contained in the User Manual for the tags.

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# 1 Introduction

The Ekahau W4 Wi-Fi tag is part of Ekahau RTLS (Ekahau Real-Time Location System) that consists of Ekahau tags, Ekahau RTLS Controller (ERC) software platform and Ekahau Vision end-user application. It is designed to be worn by patients, employees, children and other individuals, and it enables real-time visibility into a person's exact location – enterprise-wide, with reliable room- and sub-room level accuracy.

## 1.1 Software Release Level

This User Guide documents the functionality available with software release level, 1.3.15.

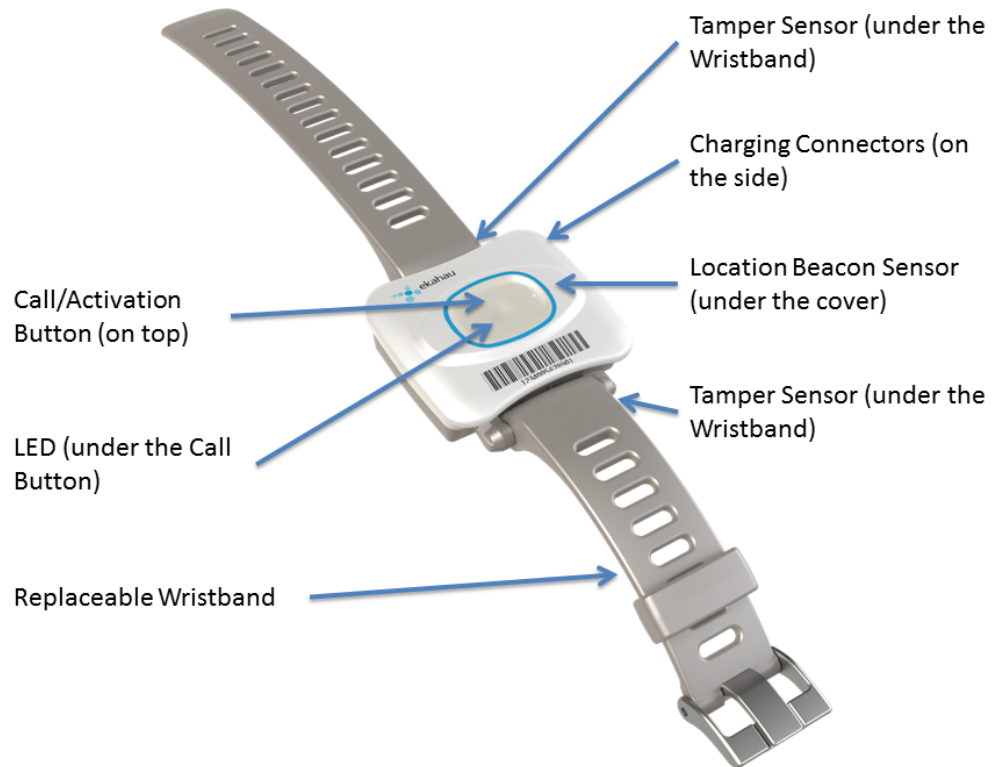
## 1.2 Features of W4

The following features are included with this software release:

- Works with standard 802.11b/g/n Wi-Fi networks
  - 802.11g/n only in CCX or Ekahau blink mode
  - 802.11b needs to be enabled in the Wi-Fi network if association mode is used
- Support for 64/128-bit WEP key and WPA2-PSK authentication
- Static and dynamic IP addressing
- Configurable button for sending and acknowledging emergency or status messages
- Location reporting triggered by button, periodic timer, motion, and by Ekahau Location Beacons
- Support for Cisco CCX and Aruba beaconing mode
- Three-color status indication LED
- Vibration alarm for alerting the person wearing it
- Battery monitoring and reporting
- IR Location Beacon sensor for room, sub-room, and bay level accuracy
- Waterproof enclosure allowing it to be thoroughly sanitized after use
- Configuration using Ekahau Activator, standalone tag configuration software.
- Configuration using Ekahau RTLS Controller.

## 1.3 User Interface

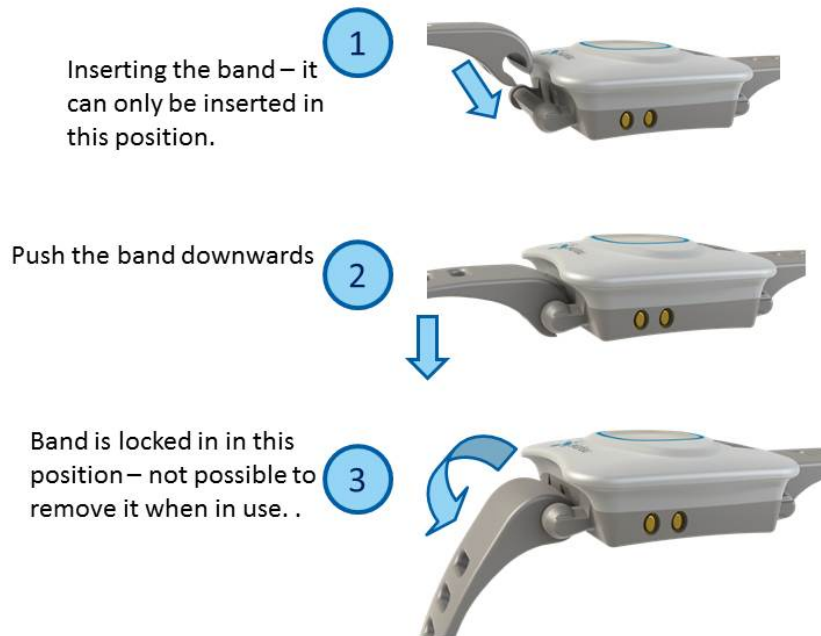
Figure 1.1. W4 user interface



## 1.4 Attaching the Wristband

The wristband (two pieces) can be attached to the W4 tag as follows:

Figure 1.2. Inserting the wristband



1. Lift the end of the wristband to slide the beginning into the bar on the tag. The wristband will not attach in any other position
2. Push the beginning part (tag side) of the wristband downwards
3. Lift the end of the wristband. The wristband is now locked onto its position.

For removal, push down the end of the wristband and lift the beginning part (tag side) up.

## 1.5 Status Indication LEDs

The tag is equipped with two multi-color LEDs that provide status indication. The table below lists the different modes of the tag LEDs:

Action	LED	Status
Activation	3 x Green	Activation successful
	12 x Red	Activation failed
De-activation (Reset)	3 x Green and Red	Reset successful
Charging	Orange	Charging
	Green	Battery full
Button press	1 x Orange	Button press recognized

---

Action	LED	Status
Action ELP / EMP packet success	-	Success of the ELP / EMP packet is not indicated with the LED
Alarm	Configurable	Can be configured to use any pattern over EMP command



## 2 Initial Activation of the Tag

When the tag is delivered it does not have any of the necessary configuration settings. These environment specific settings need to be applied before the tag can connect to the network and the ERC. The W4 tags are delivered with the battery charged to a storage charge, it is recommended to fully charge the battery, before activating the tags first time. See charging instructions in chapter *Charging the W4 tag on page 22*.

Tag activation is done using Ekahau Activator software that configures Ekahau tags wirelessly. The activation of the tags is explained in more details in chapter *Installing Ekahau Activator 3 on page 5*.

After successful Activation you will see the MAC address of the tag appears on the ERC list of tags. After successful connection with ERC the configurations can be managed directly from ERC using **Tag Configurations** page.

### 2.1 Installing Ekahau Activator 3

The Ekahau Activator 3 comes with the Ekahau RTLS installer. When you install Ekahau RTLS, you do not necessarily need to install the Ekahau Activator if the target computer cannot be used to activate tags with a supported Wi-Fi adapter. If you want to install the Ekahau Activator later on another computer, simply run the RTLS setup file on the target computer and choose to install only the Ekahau Activator. The Ekahau Activator is usually installed on a laptop as the Ekahau RTLS software is installed on a server.

