TREK1000 Quick Start Guide

Two-Way-Ranging (TWR) RTLS IC Evaluation Kit

Version 1.5

Welcome

Thank you for purchasing this TREK1000 Evaluation Kit. This demonstrates the functionality of the Decawave DW1000 chip using two-way ranging distance measurements in RTLS application use cases and allows you to evaluate the DW1000 technology.

This Quick Start Guide is all that is needed to get up-and-running quickly. The TREK1000 can be arranged to evaluate three different use cases:
1. Tracking Use Case
2. Geo-Fencing Use Case
3. Navigation Use Case

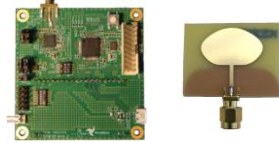**Note:** The TREK1000 is pre-configured to operate in the Tracking Use Case.

The TREK1000 contains four evaluation boards (EVB1000), four antennae, four DC power leads, four USB cables and four stands. You should check the contents of the TREK1000 carefully to ensure no components are missing or damaged.

Visit Decawave (http://www.decawave.com/products) for the TREK1000 PC application, more documentation (including the TREK1000 User Manual) & updated firmware releases.

Quick Setup: Required Components

Step 1. Check Contents of the Kit	Step 2. You Will Also Need	Step 3. Attach Antenna
4 EVB1000 Units 4 Antennas	PC	Screw the Antennas onto the Anchors.
4 DC Power Leads	3 USB Batteries or Power Supplies	It is recommended to use an SMA Torque Wrench to ensure a proper connection is made.
4 Stands		
3 x 1.8m USB Cables	PC Software* Download from: Decawave	
1 x 60cm USB Cable	TREK1000 User Manual Download from: Decawave	
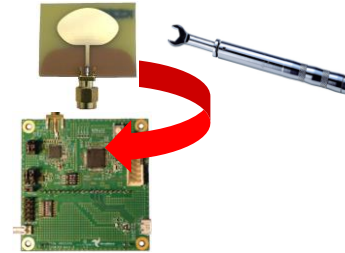
*Install the STMicroelectronics Virtual COM Port Driver on the PC from this link: http://www.st.com/web/en/catalog/tools/PF257938
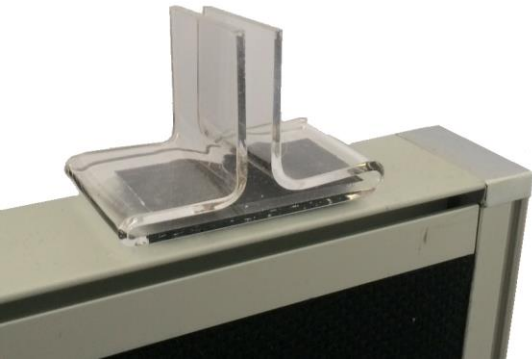
Mounting Suggestions

