Seeker X Leakage Management System

Start to Finish Guide for Hardware Installation and Asset Management & Configuration Using StrataSync & the VIAVI Mobile Tech App

November 2022

Seeker X Leakage Management System Quick Start Guide Overview

1. Important Information to Know Before Starting

2. Receive the equipment and make sure everything is counted

3. Unpack, assemble and install the Seeker X hardware

4. Install, login and setup the VIAVI Mobile Tech application

5. Assign the Seeker X meter to a technician in StrataSync

6. Deploy firmware to the Seeker X & MCA III from StrataSync

7. Deploy software options to the Seeker X/MTA from StrataSync

8. Create a configuration templates in StrataSync

9. Create a configuration for the Seeker X in StrataSync

10. Create a general configuration for the MCA III in StrataSync

11. Create a truck configuration for the MCA III in StrataSync

12. Deploy configuration templates from StrataSync

13. Synchronize configurations to the Seeker X & MCA III

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Leakage Kit Included Items
Leakage Kit Truck Installation
VIAVI Mobile Tech Application Setup
Assigning Assets in StrataSync
Managing Firmware Updates
Managing Software Options
Managing Configurations
Seeker X Configuration
MCA III General Configuration
MCA III Truck Configuration
Deploying Configurations
Syncing Configurations

Common Questions

Are my Seeker D mobile mounts compatible with the Seeker X?

Mobile Mount Comparison

How do I erase data from an MCA III?

MCA III Erasing Data

What is the minimum setup needed for LAW-X?

LAW-X Minimum Configuration

How do I find out what LAW-X Wi-Fi ports to use in my MCA III?

LAW-X Wi-Fi Port Assignment

How do I setup a downstream OFDM leakage tag in StrataSync?

OFDM Configuration Details

How do I setup an upstream OUDP leakage tag in StrataSync?

OUDP Configuration Details

Necessary Steps for a Successful Seeker X Deployment

Necessary Steps for a Successful Seeker X Deployment

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9. **Create a configuration for the Seeker X in StrataSync**
   - Seeker X Configuration Overview
   - General Seeker X Settings
   - Off-Air Survey Settings
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   - Carrier Configurations – Signal Type
   - Carrier Configurations – Tag Settings (Dual CW)
   - Carrier Configurations – Tag Settings (Chirp)
   - Carrier Configurations – Tag Settings (OFDM)
   - Carrier Configurations – Tag Settings (OUDP)
   - Carrier Configurations – Antenna Gain Settings
   - Distance Settings

10. **Create a general configuration for the MCA III in StrataSync**
    - MCA III / X-Link General Configuration – Overview
    - MCA III / X-Link General Configuration – General Configuration
    - MCA III General Configuration – EDN Configuration
    - MCA III General Configuration – LAW-X Connection
    - MCA III General Configuration – Remote Upload and Vehicle Tracking Configuration

11. **Create a truck configuration for the MCA III in StrataSync**
    - MCA III Truck Configuration – Overview
    - MCA III Truck Configuration – General Information
    - MCA III Truck Configuration – Ethernet Configuration
    - MCA III Truck Configuration – Access Point Configuration
    - MCA III Truck Configuration – IP & DNS Configuration

12. **Deploy configuration templates from StrataSync**
    - Seeker X Configuration – Deploy or Copy To Template
    - MCA III General Configuration – Deploy or Copy To Template
    - MCA III Truck Configuration – Deploy or Copy To Template
    - Configuration Template Deployment

13. **Synchronize configurations to the Seeker X & MCA III**
    - Mobile Tech Connection with Seeker X
    - Deploying Configurations
    - Seeker X Details on Mobile Tech
    - View Configurations

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Introduction & Setup Actions

Seeker X Leakage Management System Quick Start Guide Overview

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This guide is intended to provide instructions on how to perform an installation of the Seeker X and MCA III leakage ride out system.