The Ekahau Activator 3 installation package can also be downloaded from <http://www.ekahau.com/download/activator>.

How to install Ekahau Activator:

1. Choose a laptop (or a desktop) computer running Windows 7 (32 or 64bit operating system) with a supported Wi-Fi adapter (and driver supporting virtual Wi-Fi), at least 256 MB of memory, free USB port, and 3.5 MB or more free hard disk space.
2. Run the Ekahau Activator setup file from it's location, and follow the on-screen instructions
3. Install a supported **Wi-Fi adapter** from th eprograms menu: Start -> Ekahau -> Ekahau Activator 3 -> Ekahau USB Driver.

### 2.2 Supported Wi-Fi Adapters

Please visit our website for the complete list of supported Wi-Fi adapters: <http://www.ekahau.com/devices>.

### 2.3 Activation Procedure

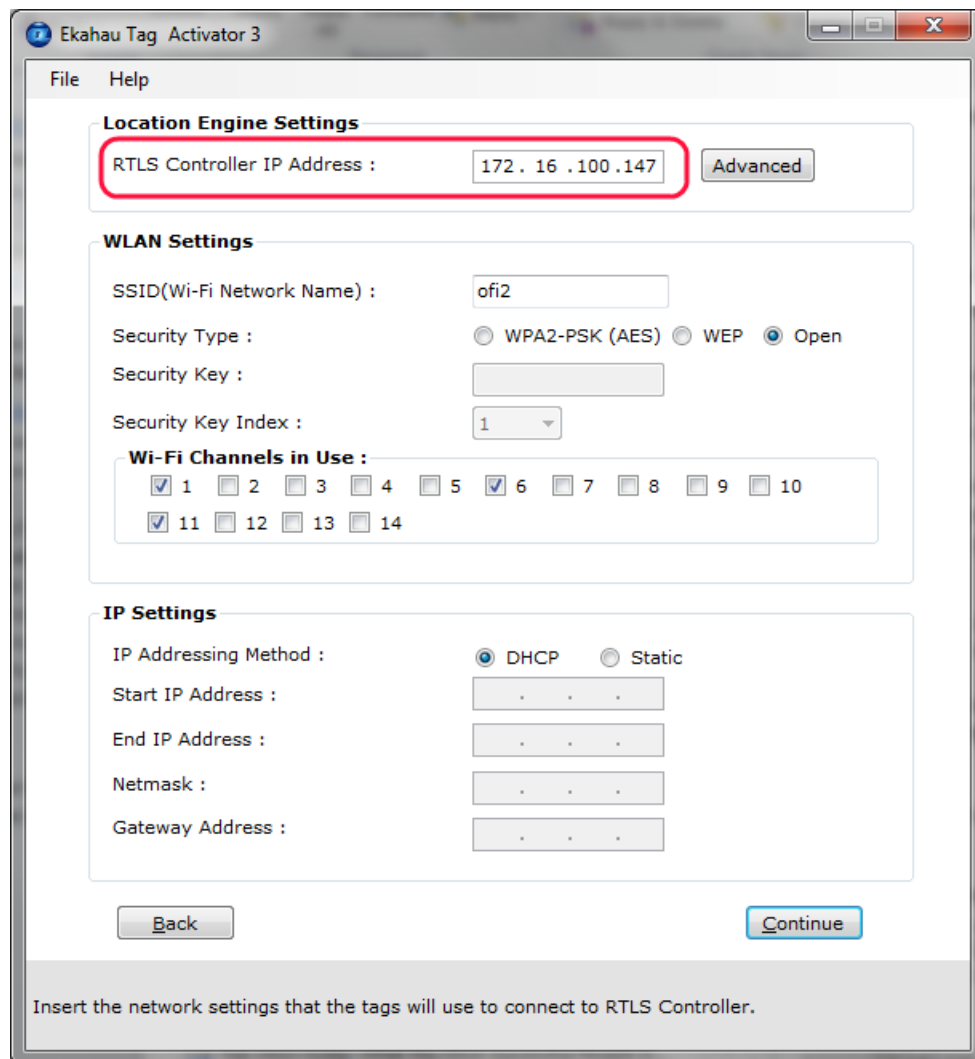
For the tags to be able to communicate with the Ekahau RTLS Controller, the tag needs to be activated e.g. the tag needs to be given the necessary parameter to associate with the network. At least the IP address of the Ekahau RTLS Controller, SSID of the network used and the IP configuration method are required. To activate W4 tags, you need to use the Ekahau Activator 3

which you can run from Ekahau Programs menu. After that, follow the following Activator configuration procedure.

### 2.3.1 Configuring Ekahau RTLS Controller Settings

Input the IP address of the Ekahau RTLS Controller.

Figure 2.1. Specifying the Engine IP address and Maintenance interval



Ekahau Tag Activator 3

File Help

**Location Engine Settings**

RTLS Controller IP Address : 172 . 16 . 100 . 147 Advanced

**WLAN Settings**

SSID(Wi-Fi Network Name) : ofi2

Security Type :  WPA2-PSK (AES)  WEP  Open

Security Key :

Security Key Index : 1

**Wi-Fi Channels in Use :**

1  2  3  4  5  6  7  8  9  10

11  12  13  14

**IP Settings**

IP Addressing Method :  DHCP  Static

Start IP Address : . . .

End IP Address : . . .

Netmask : . . .

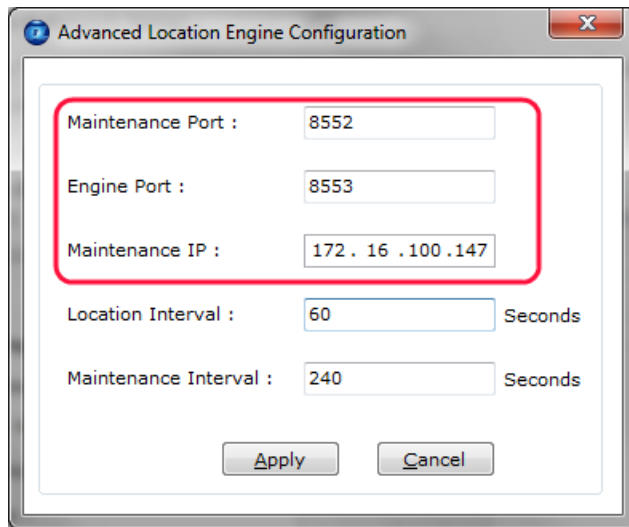
Gateway Address : . . .

Back Continue

Insert the network settings that the tags will use to connect to RTLS Controller.

In case Engine Port, Maintenance port, and/or Maintenance IP needs to be changed, go to "Advanced" mode. The (Periodic) Location Update Interval is set to 60 seconds and the (Periodic) Maintenance Interval is set to 240 seconds by default , but shorter interval can be used if, for instance, messages are sent frequently to the W4 tag.