Use the TREK Stand

Use the TREK Stand with a Tripod

Use the TREK Stand with Velcro Tape

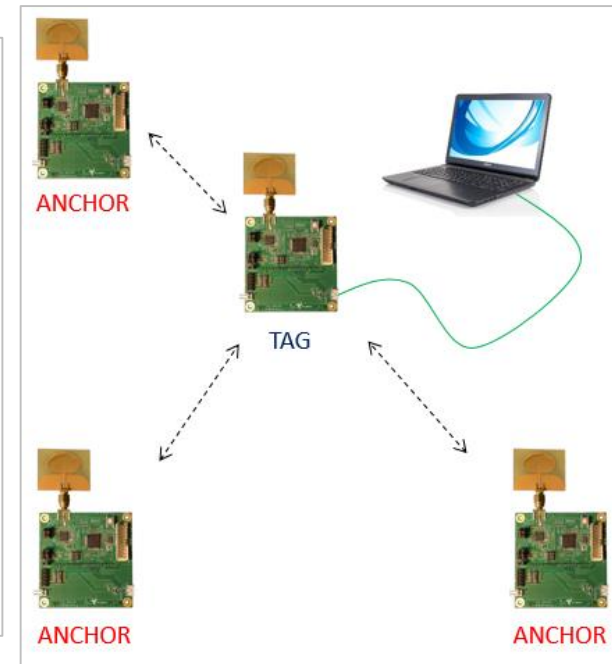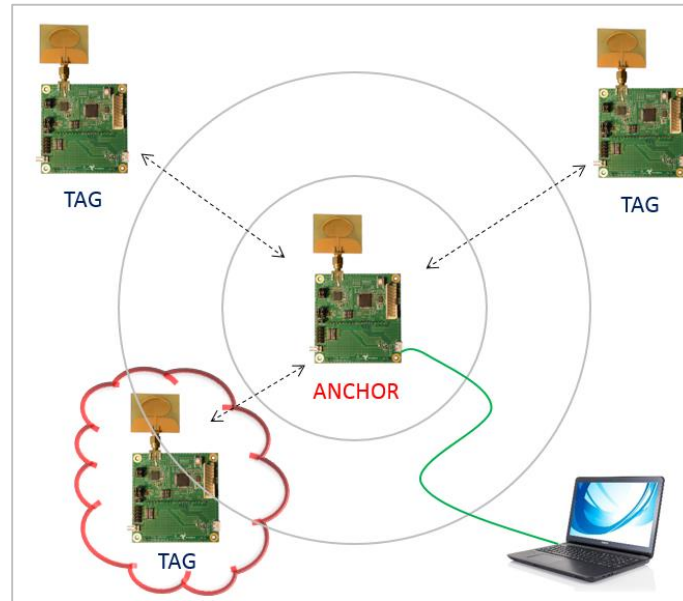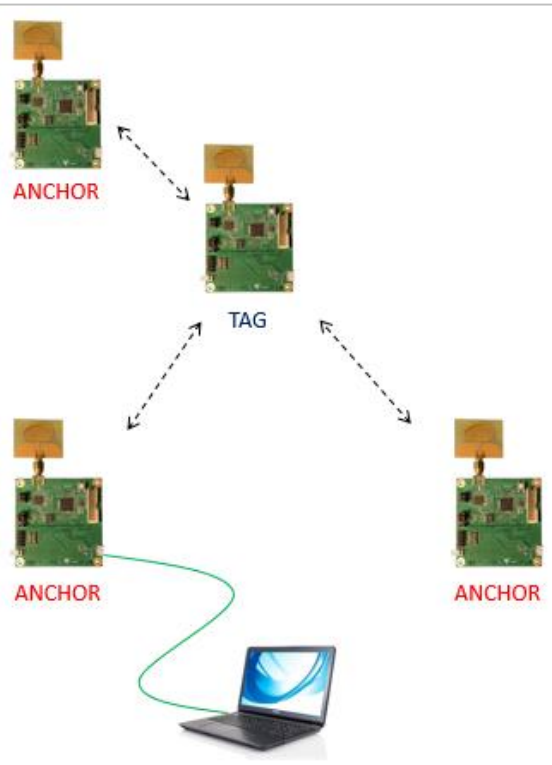# Three Use Case Configurations