This guide is broken into easy-to-follow sections with links to each section

- Easy to skip sections that you are familiar with
- Use menu shortcut links and back buttons throughout to navigate this document

This guide should cover most questions however additional support is available at trilithic.support@VIAVIsolutions.com, or call +1-844-468-4284, prompts 3-1-3

Online Support Resources

The following documents can all be found at the VIAVI Leakage Support Portal

- Seeker X & MCA III
  - Seeker MCA III Install Guide
  - Seeker X & MCA III Installation Guide
  - Seeker X User Guide
  - Seeker MCA III User Guide
  - WFS-1 Antenna User Guide
- StrataSync & MobileTech
  - Seeker X and MCA III Configurations & Updates via StrataSync Video
- LAW-X
  - LAW-X 5.0 User Guide

- Channel Taggers
  - CT-4 User Guide
  - CT-4 Setup Using ONX CATV
  - CT-X Installation Guide
  - CT-X User Guide
  - CT-X Setup Using ONX CATV

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Leakage Kit Included Items

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Items Included with the Seeker X Driveout & Walkout Kit with GPS

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Leakage Detection — TRI-LKG-SEEKER-X-MF
- Seeker X Mainframe
- Wall Charger with Plug Adapters
- USB Charging & Data Cable

Mobile Communications — TRI-LKG-SEEKER-MCA-WIFI
- Seeker MCA III
- Serial Data Cable to Connect MCA III to Mobile Mount
- Ethernet Cable
- Mounting Screws to Attach MCA III to Mobile Mount
- WiFi Antenna

Mobile Mount & Charging — TRI-LKG-SKR-X-VEH-MOUNT
- Seeker X Mobile Mount
- Mounting Arm
- Vehicle to Seeker X Mobile Mount Power Cable
- Antenna Diplexer Cable BNC to BNC
- Mounting Nuts (x3)
- Vehicle Wiring Protection Kit

Click Here for a Detailed List View of the Items Included in VIAVI Catalog Number:
TRI_SKR-X-DRIVE-GPS-PKG

Driveout Accessories

TRI-LKG-GPS-MCA	TRI-LKG-SKR-X-DPF-1	TRI-LKG-ANT-WVM-2	TRI-LKG-AVM-3
GPS Antenna	Diplex Filter (DPF-1)	High Band Vehicle Mount Antenna (WVM-2)	Low Band Vehicle Mount Antenna (AVM-3)

Walkout Accessories

TRI-LKG-ANT-WFS-1	TRI-LKG-ANT-WFS-2	TRI-LKG-NFP-1	AC-BAG-METER-MEDIUM
Low Band Handheld Antenna (WFS-1)	High Band Handheld Antenna (WFS-2)	Near Field Probe (NFP-1)	Carrying Bag with Strap

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Items Included with the Seeker X Driveout & Walkout Kit with GPS

Click here to return to the beginning of this section

VIAVI Catalog Number	VIAVI Item Number	Item Description
TRI-LKG-SEEKER-X-MF (click for detailed list)	22133595	Seeker-X Field Meter Mainframe
TRI-LKG-SKR-X-VEH-MOUNT (click for detailed list)	22133685	Seeker-X Vehicle Mobile Mount
TRI-LKG-SEEKER-MCA-WIFI (click for detailed list)	2011690000	Seeker MCA III with Wi-Fi
TRI-LKG-GPS-MCA	2071707004	GPS Receiver For Seeker MCA II and MCA III
TRI-LKG-SKR-X-DPF-1	22133687	Diplex filter for use with Seeker-X WVM antennas - DPF-1
TRI-LKG-ANT-WVM-2	22133684	Wide Band Vehicle Mount Antenna -WVM-2 - 250MHz to 1.25 GHz
TRI-LKG-AVM-3	2010379000	AVM-3 Vehicle Antenna - Magnetic Mount -108 to 160 MHz
TRI-LKG-ANT-WFS-1	22133683	Low band adjustable walkout antenna up to 400 MHz - WFS-1
TRI-LKG-ANT-WFS-2	22133599	High Wide Band Walkout antenna - WFS-2 - 450 to 1220 MHz - LPDA antenna
TRI-LKG-NFP-1	2010477000	NFP-1 Near Field Probe
AC-BAG-METER-MEDIUM	22133688	Carrying Bag with Strap for meter and accessories