Figure 2.2. Specifying advanced Positioning Engine settings



Advanced Location Engine Configuration

Maintenance Port : 8552

Engine Port : 8553

Maintenance IP : 172 . 16 . 100 . 147

Location Interval : 60 Seconds

Maintenance Interval : 240 Seconds

Apply Cancel

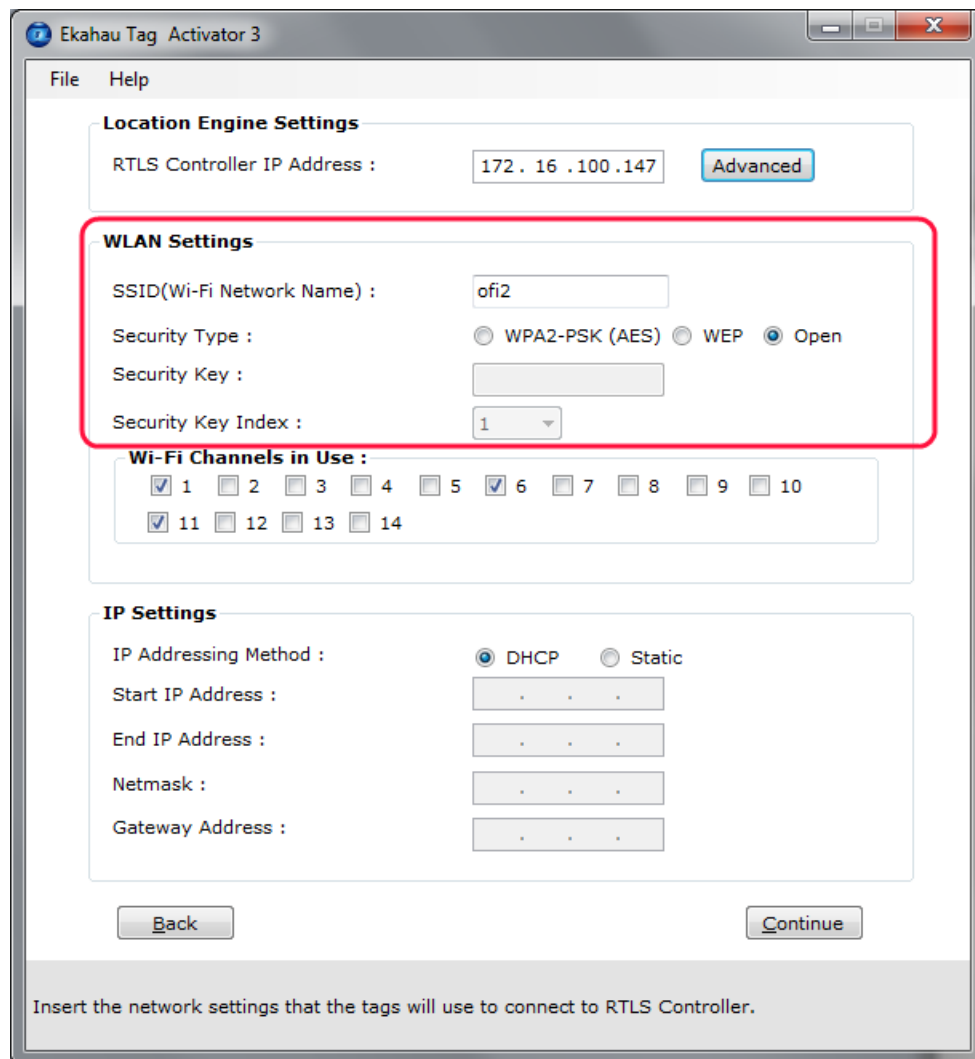
#### Note

When activating the W4 tags, only an initial setup is required for the tag to associate with the network. All settings can be set and changed from the Ekahau RTLS Controller. Ekahau Activator 3 only provides a set of basic settings.

### 2.3.2 Configuring WLAN Settings

Input the Wi-Fi Network SSID and select the Encryption method used. If WEP 64/128 or WPA2-PSK is used type in the network key as well. Normally, 1st Security Key Index (for WEP encryption) is used. Should you use key index other than the first one, please select the key index matching the Security Key.

Figure 2.3. Specifying Wi-Fi network settings



The screenshot shows the 'Ekahau Tag Activator 3' application window. The 'WLAN Settings' section is highlighted with a red border. It includes the following fields and options:

- Location Engine Settings:** RTLS Controller IP Address: 172.16.100.147 (with an 'Advanced' button).
- WLAN Settings:** SSID(Wi-Fi Network Name): ofi2; Security Type: WPA2-PSK (AES), WEP, or Open (Open is selected); Security Key: (empty field); Security Key Index: 1 (dropdown).
- Wi-Fi Channels in Use:** A grid of checkboxes for channels 1 through 14. Channels 1, 6, and 11 are checked.
- IP Settings:** IP Addressing Method: DHCP or Static (DHCP is selected); Start IP Address, End IP Address, Netmask, and Gateway Address: (empty fields).

At the bottom, there are 'Back' and 'Continue' buttons, and a footer note: 'Insert the network settings that the tags will use to connect to RTLS Controller.'

**Tip**

If WEP encryption is used the Activator automatically determines the key type and length from what you type. WEP 64 require 5 Ascii characters or 10 hex digits, respectively WEP 128 requires 13 Ascii characters or 26 hex digits.

### 2.3.3 Configuring Wi-Fi Channels in Use

It is recommended to only select the channels used in you network. Activating the unused channels will only reduce the battery lifetime of the tag. By default, the Scan Interval is 60 seconds. You may also use shorter interval, but it will drain faster the battery of the tag. Alternatively you can use longer Scan Interval and enable Motion Sensor through the Ekahau RTLS Controller after activation. This way the tag will scan only when it is in use and moving.

Figure 2.4. Specifying the channels used in the network

The screenshot shows the 'Ekahau Tag Activator 3' application window. It features a menu bar with 'File' and 'Help'. The main content area is divided into several sections:

- Location Engine Settings:** Includes 'RTLS Controller IP Address' set to '172.16.100.147' and an 'Advanced' button.
- WLAN Settings:** Includes 'SSID(Wi-Fi Network Name)' set to 'ofi2', 'Security Type' with radio buttons for 'WPA2-PSK (AES)', 'WEP', and 'Open' (selected), 'Security Key' (empty), and 'Security Key Index' set to '1'.
- Wi-Fi Channels in Use:** A section highlighted with a red border, containing a grid of checkboxes for channels 1 through 14. Channels 1, 6, and 11 are checked.
- IP Settings:** Includes 'IP Addressing Method' with radio buttons for 'DHCP' (selected) and 'Static', and input fields for 'Start IP Address', 'End IP Address', 'Netmask', and 'Gateway Address'.

At the bottom, there are 'Back' and 'Continue' buttons, and a footer note: 'Insert the network settings that the tags will use to connect to RTLS Controller.'

### Warning

Only use channels that really exists in your Wi-Fi network. Activating unnecessary channels will reduce the tag's battery lifetime!

