APPLICATION NOTE

Confidex Runestone™ and Confidex Viking™ beacons

Confidex Viking™ Bluetooth® Low-Energy (BLE) Industrial beacons track the location of assets and people, with optional sensors for capturing environmental data. Confidex Viking™ beacons are joining passive RFID in the asset management and tracking space. It is a new way to track that comes with tradeoffs in battery life and cost against improved functionality. Confidex designed the Viking product family to be a modular BLE beacon family that raises the bar for indoor and outdoor industrial asset tracking to gain real time location and conditioning visibility.

Confidex Viking™ beacons are designed with security in mind and have integrated secure NFC interface with unique identity keys for configuration. They do not allow changing of configuration through the Bluetooth interface as default. Confidex Viking™ beacons are turned on/off through the NFC interface, which prevents tampering with the beacons in public environments.

Confidex Viking™ beacons are delivered turned off according to IATA regulations, and they can be activated and operated with Confidex Runestone™ mobile application for Android mobile phones.

General information
Confidex Runestone™ mobile app is a specific application used to operate the Confidex Viking™ beacons with Confidex standard firmware. By using the Confidex Runestone™ App, the user can turn the Confidex Viking™ beacons on/off, read beacon parameters and configure the parameters over the phone NFC interface.

Supported Android version and phone models
Confidex Runestone™ app is developed for all mobile phones running on Android operating system version 8 or higher. Due to different NFC chipsets and android OS implementations by mobile phone manufacturers, Confidex cannot guarantee proper NFC interface operation on all Android devices.

The mobile phone needs to have NFC read and write functionality. Confidex have tested correct operation with Samsung models S5 - S20, Google Pixel 2, Nokia 3, Honor 9X lite, Huawei P30 Lite. Before deployment of the beacons, it is highly recommended to 1st install and test the Confidex Runestone™ app on your Android mobile phone to verify proper NFC functionality with Confidex Viking™ beacons. Please turn to Confidex for updated list of validated Android devices.

Download and installation
The latest version of Confidex Runestone™ app can be downloaded and installed from the Google Play store. After successful installation and launching of the Confidex Runestone™ app on your Android mobile phone, it will request permissions for using Bluetooth connection which need to be granted for proper operation.

NFC and BLE operation
Confidex Viking™ beacon BLE interface is configured to non-connectable broadcast mode as default and the Confidex Runestone™ app communicates only over the wireless NFC interface with the beacon. Therefore, the user needs to ensure that NFC functionality of the mobile phone is turned on. It is typically under phone Settings -> Connections -> NFC and Payment or quick access from top of the screen next to WiFi and Bluetooth activation.

Confidex Viking™ identity keys
To be able to read and configure the Confidex Viking™ beacons, the identity of each beacon must be known by the Confidex Runestone™ app. These identity files (csv) are provided by Confidex which need to be imported in the app before use. App contains pre-defined identity files for standard Viking items as default. For customer specific pre-configurations, Confidex provides project or order-based identity file(s) with the beacons. You can request these also from contact.BLE@confidex.com.

Download the latest free version of Confidex Runestone™ application from Google Play Store.

Description
Confidex Runestone™ app consist of two main window, **Beacon Status** and **Beacon Configuration**, which shows beacon settings and buttons to perform different operations when a beacon is scanned with the NFC of the mobile phone. Additional functions for managing identity files, device scanner and details can be found from the drop-down menu in the top right corner.

Importing identity file (.csv)
To be able to read and configure the Confidex Viking™ beacons with a mobile device, user needs to first import the correct identities of the beacons into the Confidex Runestone™ app.
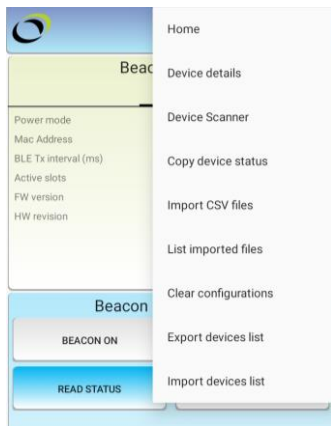
"Three dots" button opens a drop-down menu where you can select different views & functions.