Items Included with the Seeker X Meter & Vehicle Mobile Mount Kits

Seeker X Meter

VIAVI Catalog Number	VIAVI Item Number	Item Description	Replacement Part
TRI-LKG-SEEKER-X-MF	**22133595**	**Seeker-X Field Meter Mainframe**	**---**
NONE	22143879	Seeker X Meter Mainframe Final Assembly	**NOT SOLD SEPERATE**
TRI-ACCY-USBPWR-CBL	2071585004	Cable - Power/Data for USB Type-A	TRI-ACCY-USBPWR-WCBL
NONE	22094649	AC/DC Power Adapter – Battery Charger with USB Output and US/CAN/EU/UK/AUS Input Adapters	

Seeker X Vehicle Mobile Mount

VIAVI Catalog Number	VIAVI Item Number	Item Description	Replacement Part
TRI-LKG-SKR-X-VEH-MOUNT	**22133685**	**Seeker-X Vehicle Mobile Mount**	**---**
NONE	22129834	Seeker X Mobile Mount Mainframe Final Assembly	**NOT SOLD SEPERATE**
TRI-LKG-ANT-DIPLEXER-CBL	2071585200	Cable - RF Diplexer to Seeker D Mobile Mount	TRI-LKG-ANT-DIPLEXER-CBL
NONE	22133686	Vehicle Wiring Protection Kit for Seeker X Mobile Mount	TRI-LKG-SKR-X-MM-WIRE-KIT
NONE	22129837	Power Cable for Connecting Seeker X Mobile Mount to Vehicle Power	TRI-LKG-SKR-X-MM-PWR-CBL
TRI-SEEKER-MOBILE-ARM	2071688000	Mounting Arm - Seeker / Seeker SE / Seeker D Mobile Mount	TRI-SEEKER-MOBILE-ARM
TRI-ACCY-SEEKER-NUT	0500955005	Nylon Nut for Seeker or Seeker D Mobile Mount/Ram Mount	TRI-ACCY-SEEKER-NUT

Items Included with the Seeker MCA III Kit

Click here to return to the beginning of this section

Seeker MCA III with WiFi

VIAVI Catalog Number	VIAVI Item Number	Item Description	Replacement Part
TRI-LKG-SEEKER-MCA-WIFI	**2011690000**	**Seeker MCA III with Wi-Fi**	**---**
NONE	2072276999	Seeker MCA III with Wi-Fi Mainframe Final Assembly	NOT SOLD SEPERATE
TRI-LKG-SKR-MCA-PWR-CBL	2071585029	Cable - Data/Power for Seeker MCA III to Mobile Mount	TRI-LKG-SKR-MCA-PWR-CBL
TRI-LKG-MCAIII-WIFI-ANT	2071677004	Remote Wi-Fi Antenna for Seeker MCA III - 2.4 + 5 GHz	TRI-LKG-MCAIII-WIFI-ANT
TRI-ACCY-CAT5-10FT-QUAD	2072213010	Cable - Ethernet CAT5e Quad Shielded 10 Foot	TRI-ACCY-CAT5-10FT-QUAD

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Leakage Kit Truck Installation

Best Practices for Truck Installation

Where to mount the equipment

- Mount the Ram Mount to a hard surface in a location that the tech can easily reach the meter from the driver seat

Antenna placement

- AVM-3, 138 MHz whip antenna center and towards the front of the roof

- WVM-2 (Shark fin) mounted approximately 18 inches back from the whip

GPS antenna – can be inside w/clear view of sky but outside on the roof top is recommended

Wi-Fi antenna – can be inside, use phone hot spot to upload, outside if building access point

Running the wires – whatever is recommended by the installation service

Seeker X with MCA III Installation Guide

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Seeker X with MCA III Installation Guide

Click here to return to the beginning of this section

5 Connect the GPS receiver and Ethernet cable to the Seeker MCA III (optional).

GPS receiver — Serial RS-232 connection — Mobile Mount & MCA III rear view — Ethernet connection (optional)

6 Connect the Wi-Fi antenna to the Seeker MCA III.

Mobile Mount & MCA III rear view — Wi-Fi antenna

Approx. 18 inches

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VIAVI Mobile Tech Application Setup

