# UWB.41

Device Active Mode Location and Tracking Accuracy





Service name:

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## **Deliverables:**

2D/3D location accuracy maps of customer device compared to a Taoglas evaluation kit. Further analysis on measured location compared to actual location. Target is +-10% uncertainty.

## Duration:

2 Weeks



#### **Service Product Definition**

Taoglas uses Decawave powered Two-Way-Ranging RTLS IC Evaluation Kit to quickly benchmark the superior location and tracking accuracy of Taoglas UWB technology against other technologies. The kit comes with 4 units, configurable as anchors or tags, as well as a PC application for the visualization and configuration.

If one needs to proof a larger system, the system can be extended by simply adding another specialized EVL kit. Customers will also gain access to all the source code – embedded Two Way Ranging SW, location engine and GUI SW allowing customers to jump start their own product development.

## Tracking mode: Mandatory

Tracking mode — using 3 anchors and 1 tag to cover applications use cases around asset tracking, logistics and factory automation. In this mode, the user will be able to collect the 2D/3D position of the tag relative to the anchor's position.

## Geo-Fencing Mode: Optional

Geo-Fencing (also called Secure Bubble) mode-based on 1 anchor and up to 3 tags, this mode enables users to monitor if the tags are within certain pre-defined perimeters around the anchor – the bubble. This mode will allow users to evaluate use cases like personal safety (collision avoidance, security perimeter around machinery), child monitoring or 'secure-my-valuables' types of applications.

#### Navigation Mode: Optional

Also using 3 anchors and 1 tag. Connected directly to the tag, the user will be able to walk around and visualize its current position, allowing to test human and robotics navigation scenarios.

The kit is based on the Decawave DW1000 chip which is the first IEEE802.15.4-2011 UWB compliant wireless transceiver. The chip, while allowing the location of objects to a precision of 10cm, is also capable of high data-rate communications, up to 6.8Mb/s.

This combined capability makes it a perfect fit to answer the "What, When, Where" questions essential to the deployment of the Internet of Things. Due to its excellent communications range of up to 290m in Line of Sight and up to 35m in Non Line of Sight, it also reduces the system cost by reducing the need for infrastructure.

## What does Taoglas need?

#### In all cases Taoglas will require the following:

• At (2) complete devices, with all the bits and pieces.

The devices need to be functional enough to enable the customer UWB modem with an interface for comms via RS 232 serial port but preferably USB and or ethernet port for direct access to server for the latter and a programme to enable AT command access that can be downloaded to a Taoglas computer.

- The devices should be built-up as much as possible, the closer to the final assembly the more accurate the results. Batteries, displays, and metallic sub-assemblies will impact the test results and should be included.
- One complete set of any support devices such as spare battery packs, battery charger, interface cables, etc.
- Instructions on how to connect the device, power on the device, and connect to the AT command interface. If the battery will need to be charged or replaced.

#### The Process

- Taoglas will setup your tag device/s in our office so that it may communicate with the anchor'/s situated in various positions in the office/room. We will power the device as per your instructions.
- 2. 4 base station emulator UWB kits scattered around a room will be used to establish a call or receive a call in test mode for your device. This same test is then repeated with an all Taoglas reference kit comprising of a Taoglas tag in test mode. The location accuracy of the customer device is compared to the location accuracy of the reference Taoglas tag.
- 3. If the system location test results are much worse off than the Taoglas results (> 10 cm) and are not within +-10 cm of actual physical location of customer tag, Taoglas will make suggestions for improved system performance by evaluating the antenna implementation and performance If the antenna performance is acceptable the next step would be further active measurement--TIS/ EIS and RSE.
- **4.** Taoglas' automated test system will perform the Real-Time location tests at required UWB channel Bands.
- Taoglas will complete the test report detailing the setup and Real-Time location 2D/3D results.

#### Deliverables

## Taoglas will compile a report on the Location Accuracy measurements, including:

- Device test setup pictures
- Full Description of tests
- Measured Location of tag device and accuracy compared to Taoglas
  reference kit
- Finally, measured Location of tag device compared to actual Physical Placement

Taoglas will perform 500 MHz wideband tests per band of the following tests as required.

#### See table below:

	UWB PHY channel frequencies for DW100		
	Channel Number	Centre Frequency (MHz)	DW1000 operational BW (MHz)
$\bigcap$	1	3493.4	500
	2	3993.6	500
	3	4492.8	500
SA	4	3993.4	900
	5	6489.6	500
	7	6489.6	900

 If a device radio module can accommodate more than the typical 3.2-7.2 GHz as per UWB reference module DW1000 (reference it) i.e. the wider 3.1-10.6 GHz range then applicable charges will apply TBD.

DWB1000 UWB localisation chip covers FCC UWB channels 1-7 (EU/EC UWB channels 5&7)

- Only one band usually used, there is no Carrier Aggregation (CA)
- Most common is either channel 2 or channel 5



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