The following steps describe how to import the .csv file:

1. Tap on the **three dots** on the upper right. This opens a drop-down menu seen on the right.

2. Choose **Import CSV file**.

3. Add selected identity sets from predefined csv-files or import a customer specific file received from Confidex. Click **OK** button to import selected files to the database.

4. The list of all successfully imported configuration files is shown in the **List Imported Files** view where you can also remove each file. Whole configuration database can be cleared with **Clear configurations** function.

Scanning a beacon
After importing the correct Viking beacon identity file, you can scan the beacon with your mobile phone NFC interface by placing it to the center of the beacon for 2s.

Each scanned beacon is added to a device list database and displayed in the **Device Scanner** view. Also detailed information of the latest scanned beacon can be seen in **Device Details** view.

User can also manually **Export** and **Import devices list** between multiple Android devices for easier deployment.

Activating Confidex Viking™ beacons
Confidex Viking™ beacons are turned off by default during the shipment. Beacons can be turned on/off with Confidex Runestone™ app by pressing either **BEACON ON** or **BEACON OFF** buttons from **Beacon Configuration** window. After selecting one of the buttons, move your phone NFC over the beacon to turn beacon on/off. Phone gives a sound and vibrates when NFC is in operation. After successful write operation, the **Power mode** setting in the **Beacon status** window changes to "On" or "Off".
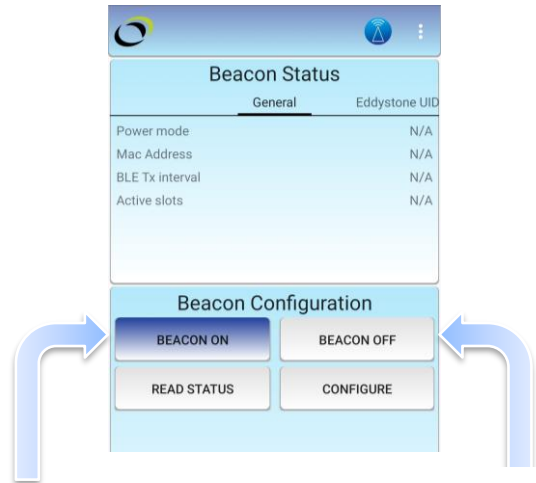
Switch beacon power mode on

Double-tap activates continuous beacon on -operations.

Switch beacon power mode off

Double-tap activates continuous beacon off -operations.

Reading Confidex Viking™ beacons
READ STATUS button is read-only operation and can be used to scan beacons and to view the individual beacon information on the **Beacon Status** window and in the **Device details** view.


Enable Read status

Enable Configure

After successfully scanning of a Confidex Viking™ beacon, the tabs in the **Beacon Status** window show the general settings as well as settings for each active configured slot. Different tabs can be accessed by swiping horizontally. Status information is displayed in the app until another beacon is scanned, or the app is restarted. General tab shows the information in table below:

FIELD	INFO TYPE	DESCRIPTION
Power Mode	ON / OFF	Beacon power mode
MAC Address	6-byte hex	Device MAC address
BLE Tx interval	1- 10 000ms	Global Tx interval for all advertisement slots
Active Slots	1 – 5 slots	List of active slots (UID,TLM,URL,STAT,ACT)
FW version	x.x.x	Beacon firmware version
HW revision	00 / 01 / 02	Beacon HW configuration