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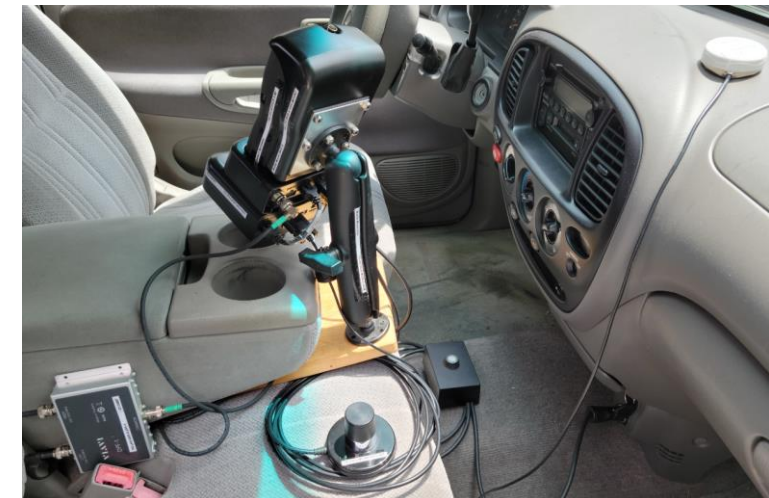
How Seeker X and MCA III are Synced with StrataSync

Click here to return to the beginning of this section

1. Seeker X as well as MCA III configurations and firmware updates can be deployed to specific Seeker X devices from StrataSync. Simply launch VIAVI Mobile Tech and log into StrataSync

2. Seeker X configurations and firmware as well as all MCA III configurations are synced to the Seeker X through the VIAVI Mobile Tech Application via an active Bluetooth Low Energy (BLE) connection. This connection will take place automatic when both devices are on. If not, press connect next to the device in the device list

3. The sync process will begin whenever a Seeker X is BLE linked to the VIAVI Mobile Tech app.

   ▪ Two different methods of assigning assets to technicians covered on the next couple slides

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VIAVI Mobile Tech Application Installation & Setup Overview

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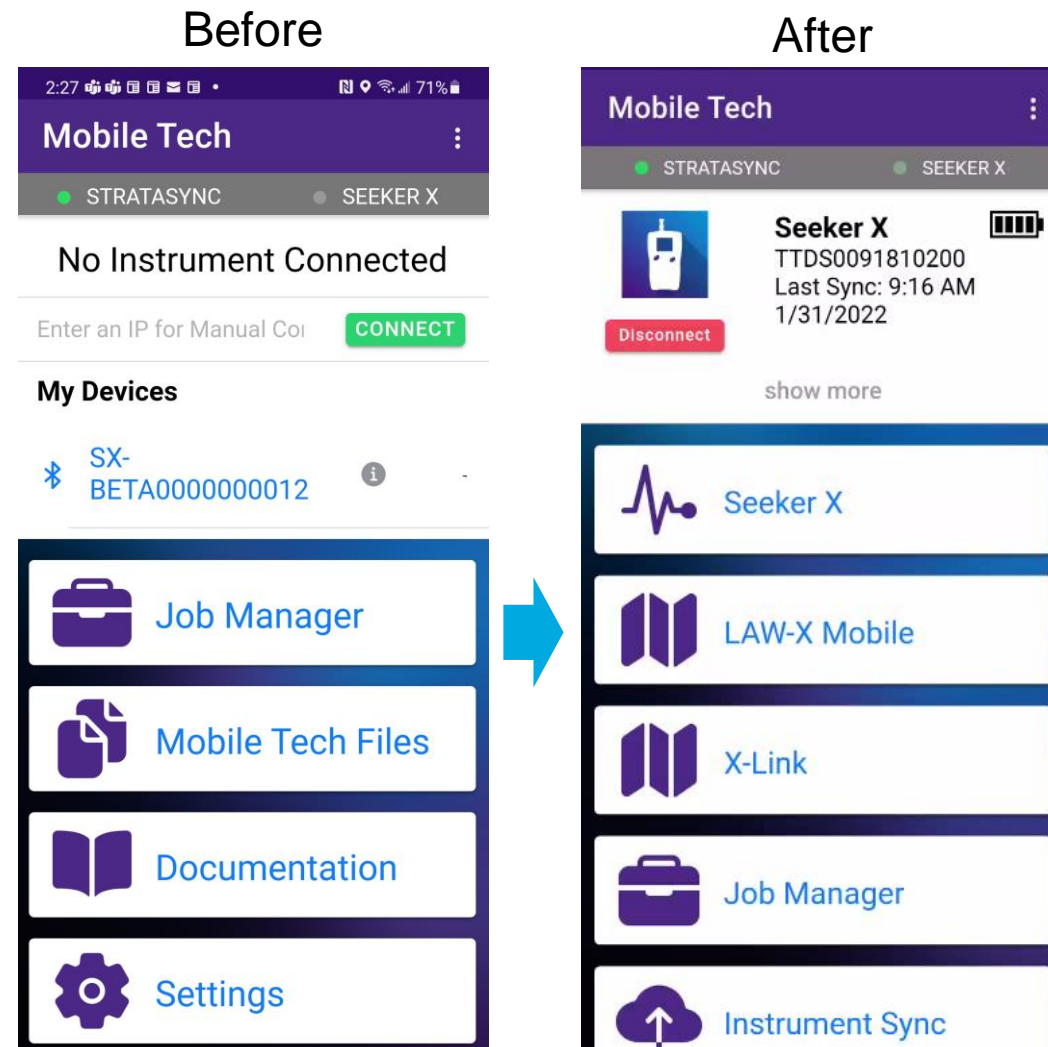
Install the VIAVI Mobile Tech application