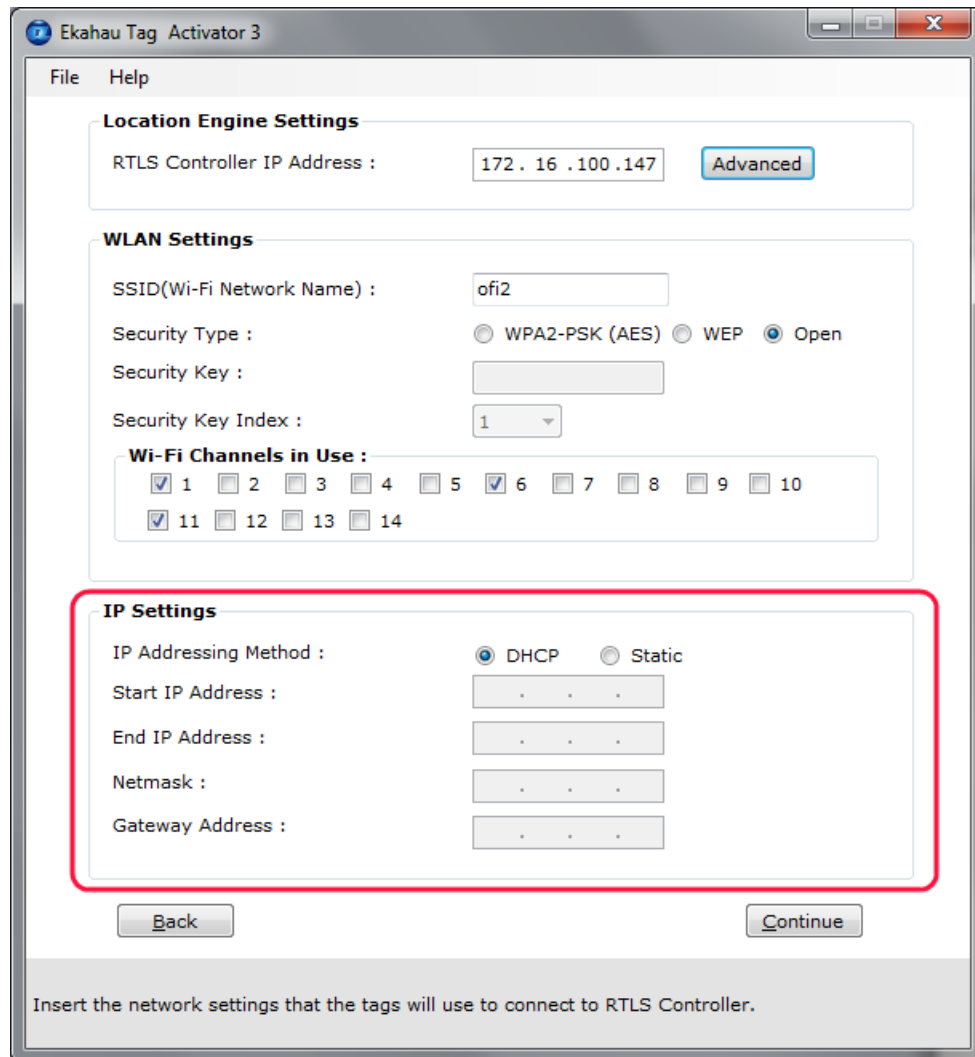
## 2.3.4 Configuring IP Settings

Check the IP settings. If DHCP is used nothing needs to be done. In case your network uses static IP addressing, type in the IP address range to be used for the W4 tags, Netmask and Gateway addresses.

**Tip**

If you only activate a single tag and wish to use static IP setting, enter same IP address in 'Start IP Address' and 'End IP Address'.

Figure 2.5. Specifying IP settings



The screenshot shows the 'Ekahau Tag Activator 3' application window. It features a menu bar with 'File' and 'Help'. The main content area is divided into several sections:

- Location Engine Settings:** Includes a text field for 'RTLS Controller IP Address' containing '172.16.100.147' and an 'Advanced' button.
- WLAN Settings:** Includes a text field for 'SSID(Wi-Fi Network Name)' containing 'ofi2', radio buttons for 'Security Type' (WPA2-PSK (AES), WEP, Open) with 'Open' selected, a text field for 'Security Key', and a dropdown for 'Security Key Index' set to '1'.
- Wi-Fi Channels in Use:** A grid of checkboxes for channels 1 through 14, with channels 1, 6, and 11 checked.
- IP Settings (highlighted with a red box):** Includes radio buttons for 'IP Addressing Method' (DHCP, Static) with 'DHCP' selected, and text fields for 'Start IP Address', 'End IP Address', 'Netmask', and 'Gateway Address', each containing three dots.

At the bottom, there are 'Back' and 'Continue' buttons, and a footer note: 'Insert the network settings that the tags will use to connect to RTLS Controller.'

## 2.3.5 Activation

Press 'Continue' button when all settings are ready.

Figure 2.6. When all the settings are done, you can start activating the tags

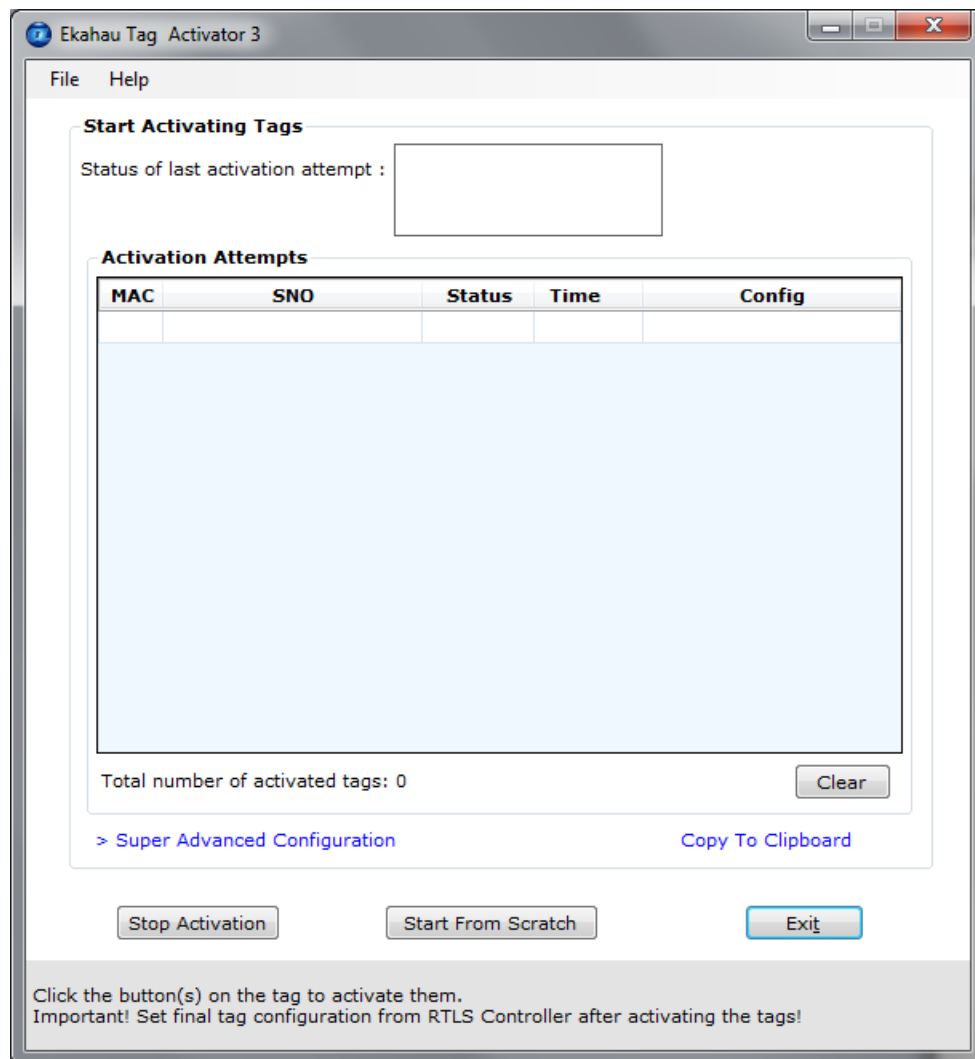
The screenshot shows the 'Ekahau Tag Activator 3' application window. It has a menu bar with 'File' and 'Help'. The main content area is divided into three sections:

- Location Engine Settings:** 'RTLS Controller IP Address' is set to '172.16.100.147'. There is an 'Advanced' button to the right.
- WLAN Settings:** 'SSID(Wi-Fi Network Name)' is 'ofi2'. 'Security Type' has radio buttons for 'WPA2-PSK (AES)', 'WEP', and 'Open', with 'Open' selected. 'Security Key' is an empty text field. 'Security Key Index' is a dropdown menu set to '1'. Below this is a section titled 'Wi-Fi Channels in Use' with checkboxes for channels 1 through 14. Channels 1, 6, and 11 are checked.
- IP Settings:** 'IP Addressing Method' has radio buttons for 'DHCP' (selected) and 'Static'. Below are four text input fields for 'Start IP Address', 'End IP Address', 'Netmask', and 'Gateway Address', each containing three dots as placeholders.

At the bottom of the window, there are two buttons: 'Back' on the left and 'Continue' on the right. The 'Continue' button is circled in red. Below the buttons, a grey bar contains the text: 'Insert the network settings that the tags will use to connect to RTLS Controller.'

The Activation process has now started. The list of the activated tags will appear on the area below.