Configuring Confidex Viking™ beacons

Confidex Viking™ beacon settings are configurable with the Confidex Runestone™ app. Settings can be changed by selecting **CONFIGURE** button in **Beacon Configuration** window. This opens the settings tabs to the bottom of the window where values can be modified. All tabs and values are written at once when beacon is scanned with phone NFC. Swipe horizontally to change between tabs.
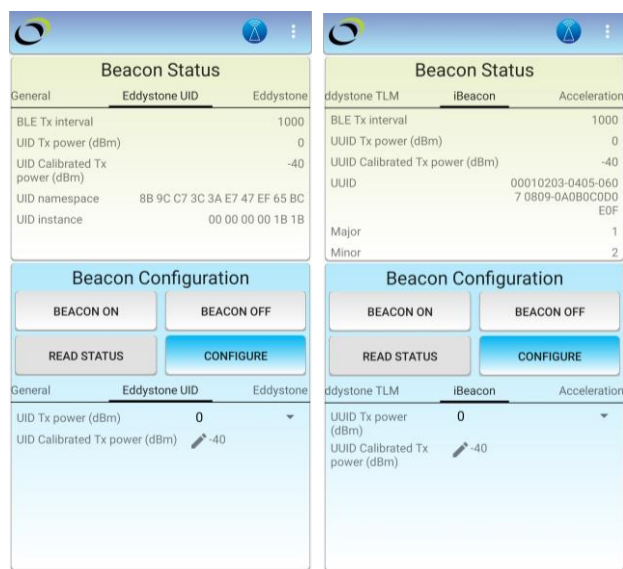
Slot configurations

Confidex Viking™ beacon supports Eddystone (UID, URL, TLM) and iBeacon (UUID) standard frame formats. Optional accelerometer sensor data is sent in two proprietary frames (STAT, ACT). Firmware supports broadcasting of five frames / slot configurations. Each slot configuration can be activated or de-activated separately, or restored to factory settings, from the **Beacon Configuration** window.

Settings of each slot can be modified by typing the new values to each tab in the **Beacon Configuration** window. After the new parameters have been set to the fields, the configuration can be written to the beacon by scanning it with the NFC interface of the mobile phone.

All configurable settings are listed in the following table:

GENERAL	DECSRIPTION
BLE Tx interval (ms)	Sets a global transmission interval for all advertisement slots.

ACTIVE SLOTS	DECSRIPTION
Active slots	Turn ON/OFF each configured slot (UID,URL,TLM,UUID,STAT,ACT)
Restore slot configurations	Reset all slot configurations to default settings

EDDYSTONE	DECSRIPTION
UID namespace (10-bytes)	Re-configure UID namespace (optionally enabled)
UID instance (6-byte)	Re-configure UID instance (optionally enabled)
UID TX power (dBm)	Sets the RF transmit power for Eddystone UID frames.
UID Calibrated Tx power (dBm)	Calibrated Tx power measure at 0m from the beacon.
URL TX power (dBm)	Sets the RF transmit power for URL frames.
URL	Set URL address to be advertised.
TLM TX power (dBm)	Sets the RF transmit power for TLM frames.
TLM Tx interval multiplier	Multiplier for transmission interval of TLM frames.

| iBEACON	DECSRIPTION
UUID (16-bytes)	Re-configure UUID namespace (optionally enabled)
Major (2-bytes)	Re-configure Major (optionally enabled)
Minor (2-bytes)	Re-configure Minor (optionally enabled)
UUID TX power (dBm)	Sets the RF transmit power for iBeacon UUID frames.
UUID Calibrated TX power (dBm)	Calibrated Tx power measure at 1m from the beacon.

ACC STATISTICS	DECSRIPTION
Acc TX power (dBm)	Sets the RF transmit power for ACC frames.
Acc RMS period (s)	Set accelerometer RMS sampling period.
Acc Min/Max period (s)	Set accelerometer MIN/MAX sampling period.
Acc meter ODR (Hz)	Set accelerometer sampling frequency.
Acc meter FS (G)	Set range the accelerometer measurement range.

ACC ACTIVITY	DECSRIPTION
Activity TX power (dBm)	Sets the RF transmit power for ACT frames.
Activity threshold (mG)	Set how much acceleration is needed to start the event counter.
Activity debounce time (s)	How long the acceleration value must be above set threshold to start the counter to filter out spurious events.
Activity keep active time (s)	How long flag is kept active after acceleration is below a threshold.

