Ekahau RTLS Interop Note & Configuration Guide
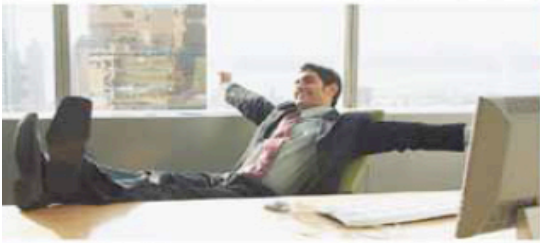
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Requirements

- Ekahau RTLS Controller (ERC) version 5.0.8 or later
- Ekahau T301A tags running FW 2.3.4 or later / Ekahau T301BD tags running FW 1.1.4.52 or later / Ekahau T301W tags running FW 1.0.0 or later
- Meru Networks Controller code 4.0-105 or later
- Meru Networks AP300 series access points

Communication Overview

1. Tags are first programmed for the blink communication mode either at the time of activation (with the Ekahau Activator application) or from the ERC following activation.
2. Once in the blink mode, the tags are programmed to send frames, or bursts, on designated 802.11 2.4 Ghz (only) channels.These frames, when received by listening APs in the transmission area, are measured for RSSI. This RSSI data, along with the tag MAC address is then sent to the ERC.
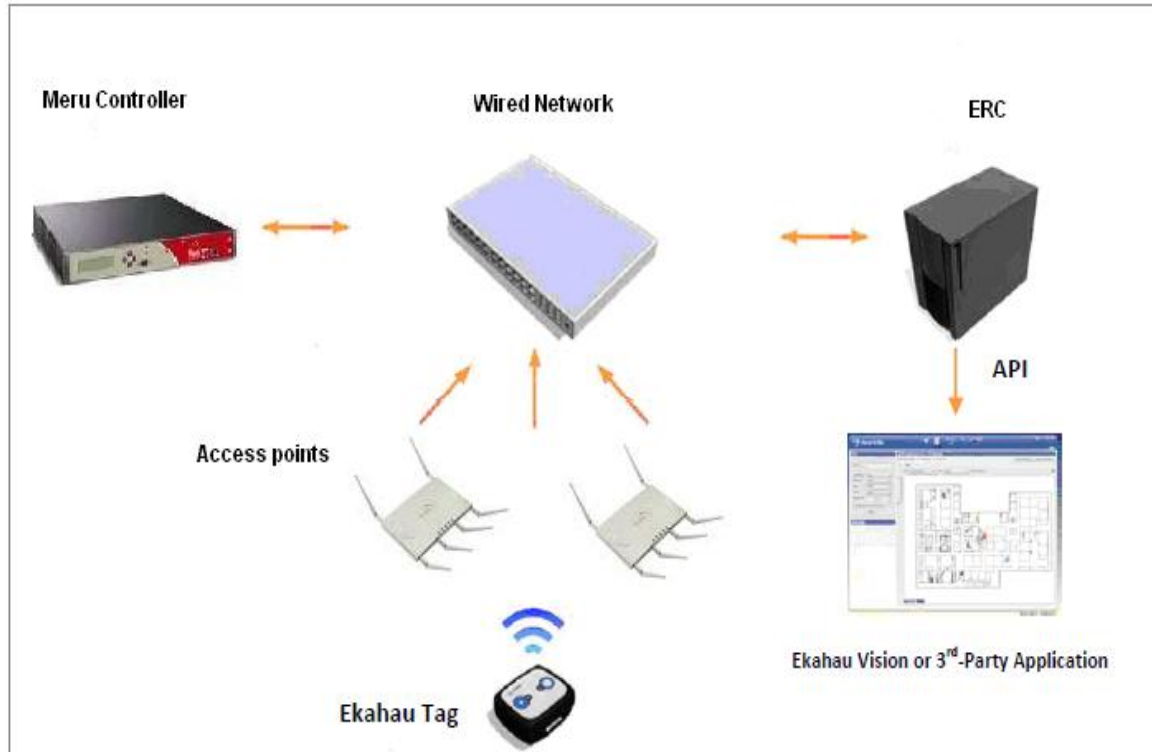
Controller and Access Point Configuration

A packet capture profile needs to be created and applied to the access points. This can be done in the controller's command line interface (CLI). Once the CLI connection is open, the following set of commands can be used to create and apply the packet capture profile for the access points.