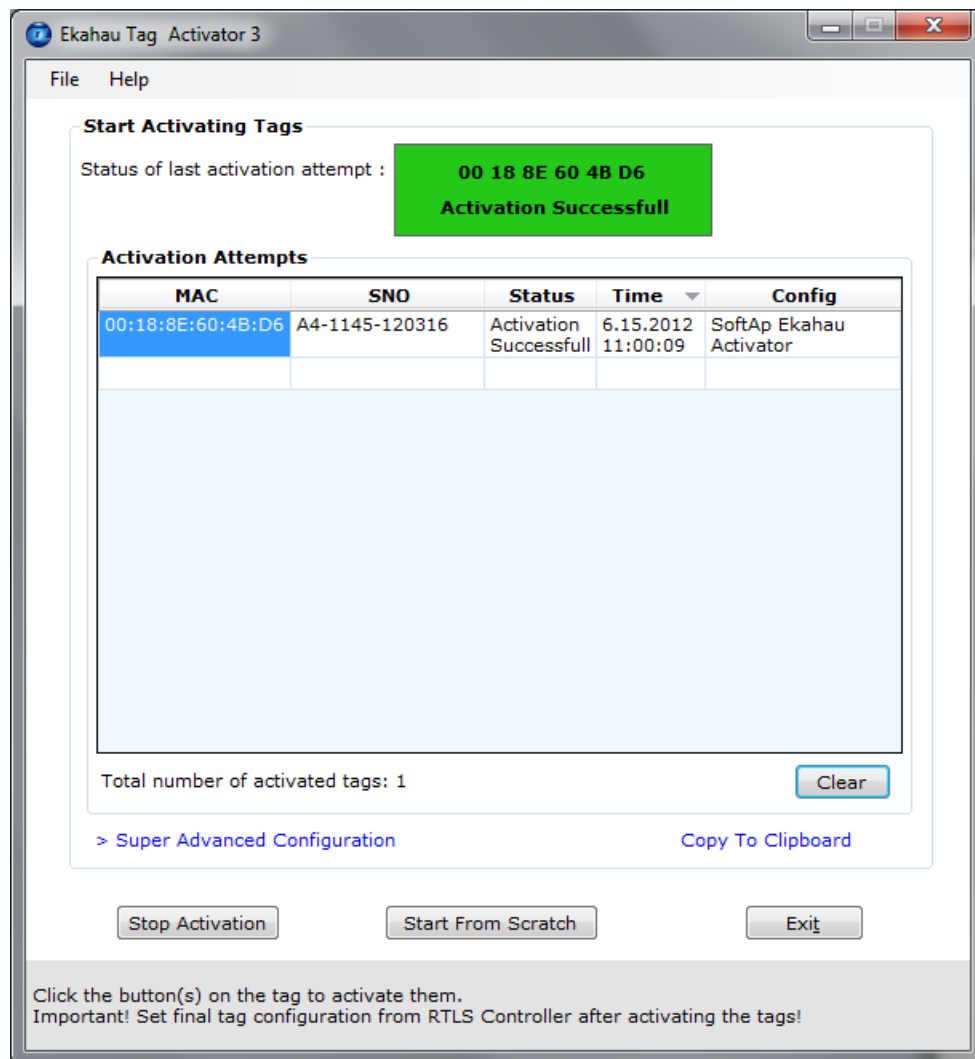
Figure 2.7. The Activator is ready to start activating the tags



Put the tag in charger and while in charger, within three seconds press and hold the tag's button at least five seconds to activate it. During this time tag's LED is red. If activation was successful the tag will vibrate and the green LED will blink, with unsuccessful activation the LED blinks red. After successful activation, the tag MAC address appears on the activation window, showing Ok status. Repeat this for all the tags to be activated.



Figure 2.8. The Activator has activated one tag

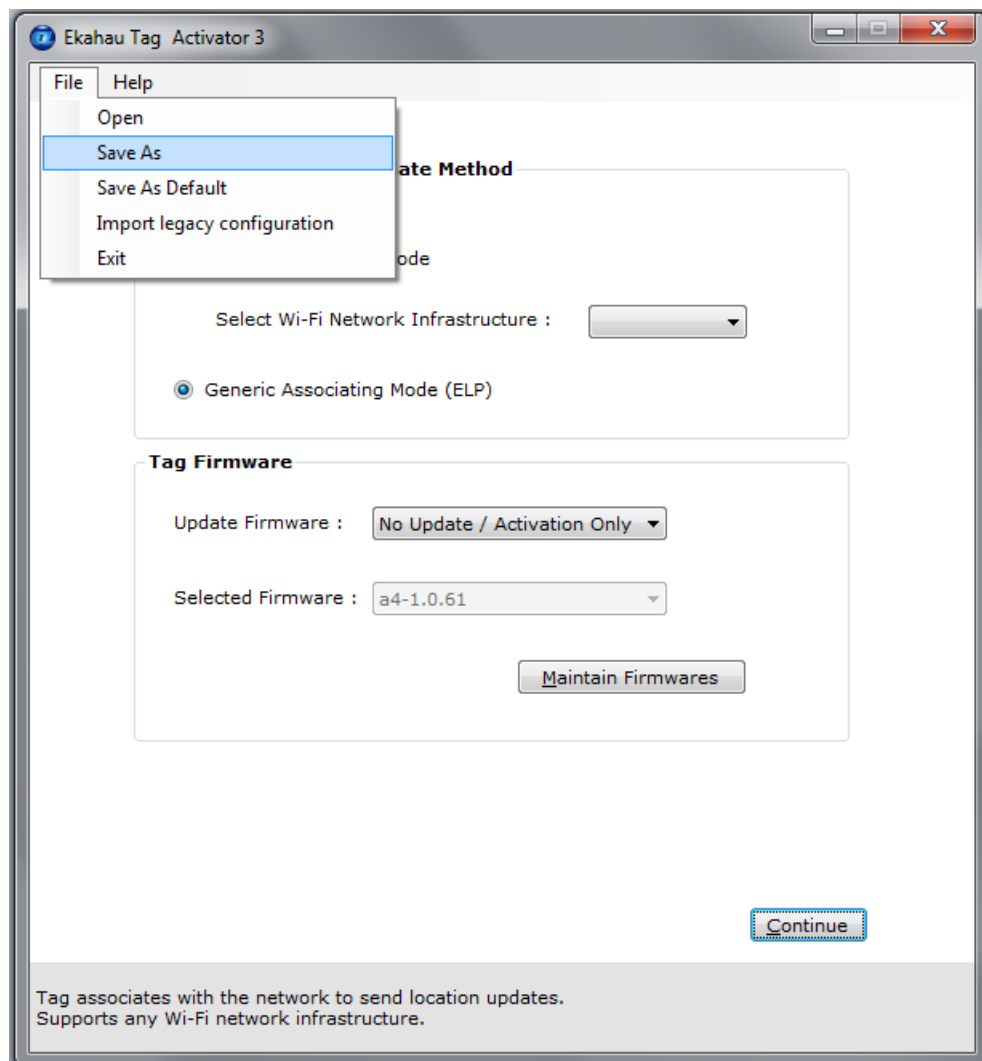


After completing activating the tags, click the 'Stop Activation' button and exit the activation window.

#### Tip

After you have finished the activation, you can save the configuration for future use from the file menu. If you save the settings with 'Save As Default' the setup will be the default every time the Activator is started.