- From the App Store or Play Store, install "VIAVI Mobile Tech"

Login to StrataSync

- Launch the app / Log into StrataSync
- Special instructions for demo site (see TAC Support)
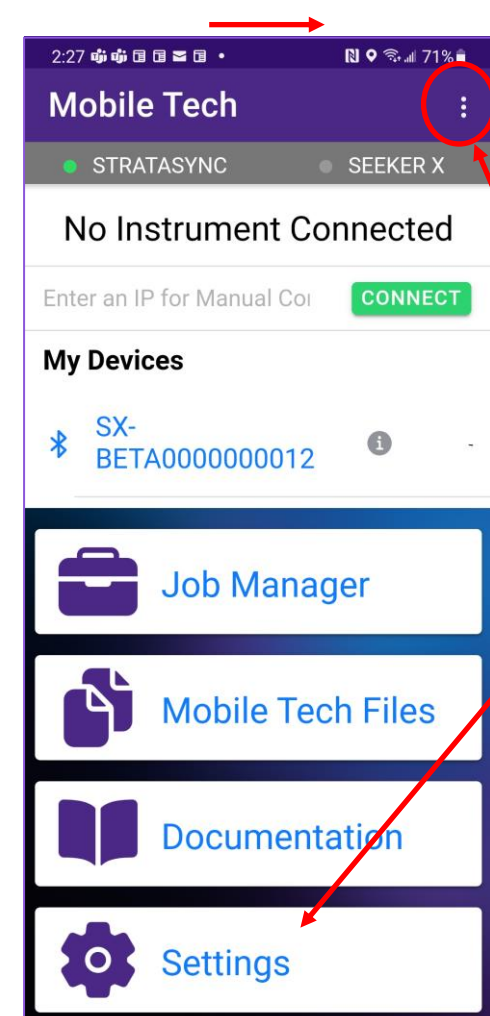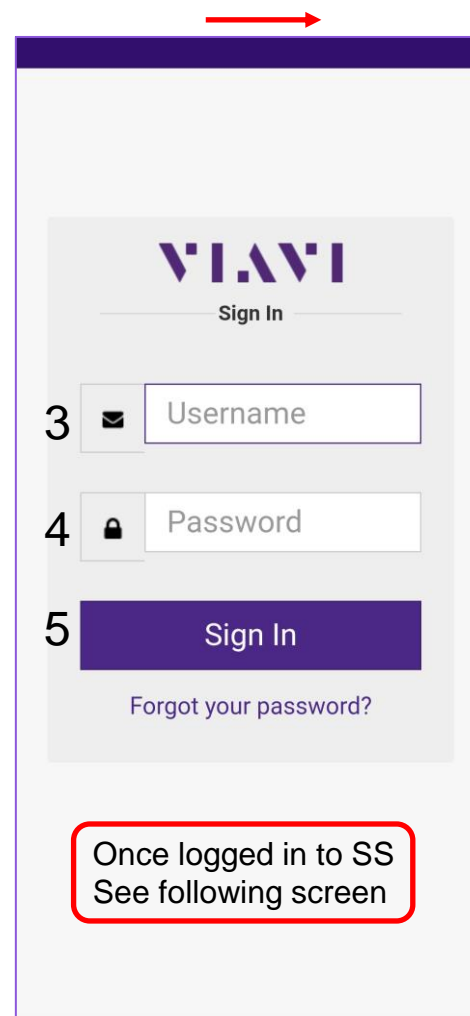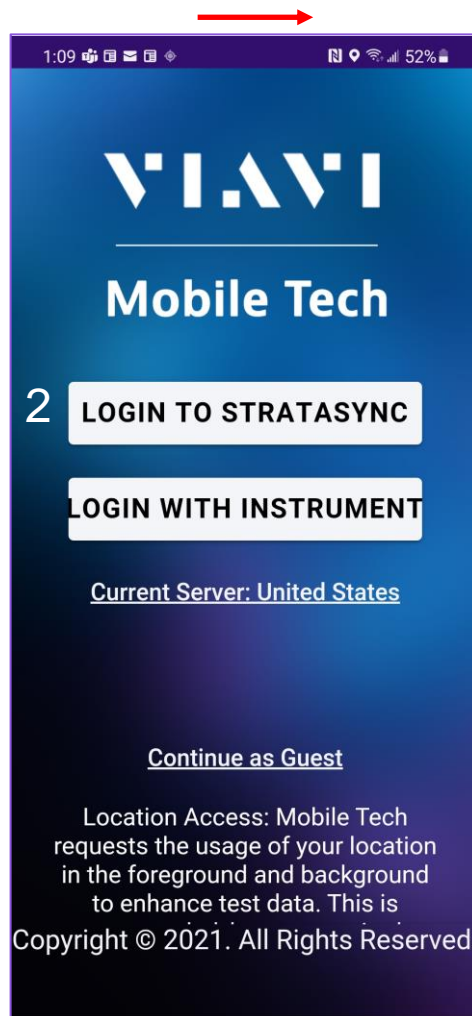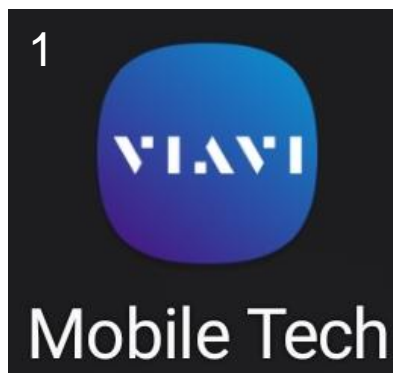
Login to LAW-X