> configure terminal
> packet-capture-profile <your_profile_name>
> mode l3 destination-ip <ERC_IP_address> port <ERC_port>
> ap-list all
> filter 01-18-8E-00-00-00
> rxtx rx
> packet-truncation-length 0
> enable-profile
> end
> copy running-config startup-config

Replace the keywords <your_profile_name>, <ERC_IP_address> and <ERC_port> with values matching your setup. By default, the ERC port number is 8570.

```
Master#
Master#
Master# configure terminal
Master(config)# packet-capture-profile test
Master(config-pcap)# mode
l2  l3
Master(config-pcap)# mode l3 destination-ip 172.18.99.99 port 8555
Master(config-pcap)# ap-list all
Master(config-pcap)# filter 01-18-8E-00-00-00
Master(config-pcap)# packet-truncation-length 0
Master(config-pcap)# enable
Master(config-pcap)# end
Master#
Master#
Master# sh packet-capture-profile test
AP Packet Capture Profiles

Profile Name                              : test
Enable/Disable                            : enable
L2/L3 Mode                                : l3
Destination IP Address                    : 172.18.99.99
UDP Destination Port                      : 8555
Destination MAC for L2 Mode               : 00:00:00:00:00:00
Rx only/Tx only/Both                      : rx
Rate Limiting per station or cumulative   : station
Token Bucket Rate                         : 10
Token Bucket Size                         : 10
AP Selection (ID)                         : all
Extended Filter String                    : 01-18-8E-00-00-00
Interface Index                           :
Packet Truncation Length                  : 0
Rate Limiting                             : off
Capture Sibling Frames                    : on
Master#
Master#
```

Note 1 If you want to apply the profile only to a subset of all access point you can use the "ap-list" command to do that. Replace the keyword "all" with the list of your selected access point IDs.

Note 2 To see the full list of packet capture profiles, use the command
show packet-capture-profile
To see the details of a packet capture profile use the command
show packet-capture-profile <your_profile_name>

The packet capture profile can be configured in a similar manner via the controller GUI:

Ekahau RTLS Controller Configuration

The ERC is configured for the Meru Blink Mode with the ERC Configuration Utility. This utility is accessible during ERC installation or by going to Start -> Programs -> Ekahau -> Ekahau Positioning Engine -> Configuration Utility.

1. The settings for the Meru Blink Mode configuration can be found by running the configuration utility and selecting the "Additional Server Features" option.
2. In the following screen, select "Meru Updater" and Click Next.
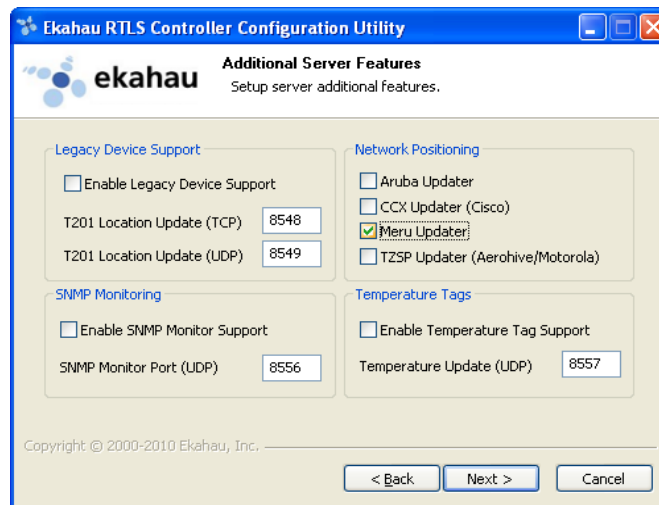
3. Enter the Meru Listener Port and Click Apply.
4. The ERC will restart.