1. Tracking Use Case
- 3 Mounted Anchors
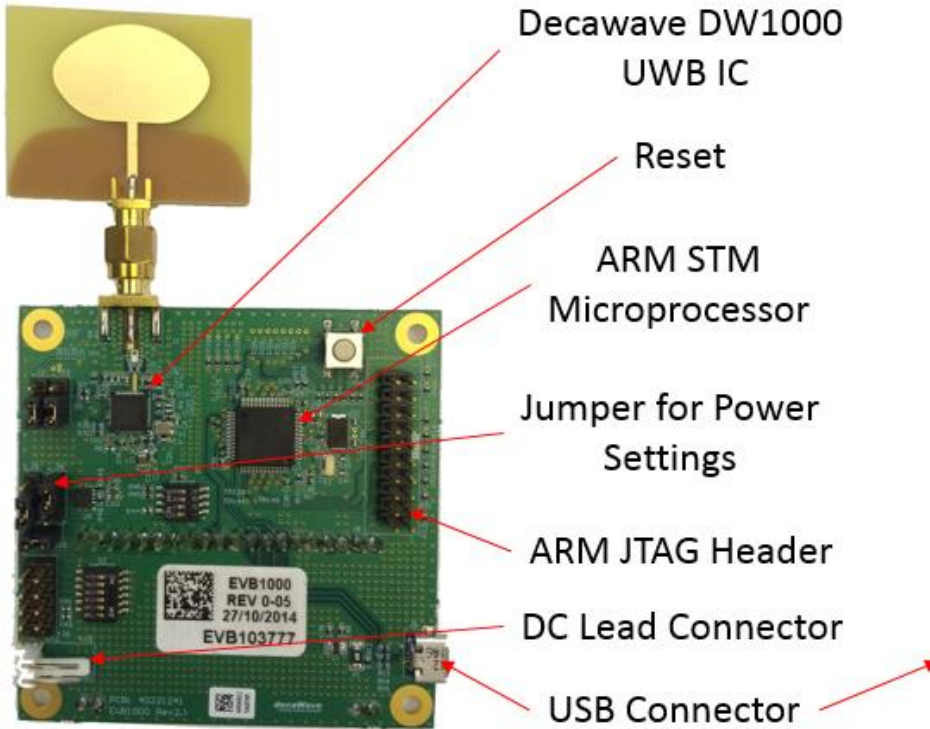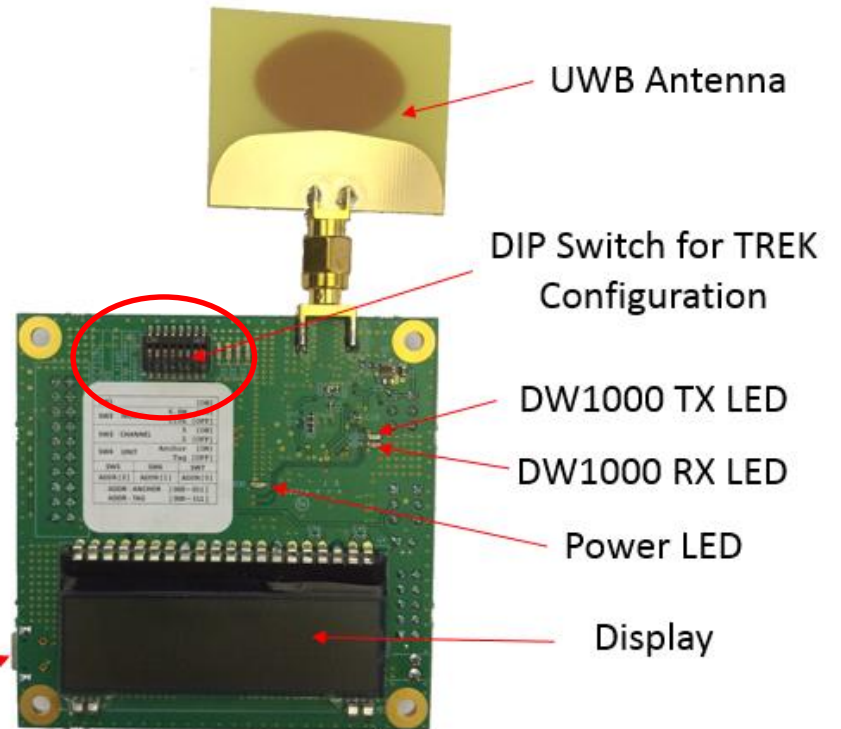- 1 Mobile Tag
- 2D & 3D Tag Tracking

2. Geo-Fencing Use Case
- 1 Fixed Anchor
- 3 Tags
- Warning when Tags enter/leave a zone (bubble)