OTHER TOOLS AND FEATURES

Device scanner tool

DEVICES SCANNER shows status and details of Confidex Viking™ beacons that have been scanned with the Confidex Runestone™ app. Beacons can be manually deleted from the device list, which can also be exported and imported between phones and Runestone apps.
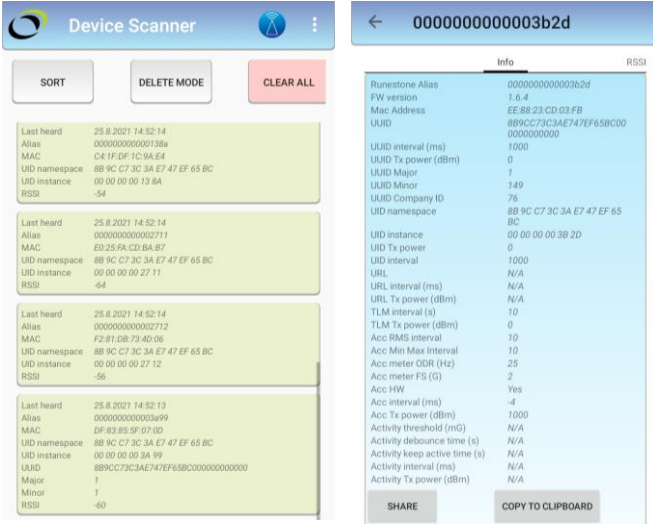
Device scanner shows latest RSSI (Received Signal Strength Indication) value and timestamp from last received packet. Device list can be sorted or cleared with the buttons on top of the list. **Device details** view can be opened by pressing a beacon on the list.

Device details and graph tool

Info tab in the **DEVICE DETAILS** view shows individual beacon configuration data. Data can be copied to clipboard or shared directly from the app. On the RSSI and Calibrated Tx power tabs, user can analyze and measure RSSI and calibrated Tx power of the beacon at certain distance. Optional acceleration tab can be used to monitor accelerometer values and activity of the tag.
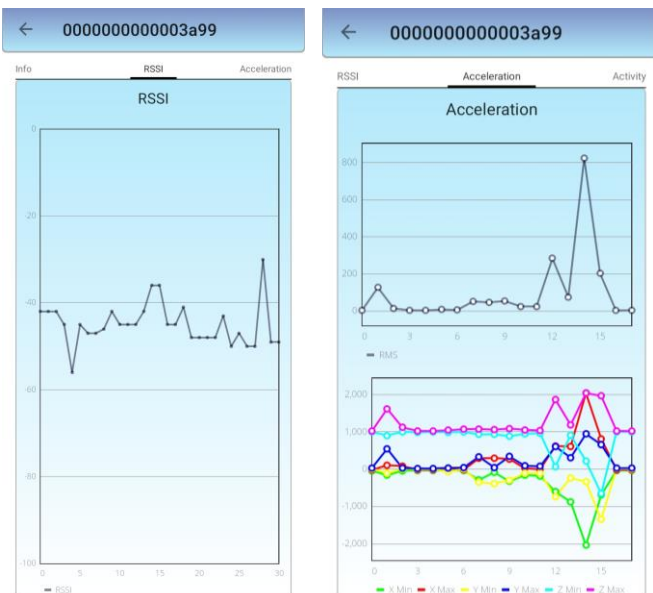
COMPLIANCY

Declaration of Conformity

Europe (CE), USA (FCC), Canada (IC), Japan (MIC), Australia/New Zealand (ACMA), South-Korea (KC), Russia (EAC), Ukraine (UkrSEPRO), Brazil (ANATEL).

ORDER INFORMATION

Download the latest free version of Confidex Runestone™ application from Google Play Store.

For availability of Confidex Viking™ BLE beacons, please contact Confidex Smart Industries Sales at www.confidex.com/contact-us

For additional information and technical support, please contact us in contact.BLE@confidex.com

SAFETY GUIDELINES

SAFETY

The device does not contain any serviceable components, do not disassemble the device.

Substances contained in the product and/or the battery may be harmful if handled or disposed improperly.

The product does not contain any comestible substances nor substances of nutritional value. Do not eat the product.

Dispose this product only in accordance with waste and recycling protocols.

Confidex Viking™ products are RoHS & REACH compliant.