

TinyMesh Locator Function

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References

1. TinyMesh Data Sheet, latest revision available at www.radiocrafts.com or www.tiny-mesh.com

Definitions

RSSI: Received Signal Strength Information. RSSI is a logarithmic value indicating received power and the lower the value, the less power is received and the weaker is the link.

Introduction

TinyMesh features a unique locator function as part of the comprehensive embedded control- and monitoring features embedded in the protocol. This Application Note describes the location features in more detail.

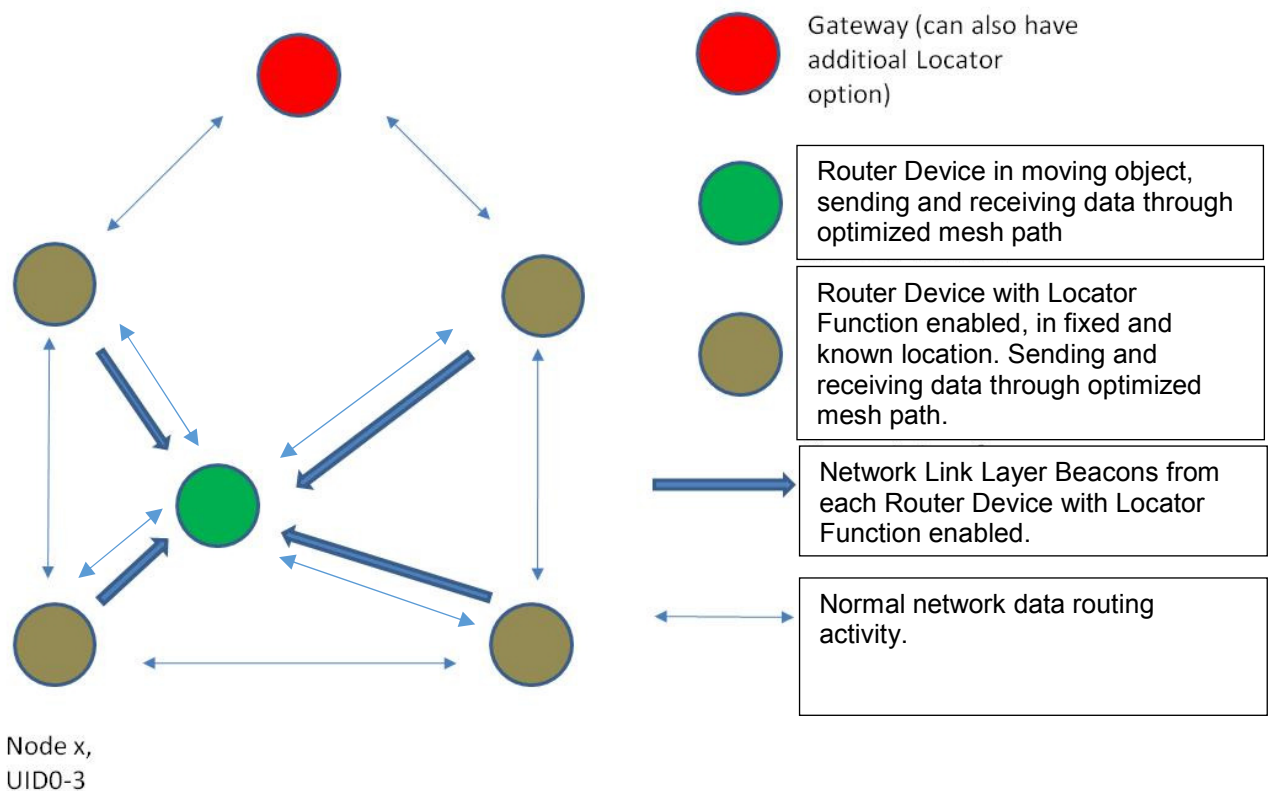


Figure 1: Fixed location Router Devices with Locator Function enabled, sending periodic Locator Beacons, received by a moving Router Device. The moving Router Device routinely compares RSSI of received Locator Beacons and saves the Unique Identity of the fixed Router Device with the best received signal strength (RSSI)

In the figure above, Node x with UID0-3 is received with the best RSSI. The Unique Identity of this device is reported back to the Gateway by the moving Router Device, where it is made available on the Gateway UART

The TinyMesh network consists of any number of Routers in any network topology. Network self-forming and self-healing initiates immediately in the presence of one or more Gateway(s).

Localization support

When a Router Device is configured with Locator Enable, it becomes a Locator (as well as it still supports all other features as I/O control and monitoring). One or more standard Router Devices moving in an area with fixed Locators, will receive Locator Beacons and decide which one has the best RSSI-value. This information is transmitted through the mesh network of Locators and Routers to the Gateway Device.

A Gateway Device may also be enabled as a Locator, to become a part of the localization network.

At the Gateway UART, the Unique Identity (UID) of each moving Router(s) in the network will be made available and as well the closest Locator for each moving Router. The interval of transmissions of messages from the moving Routers is defined by the configurable IMA interval, settable by an over the air configuration message, or as a configuration setting entered through the module UART.

For detailed information on how to configure the Tinymesh functions, please reference the data sheet.

It should be noted that obstacles in the transmission path (like a wall), may introduce significant reduction in the signal strength. This means that a moving Router can be physically closer to another Locator (in distance, meters) than the one having best RSSI, if the signal from the closest Locator has passed through one or more walls. Proper Locator placement is crucial for most reliable positioning. Reduced distance between Locators naturally gives improved accuracy. Additionally, an empiric formula for calculating distance versus RSSI value can be found, but the accuracy cannot be expected to be high due to the variation in RSSI versus obstacles in the path.

Note: In TinyMesh, the RSSI-value is given in hex value **without** any negative format. So when it comes to RSSI interpretation and conversion it will result in a low RSSI reading meaning "strong" RF signal.

Document Revision History

Document Revision	Changes
1.0	First release
1.1	More detailed drawing and -description

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