3. Navigation Use Case
- 3 Mounted Anchors
- 1 Mobile Tag
- 2D & 3D Tag Tracking
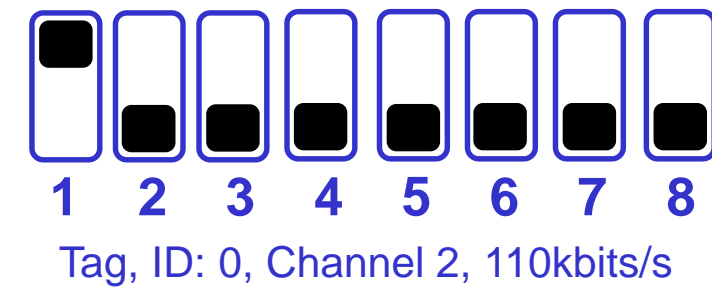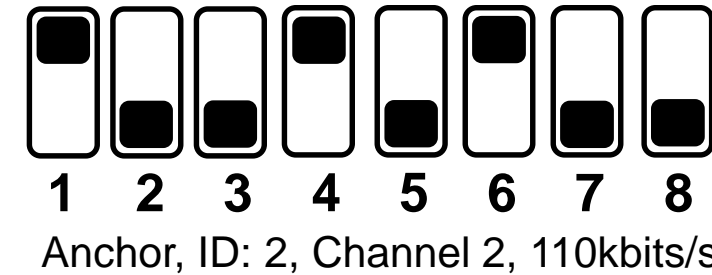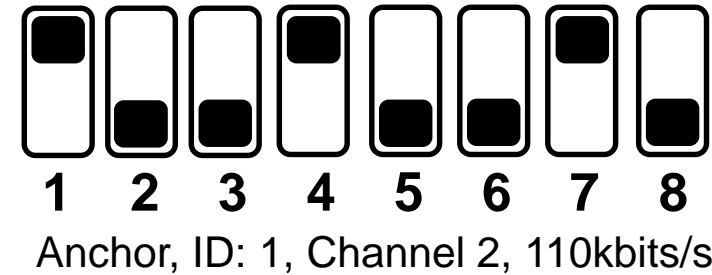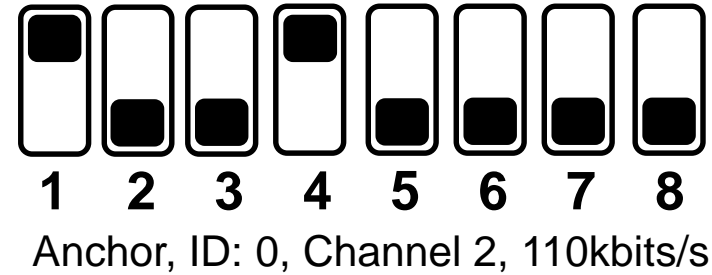- PC connected to Tag