Tag Configuration for the Meru Blink Mode

Overview

In the Ekahau RTLS, tags communicate for two purposes. First, they communicate to report their location. Secondly, they communicate to perform maintenance operations, which include programming changes and firmware updates. Ekahau T-series RTLS tags support location updates via Meru Blink Mode. In this mode, tags will report location by transmitting a special blink frame yet still maintain the capability for association-based sessions, for periodic maintenance sessions. A description of communication methods:

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- One-way **Meru Blink Mode**: Tags utilize connectionless infrastructure blink frames to communicate location on a Layer 2 basis. No authentication/association required.
- **Wi-Fi Associated mode:** Tags authenticate and associate to the network in order to transmit data, receive acknowledgements, send/receive text messages, or receive software/configuration changes over the air.
- **Hybrid** Blink/Associated Mode: Tags communicate location via blinking, and utilize associated mode on a periodic basis as necessary.

Supported Tag Types

T301A – Firmware version 2.3.4 or later
T301BD – Firmware version 1.1.4.52 or later
T301W – Firmware version 1.0.0 or later

Meru Blink Mode Activation

Ekahau tags can be programmed for the Meru Blink Mode either at the time of activation or when they've contacted the ERC server. Tags can alternate between the Meru Blink Mode and associated mode depending on configuration. To activate a tag for the Meru Blink Mode, launch the Ekahau Activator, and enter following:

1. RTLS Controller Settings
Enter in the IP address for the ERC server. In the Meru Blink Mode, the location frames are not directed via IP, however, the IP address remains essential to enable "over the air" programming of the tags from the ERC during maintenance sessions.

2. Scan Settings
Select "Meru" from Scan Settings "Mode" menu. "Count" refers to the number of frames the tag will send on each channel. In most use cases, it is recommended that the "Count" to be set to 2 or 3. Channel selection defines the channels that the tag will use to send the blink frames.
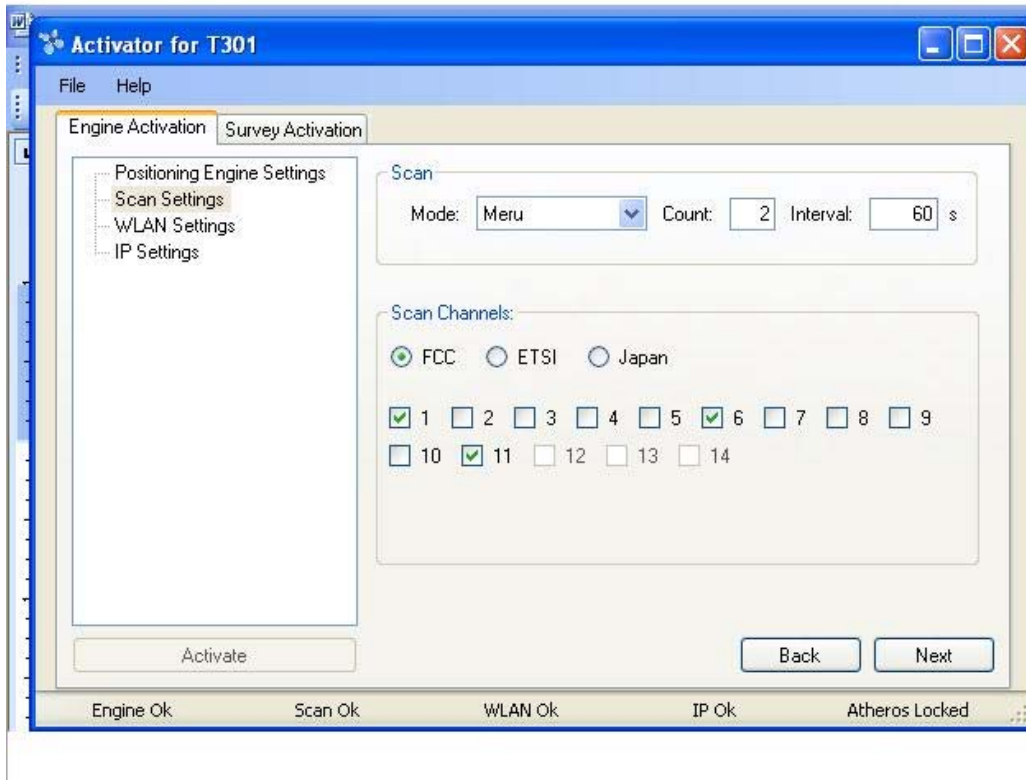
3. WLAN Settings
Includes the WLAN SSID and encryption settings for the tag to communicate to the server. Even though the location update will take place via the Meru Blink Mode, these network settings are necessary to allow the tag to communicate to the server in association mode for FW updates and programming changes.