Figure 2.9. Saving the configuration for later use



### 2.3.6 List of Available Settings in the Activator

The list of available settings in the Activator:

Setting	Description	Values	Default Value
<b>Positioning Engine settings</b>			
Engine IP	IP Address Ekahau RTLS Controller	IP Address	0.0.0.0
Engine Port (UDP)	Port number of location protocol port of ERC	Port Number	8552
Maintenance IP	IP Address of Ekahau RTLS Controller, from where TAG gets the settings. Typically same as the ERC IP	IP Address	0.0.0.0

Setting	Description	Values	Default Value
Maintenance Port(UPD)	Port number of maintenance protocol port of ERC	Port Number	8553
Maintenance interval	The interval of the periodic maintenance calls in seconds	0 - 63072000	10
<b>Scan Settings</b>			
Scanning Interval	The interval of the periodic location scans in seconds	0 - 63072000	10
Scan Channels	Sets the channels that are scanned	Enabled; Disabled	1-11 Enabled; 12-14 Disabled
<b>WLAN Settings</b>			
SSID	Sets the Wi-Fi network name -Service set identifier	SSID=max 32 digits	default
Encryption	Selects if WEP encryption is used	No Encryption; WEP 64/128; WPA2-PSK	No Encryption
WEP	Sets the WEP passphrase	ASCII: 5 or 13 characters HEX: 10 or 26 hexadecimal numbers (0-f)	-
WEP Key Index	Sets the WEP Key index used	1-4	1
WPA2-PSK	Sets the WPA2-PSK encryption and passphrase	8-63 ASCII characters	-
WPA-PSK	Not supported with W4		
<b>IP Settings</b>			
IP method	Defines the IP address assigning method	DHCP; Static	DHCP
<i>Static IP Settings</i>			
Address range	Sets the start and end address of the range used to assign the IP addresses to the tags when Static IP is used	IP address	0.0.0.0 0.0.0.0
Network mask	Tag netmask when static addressing is used	IP address	0.0.0.0
IP gateway	IP network gateway when static addressing is used	IP address	0.0.0.0



## 3 Configuration After Initial Activation

The tag can be adjusted for each application and network settings by adjusting a set of parameters. The parameters can be changed wirelessly after resetting the tag by using the Ekahau Activator software or through **Tag Configurations** in Ekahau RTLS Controller.

Ekahau Activator is used for configuring the initial configuration settings that allows connecting the tag to ERC over the network. After connection is established with ERC, all configurations can be managed through Ekahau RTLS Controller.

### 3.1 Tag Configuration Settings in ERC Configs Page

In Ekahau RTLS Controller it is possible to create a configuration to a single tag or a group configuration to multiple tags. After the tags are activated, the configurations are applied to tags from the Tags page. It is also possible to apply a configuration automatically to all new tags via the Configs page. The list of available settings is in the following table:

Setting	Description	Values (Default underlined)
<b>Networks</b>		
Scan Method	Allows using a vendor-specific method for signal measurement.  The Generic method is vendor-independent.	Generic, Aerohive, Aruba, Cisco CCX, Extricom, Meru, Motorola, Juniper blink
ELP Mixed Mode Flags	Allows location updates sent via CCX/Ekahau Blink and button presses etc. sent via ELP . CHOOSE button shows the options. Recommended not to use Mixed Mode with Cisco MSE (or battery reporting will be mixed up)	Can be set based on scan reason(s) (button, safety switch, motion...)
SSID 1	SSID 1 name, Encryption, Password and WEP index.	See Configuring WLAN Settings on page 7 for details
SSID 2	SSID 2 name, Encryption, Password and WEP index.	See Configuring WLAN Settings on page 7 for details
SSID 2 Association	Sets whether tag attempts to associate on T301BD SSID 2 network.	No association and scan only; associate and scan; Disabled
Broadcast probe	Sets whether the tag uses broadcast probe when scanning.	Enabled; Disabled
<b>Tag IP Settings</b>		
IP Setting	Sets the IP method used.	Use DHCP for each access point Use DHCP once for all access points  Preserve the IP-address that was given by Activator
<b>Positioning Engine</b>		

Setting	Description	Values (Default underlined)
IP Address	Sets the ERC IP Address.	IP Address
Location update Port (UDP)	Port number of location protocol port of ERC	Port Number
Maintenance port (UDP)	Port number of maintenance protocol port of EPE.	Port Number
<b>General</b>		
Name	Name for the configuration set.	Free text
Description	Description for the configuration set.	Free text
<b>Channels</b>		
Scan Channels	Sets the channels scanned during a location scan.	<u>1-11</u> ; 12 (EU); 13 (EU); 14 (Japan)
<b>Periodic Location Update and Maintenance</b>		
Periodic Location Update	Enables or disables the periodic location update.	<u>Enabled</u> ; Disabled
Location Update Interval	Sets the interval for the periodic location update.	The interval in Seconds, Minutes, Hours or Days
Periodic Maintenance	Enables or disables the periodic maintenance calls.	<u>Enabled</u> ; Disabled
Maintenance Interval	The interval of the periodic maintenance calls in seconds.	The interval in Seconds, Minutes, Hours or Days
<b>Sensors</b>		
Motion Sensor	Enables or disables motion sensors.	<u>Disabled</u> Profile 1 (in motion for 8s) Profile 2 (in motion for 4s) Profile 3 (in motion for 2s) Profile 4 (in motion for 1s)
Motion Update Method	Sets whether location updates are sent periodically during the motion or just when the motion starts and after the movement has ended.	<u>In-motion and after motion</u> ; After motion
Motion Update Interval	Sets the interval for motion updates.	<u>5s</u> ; 10s; 30s; 1min; 2min; 5min
Motion Stagnant Event	Enables or disables stagnant sensing.	Enabled; <u>Disabled</u>
Motion Stagnant Threshold	Sets how long the tag has to remain stagnant to produce a stagnant event.	The threshold in Seconds, Minutes, Hours or Days

Setting	Description	Values (Default underlined)
Location Beacon Sensor	Enable or disable the location beacon sensor . In active mode a location update is done immediately when the tag notices a location beacon. In passive mode the recent observed location beacon ID is sent to EPE only when location update is initiated by other stimuli such as periodic or motion wakeup.	<u>Disabled</u> , Passive Mode, Active Mode
<b>Advanced Scan Settings</b>		
Initial Scan Count	Number of scans the tag does on each triggered scan despite the triggering event. Used to improve the accuracy in difficult conditions and for rarely scanning applications	<u>1</u> - 10

**Note**

1) Network wide DHCP enables roaming between sub-networks. With this setting the tag refreshes its IP address whenever the tag associates with a new access point. It is not recommended to use the feature, if not required, due to higher power consumption

**Note**

2) Using the **Advanced Scan Settings** need a careful consideration. The scanning consumes a high amount of energy, and the more scanning is done the less battery life the tag has. Typically these parameters are used to improve accuracy in very difficult conditions or in cases the tag otherwise would scan rarely.

## 3.2 Tag Actions Available in ERC Tags Properties Page

Setting	Description	Values (Default underlined)
<b>User Data</b>		
Name	A user given name for tag	Free text
Custom	A custom note	Free text
Member of Groups	The groups the tag belong to	List of groups or "No Groups created" if no groups exist. Go to groups page to create groups.
<b>Commands</b>		

Setting	Description	Values
LED / Vibration	Launches the alarm at the tag with LEDs only or with vibration and LEDs. The alarm duration can be set.	LED; LED and Vibration Duration: 10s; 1min; 10min; 30min; 1h; 2h
Manual Commands	Manual command or a list of commands can be sent to a tag.	-
Set Config	A pre-defined config can be selected and sent to tag(s)	A list of available configs. Go to configs page to create tag configurations.
<b>Firmware Update</b>		
Firmware	Tag firmware can be updated. The new firmware needs to be first uploaded in the configs page	A list of available firmware updates uploaded in ERC. The firmware needs first to be uploaded into ERC, this is done in configs page.
<b>Create New Group</b>		
Group Name	New group is created and the tag is included into this created group.	Free text
<b>Address</b>		
Gateway	Sets the default gateway for the tag	IP Address
<b>Delete</b>		
Delete	The tag is deleted from the system. All statistics are cleared. The tag will appear in the system again when it report it's location next time.	-

**Note**

Currently the W4's vibration is controlled and configured by using the same commands that are used with the Buzzer. Remember that W4 tag does not have a buzzer alarm!