![Decawave logo]

EVB1000

EVB1000 Back

EVB1000 Front

- Decawave DW1000 UWB IC
- Reset
- ARM STM Microprocessor
- Jumper for Power Settings
- ARM JTAG Header
- DC Lead Connector
- USB Connector

- UWB Antenna
- DIP Switch for TREK Configuration
- DW1000 TX LED
- DW1000 RX LED
- Power LED
- Display
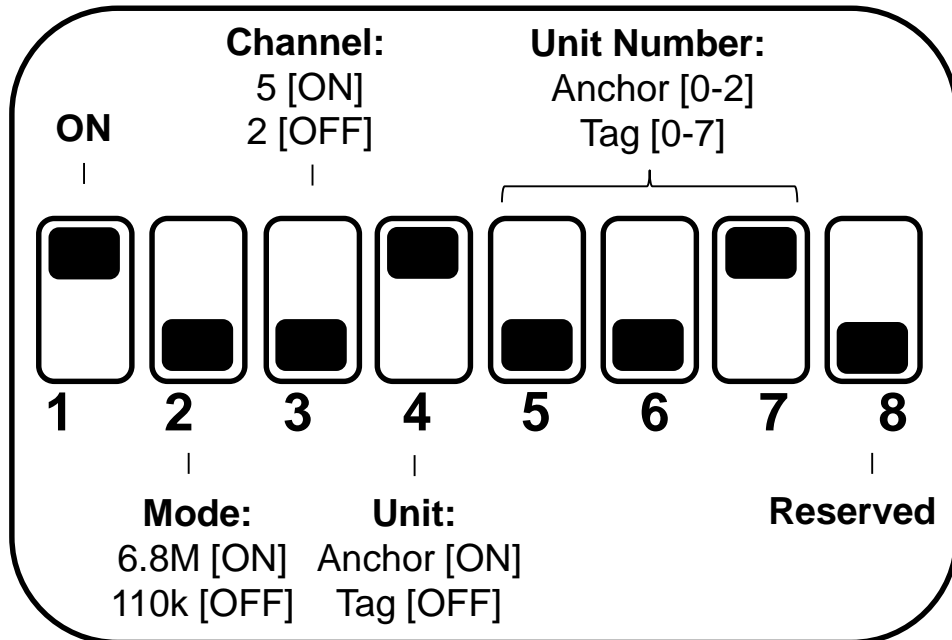
1. Tracking Use Case: Configure

Configure using the TREK configuration DIP switches

1. Configure 3 units as Anchors
2. Anchors should have IDs of: 0, 1, 2

3. Configure 1 unit as a Tag
4. The Tag should be given an ID of: 0

Anchor, ID: 0, Channel 2, 110kbits/s

Anchor, ID: 1, Channel 2, 110kbits/s

Anchor, ID: 2, Channel 2, 110kbits/s

Tag, ID: 0, Channel 2, 110kbits/s

Channel:
5 [ON]
2 [OFF]

ON

Unit Number:
Anchor [0-2]
Tag [0-7]

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Mode:
6.8M [ON]
110k [OFF]

Unit:
Anchor [ON]
Tag [OFF]