- VMT / Settings / Configure Home Screen / LAW-X Mobile / Enable
  - This adds the LAW-X Mobile card to the home screen
- Once you have LAW-X Mobile on the home screen
  - Enter the LAW-X URL for the LAW-X Server
  - Enter LAW-X "Username"
  - The status should show "Logged In"

Before

After

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Logging into StrataSync via the VIAVI Mobile Tech Application

1. Launch Mobile Tech
2. Login To StrataSync
3. Type in SS Username
4. Type in SS Password
5. Press Sign In
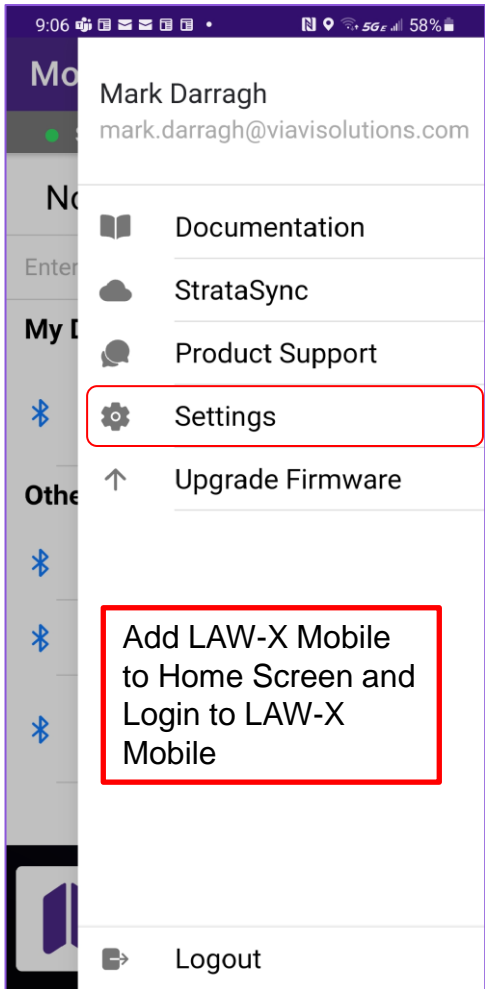6. Additional Settings
   <u>continue next slide</u>