## 4 Tag Operation

### 4.1 Button Activated Location Update

In addition to periodic location updates, the tag can also be set to scan and update its location when any of the buttons is pressed. After a button press the tag scans immediately and sends the results to ERC. The LEDs indicate the scan success or failure similarly as in the scan activated by the wake up interval.

### 4.2 Maintenance Call

The W4 performs normal periodic Maintenance Calls. The interval of the Maintenance Calls can be set during the initial activation or after the activation via Ekahau RTLS Controller.

The W4 tag does not perform button activated maintenance calls. Instead, when the button is pressed, ERC will respond to the Location Update with ACK packet which can indicate if there is pending Maintenance command message. If there is, the W4 will perform automatically Maintenance Call.

### 4.3 De-activation / Resetting to Factory Settings

To deactivate the W4 tag, put it into charger and within three seconds press and hold the button for at least ten seconds. During this period the LED will show orange light. The tag vibrates and blinks the LED three times as green and red in turns when successfully reset.

### 4.4 Firmware Update

The tag firmware can be updated wirelessly using ERC. The firmware is uploaded to the tags from the **Tag Properties** page or directly from **Tags** page in ERC. Follow instruction in the ERC User Guide for updating the firmware.

#### Note

If the Tag battery level is below 10 % the FW update is not allowed. The corresponding error code in ERC is **TU**. To update the firmware, please first recharge the battery and try again.

#### Note

W4 firmware update requires a new UDP port allocation from EPE (defaults to 8562). See "Global Server Settings" page in EPE Config Utility.

## 4.5 Optimizing Battery Life

The W4 Wi-Fi tag uses an ultra-low power system-on-chip architecture that lowers the power consumption to minimal. This enables running tags with same batteries for several years. However, to get the maximum lifetime from your tags you should take care that your network and tag configuration supports all possible power save features.

The principal in optimizing battery life is to determine the maximum interval for location updates, still sufficient for the use case, to minimize the amount of time the tag is active.

Recommendations for optimizing battery lifetime:

- Scan only channels that are in use in your network. Typically, because of overlap of channels, there are only 3 or 4 channels in use from the 11 (or 13/14) available.
- Use single SSID whenever possible. Using multiple SSIDs requires additional network scans and decreases battery lifetime.
- When using dynamic IP addressing tune the DHCP server to provide very long lease times for tags.
- W4 tag supports roaming between subnetworks. This feature renews tag's IP address whenever the access point association changes. Since renewing IP addresses consumes large amounts of energy, it is strongly recommended not to use the network wide dynamic addressing feature if it is not needed.
- Tune the wake up settings to match your application needs. More frequent updates lower the battery lifetime.

## 4.6 Turning off the W4 Tag

The W4 tag can only be turned off by resetting the tag to factory settings which is explained in chapter *De-activation / Resetting to Factory Settings on page 21*. To continue using the tag after resetting, you have to re-activate it following the instructions explained in chapter *Activation Procedure on page 5*.

## 4.7 Charging the W4 tag

The W4 tag is delivered with the battery charged to a storage charge, and it is recommended to fully charge the batteries before first time activating the tag. To ensure the tag battery is full, please put the tag in to a charger for 4 hours.

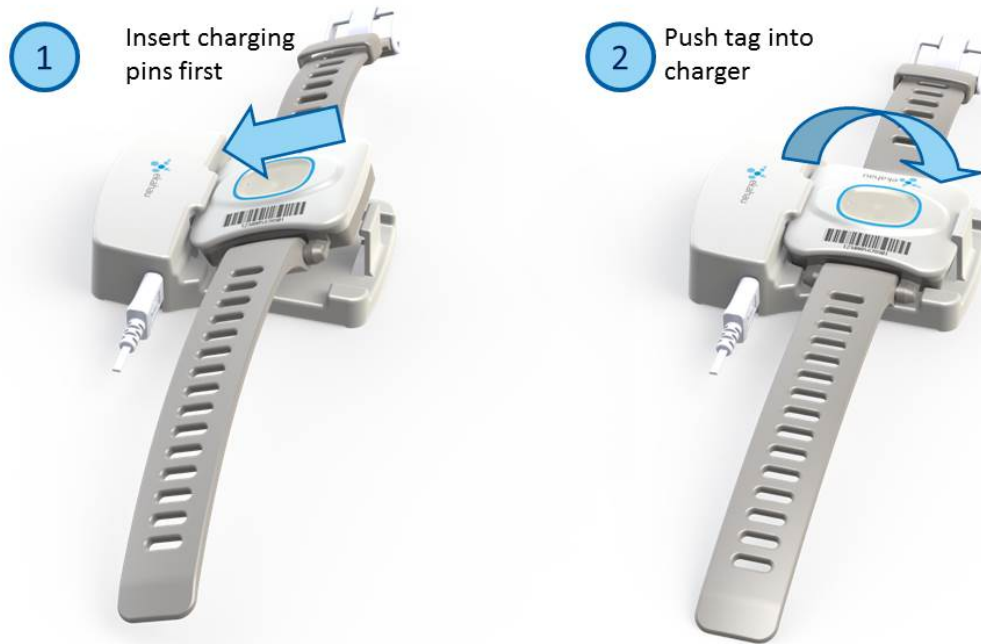
The tag will give a notification when the tag battery is low. Connect the charger and the LED will show red light during the charging. after the tag is fully charged the LED will turn green. If the tag battery is completely empty, the tag will automatically turn off. After a charger is connected, the tag will automatically return to it's normal function, maintaining last settings.

The Ekahau supported adapters are

1. Ekahau W4 Single Charger
2. Ekahau W4 Multi Charger

The W4 tags are attached to the Single Charger as illustrated below.

Figure 4.1. W4 insertion in the Single Charger.



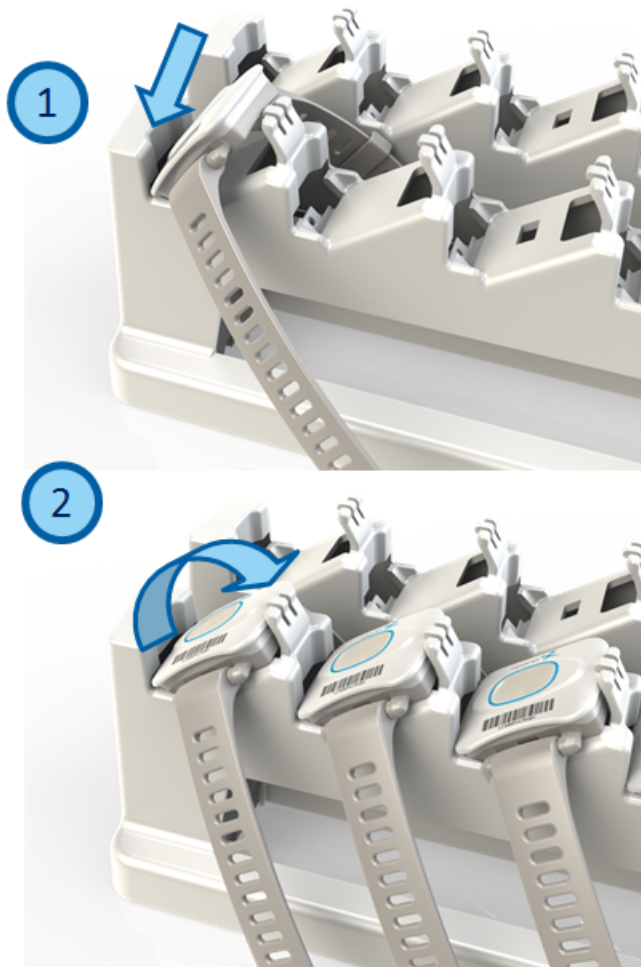
1. Slide the tag with the connectors downward to the charging slot.

2. Press the top of the tag towards the clip until it clicks in the charging position and the charging light turns on (under the button of the tag). Note that if the battery is fully discharged, it may take up to 15 minutes for the charging light to turn on.