Reserved

1. Tracking Use Case: Mount

Mount the Anchors

1. Mount the 3 Anchors at the same height

2. For correct height tracking Tag should be below the plane of the Anchors

3. Anchors must be >15 cm from any wall
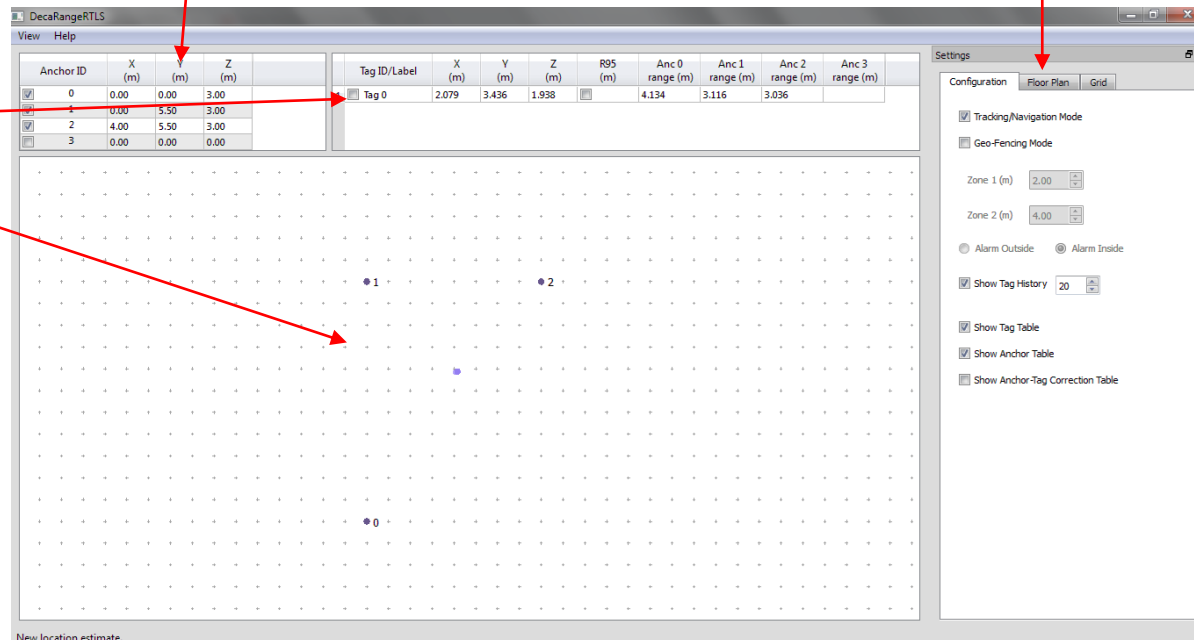
4. Connect Anchor (ID=0) to the PC

Anchor 0

Wall

Important!

>15cm
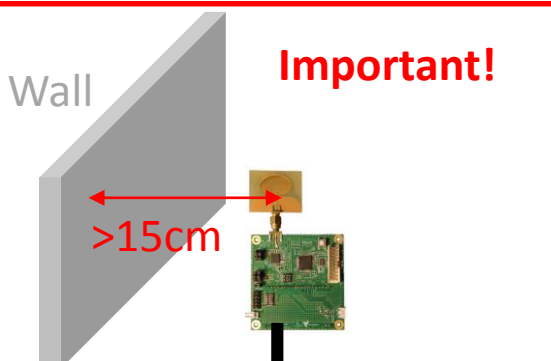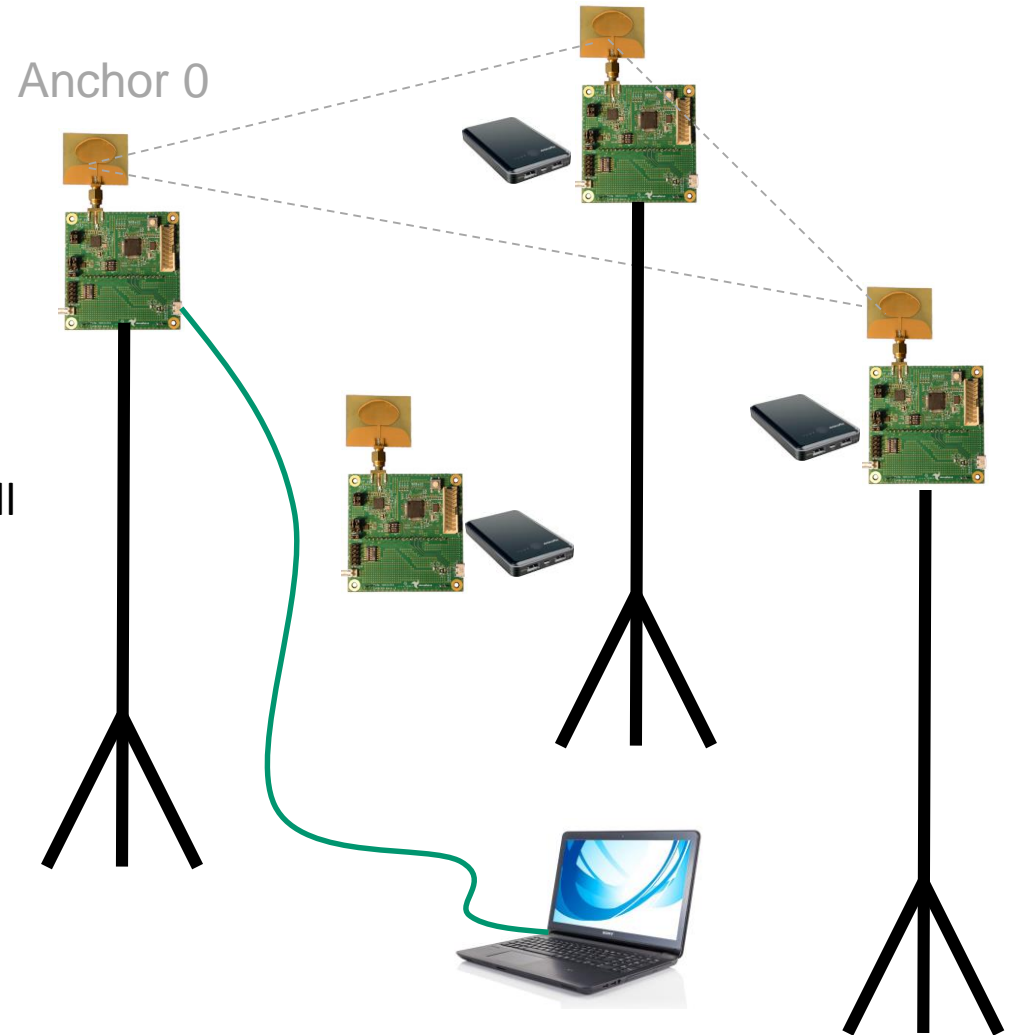
Operate TREK in the Tracking Use Case