1 **VIAVI** Mobile Tech

2 **LOGIN TO STRATASYNC**

LOGIN WITH INSTRUMENT

<u>Current Server: United States</u>

<u>Continue as Guest</u>

Location Access: Mobile Tech requests the usage of your location in the foreground and background to enhance test data. This is Copyright © 2021. All Rights Reserved.

VIAVI Sign In

3 ✉ Username

4 🔒 Password

5 **Sign In**

Forgot your password?

Once logged in to SS See following screen

Mobile Tech ⋮ → 1

● STRATASYNC   ○ SEEKER X

No Instrument Connected

Enter an IP for Manual Con **CONNECT**

My Devices

✳ SX-BETA0000000012 ⓘ

6 Next slide

Job Manager

Mobile Tech Files

Documentation

Settings → 2

Logging into LAW-X Mobile via the VIAVI Mobile Tech Application

Click here to return to the beginning of this section

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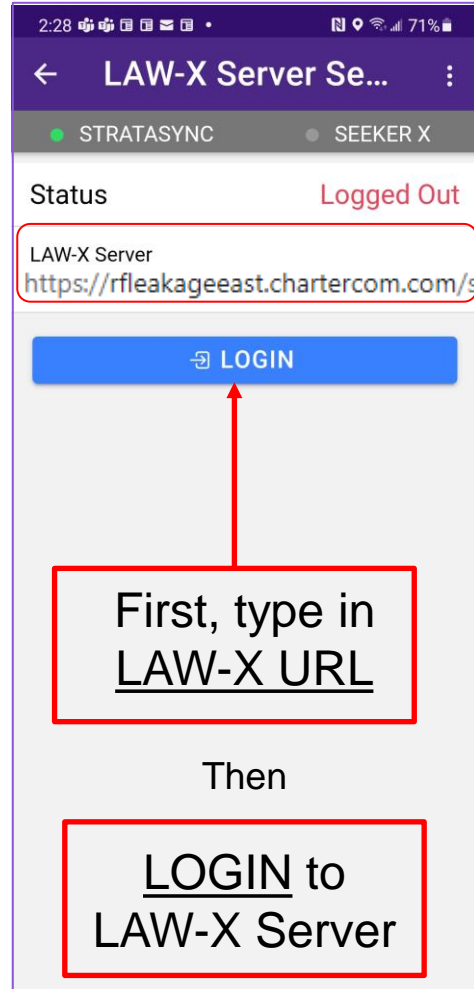
Logging into LAW-X Mobile via the VIAVI Mobile Tech Application
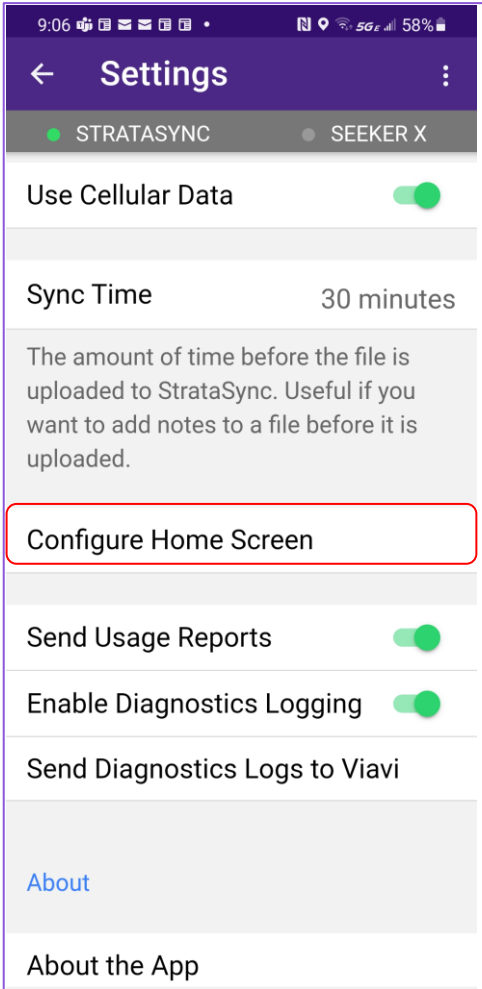
Click here to return to the beginning of this section