4. IP Settings
Select Static or DHCP. IP addressing, like the ERC IP and WLAN SSID information, as this is needed in the Meru Blink Mode to allow the tag to be managed over the air from the server.

Meru Blink Mode Programming from the ERC

To put Ekahau tags in the Meru Blink Mode from the EPE, they will first need to be activated via Ekahau Activator and have an active maintenance session to the ERC server. Once tags are connected, utilize the "Configs" tab in the ERC to create a Meru Blink Mode configuration for the tags. From the Configs page, select "Create New T301 Configuration". At the top of the configuration page, select "Advanced Network Settings" to select "Meru" from the drop down menu.

Refer to User Guide documentation for instructions on Activation and Configuration. Some explanation on a few key configuration options as they relate to the Meru Blink Mode includes the following:

SSID 1 and SSID 2
These options do not affect the Meru Blink Mode location update function; however, tags do need at least one SSID to communicate to the server for maintenance updates

Tag IP Settings
These options does not apply to the Meru Blink Mode location updates, however, tags do need an IP address for communication to the server during maintenance events. We recommend that this setting be set to "use DHCP once for all access points".

Scan Channels
The tags in the Meru Blink Mode will send blink frames on each channel selected in sequence. Typically channels 1, 6, and 11 are selected.

Initial Scan Count
In the Meru Blink Mode mode, initial scan count affects how many blink frames the tag will send on a channel before moving on to the next channel. The recommended number is 2 to 3 blink frames per channel.

Meru Blink Mode Configuration Example

As an example, a tag configured for channels 1, 6, and 11, and initial scan of 3, wakes up to report location at its prescribed periodic interval or based on movement. The tag will send 3 blink frames to channel 1, and then send 3 frames to channel 6, and finally, it will send 3 frames to channel 11. The entire operation occurs in a matter of a few milliseconds and the tag goes back to sleep until the next interval. Each AP in the area

that "hears" these frames will record the MAC address of the tag and the associated RSSI value of the received frame and pass that information on to the ERC.

ERC Verification

Once the service has been configured correctly and the services have restarted, tags communicating via Meru Blink Mode should become visible in the ERC "Tags" page. As tags communicate to the network via the Meru Blink Mode and APs pass data to the ERC, the respective APs will register themselves with the EPE. Select the "WLAN Controllers" link from the System page in ERC to verify.

Each registered access point will be displayed in the WLAN Controllers page as well as the timestamp of the latest packet received from the active access points.

Note: For a new installation which is being calibrated for the first time, ensure that the EERC is licensed. To enable location services, a location model (.esx) file must also be activated from the "models" tab in the ERC. For a first-time calibration you may activate a "dummy" model in the ERC to enable services. A dummy model need only contain a map, a rail, and small amount of survey data.

RTLS Calibration for Meru Blink Mode

When tracking tags with Ekahau RTLS via the Meru Blink Mode it is recommended to perform calibration via the Meru Blink Mode. More on calibration in general can be found in the RTLS Calibration Best Practices document.

1. Activate a tag for the Meru Blink Mode

1. Follow steps for the blink mode Activation, but set the tag for a rapid update interval with the Ekahau Activator.
2. Set up Network settings (WLAN SSID, encryption, etc.) as you would normally or use the site's default .ini (see Activator User Guide for more information).
3. Select Scan Settings menu
    a. Set Mode: "Meru" from the Mode drop down menu
    b. Set Count: 3
    c. Set Interval: 1 (fast repeat)
4. Activate the Tag and ensure that it is communicating to the server via the Meru Blink Mode.
5. If you are unsure of what communication method the tag is using you can check that by entering the following URL.

   http://<ERC_IP>:8550/epe/eng/lastrssi?mac=00:18:8E:00:73:72

Replace the MAC address in the URL with your tag's MAC address as well as the <ERC_IP> with your ERC IP. In the resulting page you should see the following line indicating that the communication method is the Meru Blink Mode.