1. Ensure the 4 EVB1000 units are powered

2. Launch the DecaRangeRTLS.exe client

3. Set Anchor Co-Ordinates (Accuracy of positioning determines system performance)

4. Use mouse to position Anchors on screen

5. Track the Tag

Upload Floorplan

![Decawave]

2. Geo-Fencing Use Case: Configure

Configure using the TREK configuration DIP switches

1. Configure 1 unit as an Anchor
2. Anchor must have ID of: 0

3. Configure up to 3 EVB1000 units as Tags
4. The Tags should be given IDs of: 0, 1, 2

Anchor, ID: 0, Channel 2, 110kbits/s

Tag, ID: 0, Channel 2, 110kbits/s

Tag, ID: 1, Channel 2, 110kbits/s

Tag, ID: 2, Channel 2, 110kbits/s

ON

Channel:
5 [ON]
2 [OFF]

Unit Number:
Anchor [0-2]
Tag [0-7]

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Mode:
6.8M [ON]
110k [OFF]

Unit:
Anchor [ON]
Tag [OFF]

Reserved

Mount the Anchor

1. Mount one Anchor (ID=0)

2. The Anchor must be >15 cm from any wall

3. The PC is connected to the Anchor

4. The 3 Tags can be moved inside and outside the perimeters
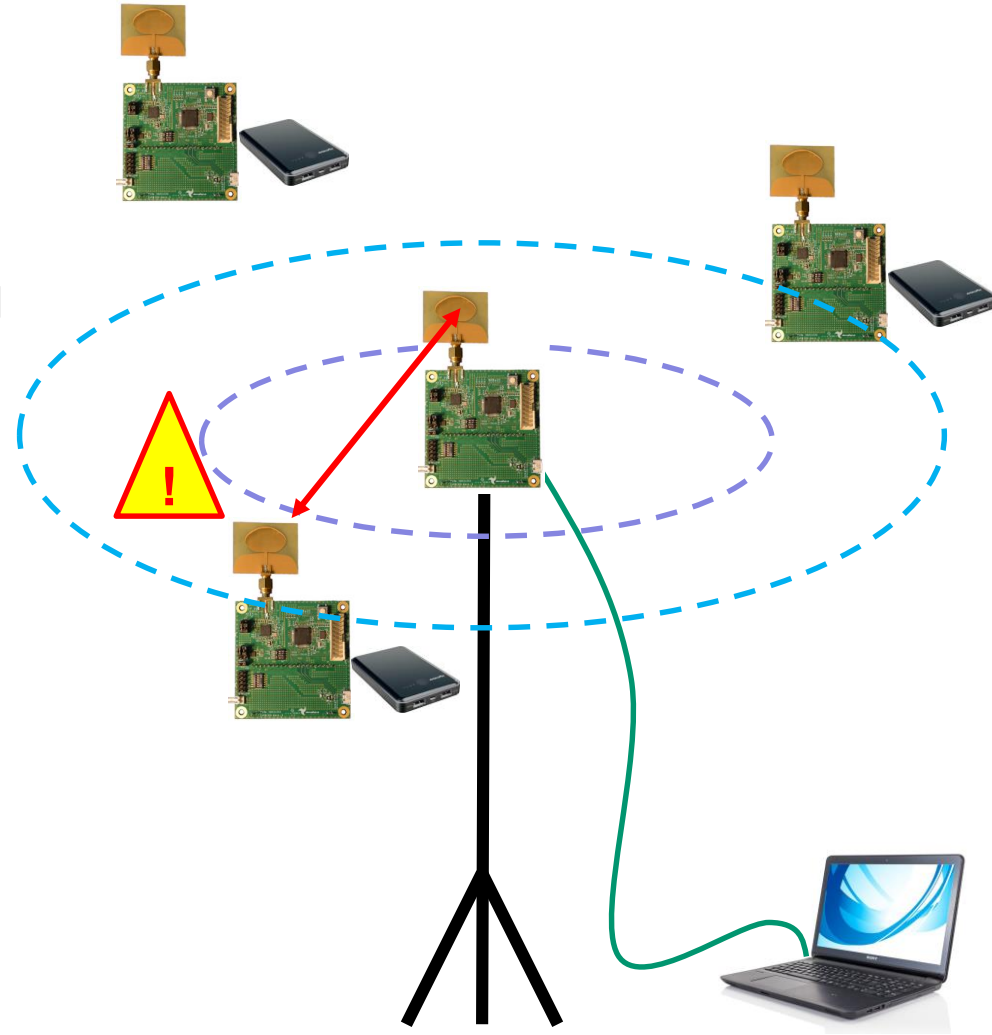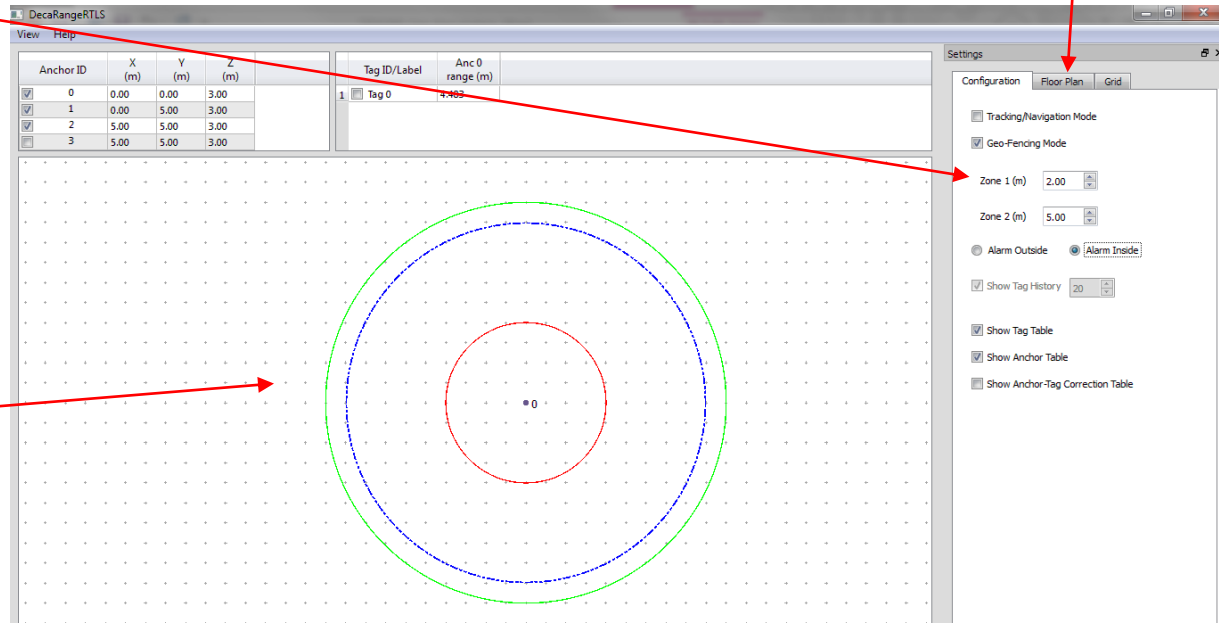
Operate TREK in the Geo-Fencing Use Case