Deattach the tag from the charger by gently pulling the clip away from the tag until the tag is released from the charging position.

The W4 tags are attached to the Multi Charger as illustrated below.

Figure 4.2. W4 insertion in the Multi Charger.



1. Slide the tag with the connectors downward to the charging slot.
2. Press the top of the tag towards the clip until it clicks in the charging position and the charging light turns on (under the button of the tag). Note that if the battery is fully discharged, it may take up to 15 minutes for the charging light to turn on.

Detach the tag from the charger by gently pulling the clip away from the tag until the tag is released from the charging position.

#### Note

In case the tag battery is completely empty, typically when left empty and uncharged for several days, it may take a long time for the tag even to turn on the orange led. Just connect the charger and leave the tag to recharge overnight.

#### Warning

Only use Ekahau supported adapters for charging the tags.

**Warning**

Recharge the tag only in room temperature conditions, 0 °C - 40°C (32 °F - 104 °F). Recharging the tag in too cold or too hot conditions may damage the tag.



## 5 Technical specifications

### 5.1 General

- Outside Dimensions: 51.5 x 50 x 17.5mm, 2 x 1.9 x 0.7in
- Weight: 31g / 1.09oz
- Power: Re-Chargeable Lithium Polymer battery
- Charging with 5 VDC, 500 mA max
- One button with call button functionality
- Vibration alarm for alerting the person wearing
- Built-in 3D accelerometer for detecting different states of movement (Currently not in use)
- One red/green/orange status indication LED
- Operating Temperature: 0 to 50 °C / 32 to 122 °F, battery lifetime is lower on the low and high end of the temperature range.
- Storage Temperature: -40 to 60 °C / -40 to 140 °F, battery lifetime is lower on the low and high end of the range. Storage in room temperature is recommended.
- Humidity: From 20 % to 95 % non-condensing, relative humidity
- Environmental Protection: Dust and water proof enclosure

### 5.2 Wi-Fi

- Supported IEEE Standards: 802.11b/g/n (g/n in CCX or Ekahau blink mode only)
- Modulation Scheme: Direct Sequence Spread Spectrum (DSSS)
- Media Access: CSMA/CA
- Frequency Ranges:
  - 2.400 - 2.4835 GHz (USA, Canada, Europe)
  - 2.400 - 2.497 GHz (Japan)
- Supported Networking Protocols: UDP/IP, DHCP or static addressing
- Security: 64/128-bit WEP key and WPA2-PSK authentication
- Antenna Type: Internal 2.4GHz SMD omni-directional ceramic multilayer
- Maximum Antenna Gain: +1.8 dBi

### 5.3 Operating Ranges from an Access Point

- Open Space: 100m/330ft at 11Mb, 150m/500ft at 2Mb
- Typical Office: 40m/140ft at 11Mb, 60m/200ft at 2Mb

### 5.4 Care and Maintenance

- Keep the tag dry. Precipitation, humidity and all types of liquids or moisture can contain minerals that will corrode electronic circuits.
- Do not use or store the tag in dusty, dirty areas. Its moving parts can be damaged.
- Do not store the tag in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the tag in cold areas. When it warms up (to its normal temperature), moisture can form inside, which may damage electronic circuit boards.
- The operating temperature of the tag is 0 to 50 °C (32 - 122 °F). Do not operate the tag outside this temperature range.

- Do not drop, knock or shake the tag. Rough handling can break internal circuit boards.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the tag.
- Do not paint the tag. Paint can clog the moving parts, affect the radio communication and prevent proper operation.
- Use a soft, clean and dry cloth to clean the tag.
- Use only the supplied antenna. Unauthorized antennas, modifications or attachments could damage the tag and may violate regulations governing radio devices.



## 6 Certifications

### 6.1 FCC Rules

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) device may not cause harmful interference, and
- (2) device must accept any interference received, including interference that may cause undesired operation.

FCC ID of this device is: **TA7-T301-W1**

Note: 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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### 6.1.1 Réglementations FCC

Les changements ou modifications non expressément approuvés par Ekahau, Inc. peuvent annuler votre droit d'utiliser cet appareil aux termes des réglementations FCC.

Cet appareil est conforme à la section 15 des règlements FCC sur les appareils numériques de classe B.

Fonctionnement soumis aux conditions suivantes :

- (1) Cet appareil ne doit pas causer d'interférences nuisibles.
- (2) Cet appareil doit accepter toute autre interférence reçue, y compris les interférences susceptibles d'entraîner un fonctionnement non désiré.

### 6.2 CE Marking

This device has been tested to meet the Electromagnetic Compatibility (EMC) and User safety requirements in accordance with following standards: EN55022, EN55024, EN301489-1, EN301489-17, EN300328, EN62479 and EN60950 for the CE Declaration of Conformity (DoC).

## 6.3 Industry Canada Statements for Portable Devices

### Section 7.1.3 of RSS-GEN

Operation is subject to the following two conditions:

- 1) this device may not cause interference, and
- 2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le fonctionnement de ce système est assorti aux deux conditions suivantes :

- 1 L'appareil ne peut causer d'interférences nuisibles, et
- 2 L'appareil doit accepter les interférences reçues, y compris celles qui pourraient nuire à son fonctionnement.

### Section 7.1.2 of RSS-GEN

"Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication."

"Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante."



## 7 Limited Warranty

Ekahau warrants that the Tags will operate in accordance with and substantially conform to their published specifications when shipped or otherwise delivered to the end user and for a period of 1 year thereafter, provided, however, that Ekahau does not warrant any claim or damage under this Warranty if such claim or damage results from:

1. Misuse, neglect, accident or improper installation or maintenance of the Tags,
2. Tags that have been altered, modified, repaired or tampered with by anyone other than Ekahau,
3. Use of the Tags not in compliance with their respective documentation, user manuals, instructions, and any usage restrictions contained therein, including, but not limited to, the provisions relating to the environment and ranges where the tags must be used, or
4. Accident, fire, power failure, power surge, or other hazard.

Otherwise, the Tags are sold AS IS. In no event does Ekahau warrant that the Tags are error free or that end user will be able to operate the Tags without problems or interruptions.

End User is responsible for using the Tags within their specifications as contained in the Documentation.

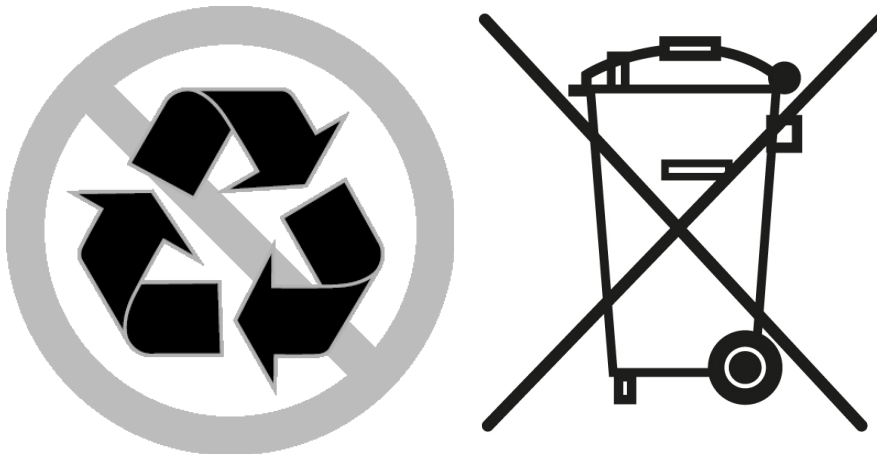
## 8 Disposing

### Note

The Ekahau W4 Wi-Fi tag is non-recyclable. Product has non-replaceable battery which contains hazardous materials. To dispose the product, send it to a specialized company that is capable of handling electronic waste. Alternatively, you can return product back to Ekahau who will dispose it for you.

*F*

*Figure 8.1. The Ekahau W4 Wi-Fi tag is non-recyclable*







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