<measurementmethod>MERU_BLINK</measurementmethod>

6. If the tag does not report to the engine, review and troubleshoot activator settings, network settings, and the settings used by the ERC.
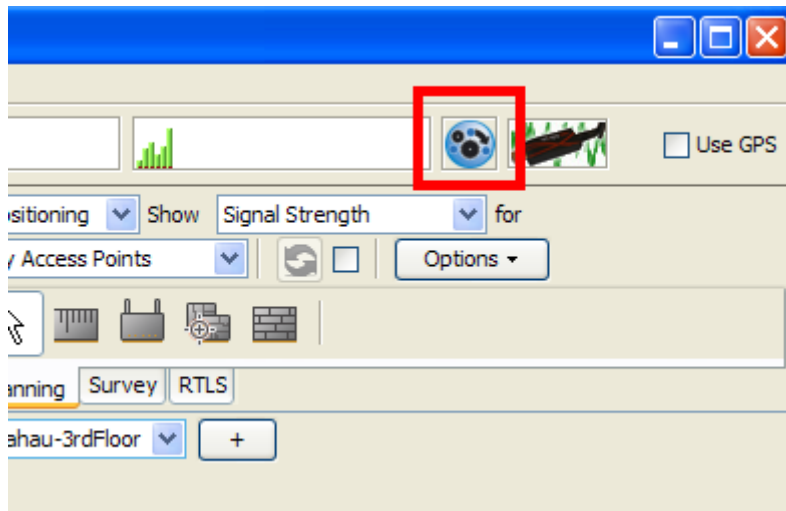
2. Prepare Ekahau Site Survey

1. Launch Ekahau Site Survey and open a copy of your existing Positioning Model file (*.esx) or start by creating a new model.
2. **Note: if this is a first-time calibration, you will need to activate a "dummy" model in the ERC to enable location service. The ERC will also require a license.**
3. Connect to the wireless network that the Ekahau tags utilize to communicate to the server.
4. Ensure that you can run the ESS and open a connection to the EPE: (http://"server IP address":8550.
5. In the ESS Click on the NIC card icon or go to Menu -> Device/Devices…
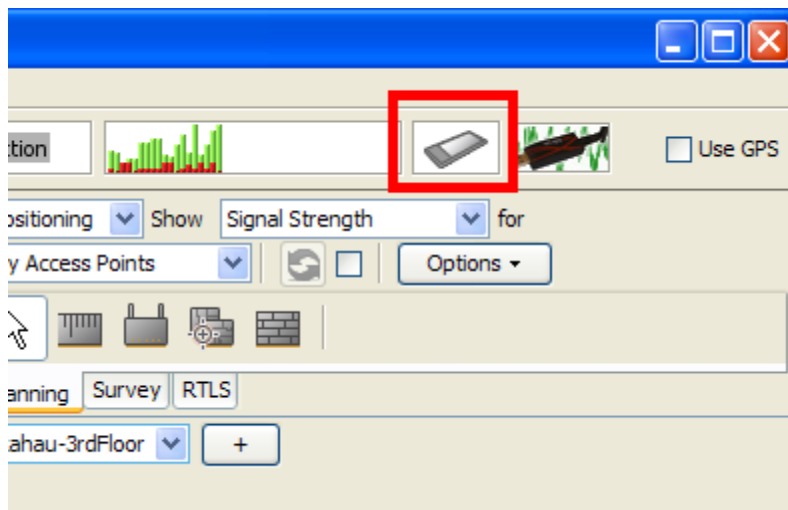
6. Select – Ekahau RTLS Controller
7. Enter in the IP address, username, and password for the ERC server. Then enter the MAC address of the tag you activated for the Meru Blink Mode and verified in the ERC.
8. Click on "Test Connection" and wait for the "OK" status.
9. Click "Use for Scanning" and the survey will start using the RTLS controller/tag connection to survey the network.
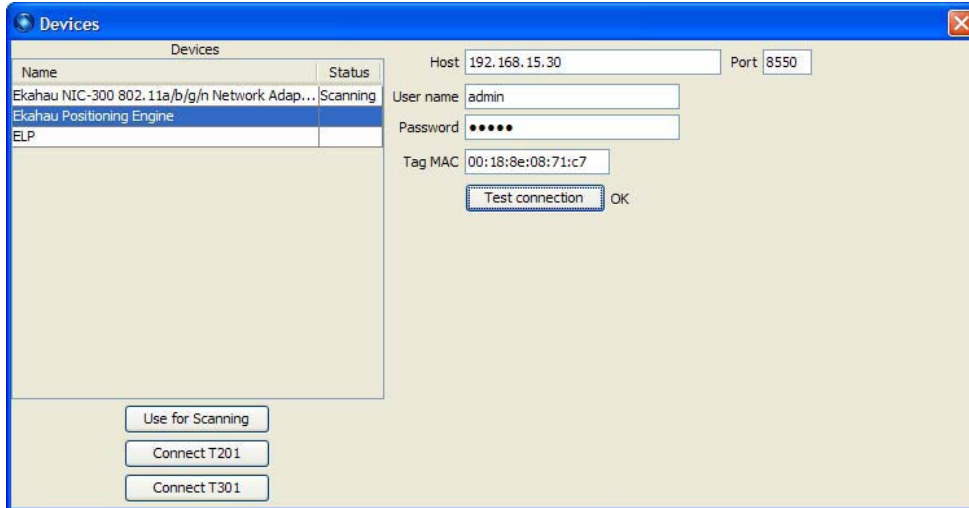
10.   Once successful, the NIC card icon will be replaced with the Ekahau RTLS Controller icon in the Ekahau Site Survey Window.