1. Ensure at least 2 EVB1000 units are powered

2. Launch the DecaRangeRTLS.exe client

3. Select Geo-Fencing Mode

4. Set the zone perimeters

5. Select 'Alarm Inside' or 'Alarm Outside'

6. The tag is displayed as circle which changes from green to blue to red as it crosses zone perimeters

Upload Floorplan

Configure using the TREK configuration DIP switches

1. Use the same configurations as the Tracking Use Case

Mount the Anchors

1. Mount the 3 Anchors as per the Tracking Use-Case (see previous description for instructions)

2. This time connect the PC to the tag instead of an anchor

Operate TREK in the Navigation Use Case

1. Use the same DecaRangeRTLS.exe setup as the Tracking Use Case

2. In this scenario the display will show the location of the device it is attached to
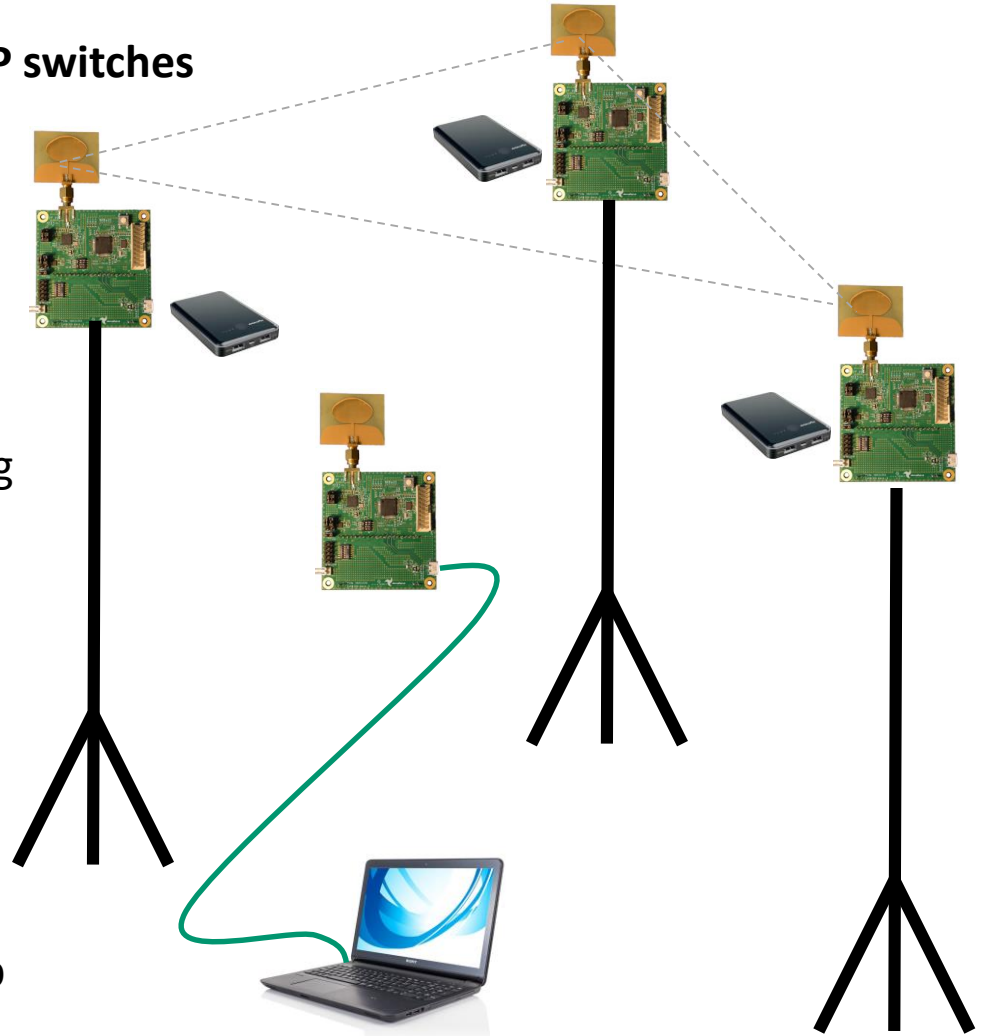
Disclaimer

DOCUMENT INFORMATION - Disclaimer

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Caution! ESD sensitive device. Precaution should be used when handling the device in order to prevent permanent damage.

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This TREK1000 evaluation kit based on DecaWave's DW1000 IC is intended solely for use by competent engineering personnel for the purposes of evaluating the use of DecaWave's DW1000 IC in wireless location and communications systems. The TREK1000, as supplied from DecaWave, has not been certified for use in any particular geographic region by any regulatory body governing radio emissions in such regions.

The TREK1000 is supplied under the following conditions: -

- The distribution and sale of the TREK1000 is intended solely for use in future development of devices which may be subject to regulations or other authority governing radio emission.
- This TREK1000 may not be resold by users for any purpose.
- The TREK1000 as supplied by DecaWave may not be incorporated directly into user devices or products unless such products undergo the appropriate certification.
- Operation of the TREK1000 in the development of future devices is at the discretion of the user and the user bears all responsibility for any compliance with regulations laid down by the authority governing radio emissions in the user's jurisdiction.

All products developed by the user incorporating the DW1000 must be approved by the relevant authority governing radio emissions in a jurisdiction prior to the marketing or sale of such products in that jurisdiction. User bears all responsibility for obtaining such approval.

If the user has obtained the TREK1000 for any purpose other than those listed above the user should return the TREK1000 to the supplier immediately.

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