3. Survey the Project Area

1. Once the tag and ESS are configured, survey the project area according to user guides and best practices.
2. Please consult the Ekahau Site Survey User Guide for Deploying RTLS, which can be accessed from the ESS "Help" menu as well as the Ekahau RTLS Calibration Best Practices document for general usage and survey advice.

4. Activate Model
1. Finish, save, upload project ESX back to ERC either via ESS or by connecting to ERC through a WEB browser.
2. Set new model as "ACTIVE" and test.

Limitations :

1. In the tag activator app, the "Meru" mode option under "Scan Settings" is only available under Activator version 1.2.0 onwards. If you are using an older version, or do not see this option, please update the app version.
2. If using tags in association or hybrid mode, be advised that deployments with Virtual Cell enabled, will yield erratic location results. This is due to the Ekahau Positioning Server's inability to read off of the Meru IE in the beacons, and hence attempt to interpret different APs based solely on the bssid that they broadcast.
3. This document is only specific to tags. Currently, MUs (mobile units) are tracked via Ekahau's "Positioning Client" software. Hence, tracking for such devices should be considered in only non-Virtual Cell environments.
4. This document is relevant to an all-AP300 environment only. Using mixed environments (AP200 + AP300) will result in unexpected behaviour on the part of the packet capture profile on the controller, and hence is strongly advised against. The same goes for an all-AP200 env, where the packet capture profile fails once a filter string is added.
5. In the tag activator app, when all settings have been configured, the bottom right corner of the app should read "Atheros OK". Sometimes, it continues to show "Atherlos Locked" regardless of settings. In this case, the driver needs to be installed manually. To do this:
    1. Windows menu -> Control Panel -> Network connections.
    2. Select network adapter and right click to select Properties.
    3. Select "install"; select "Protocol" and click "Add".
    4. Select "Have Disk".
    5. Browse to (on default Activator install) \Program Files\Ekahau\Ekahau Activator T301\drivers\protocol.
    6. Choose the "ekahau.inf" file and click OK.
    7. Start the driver by going to the command prompt and issuing this command: sc start ekauio. If no errors are reported, the driver is successfully installed and "Atheros OK" should appear in the Activator app.