1. LAW-X user list populates based on StrataSync email tied to your user account
2. Select login account. In most cases, there will only be one login account
3. Select OK
4. Status shows Logged In
5. Notice that LAW-X Mobile is now available

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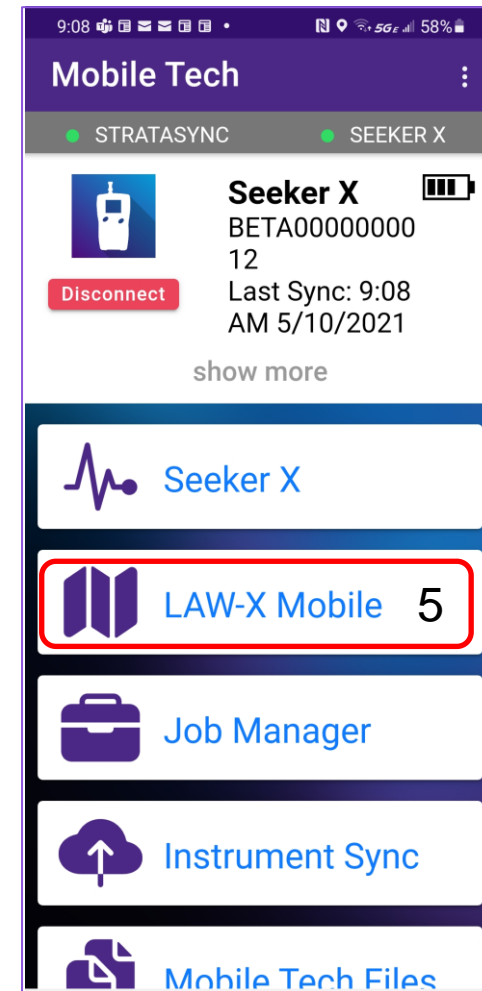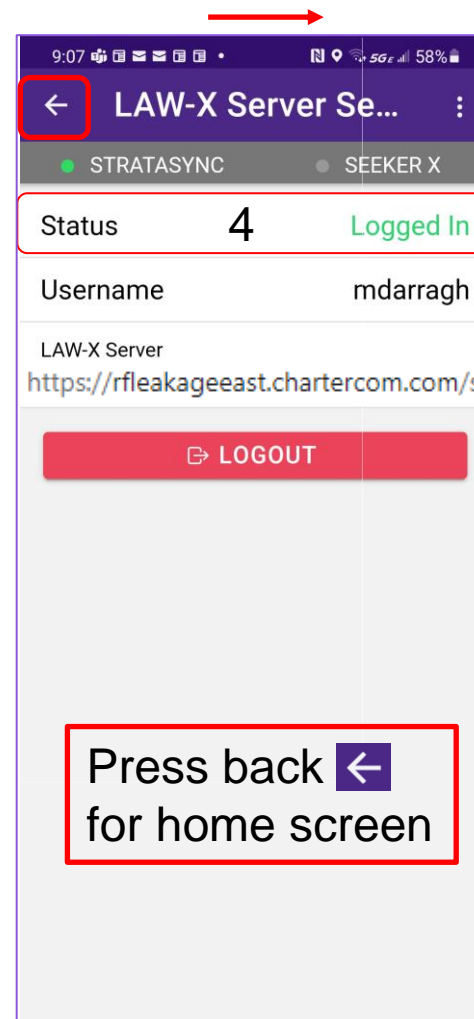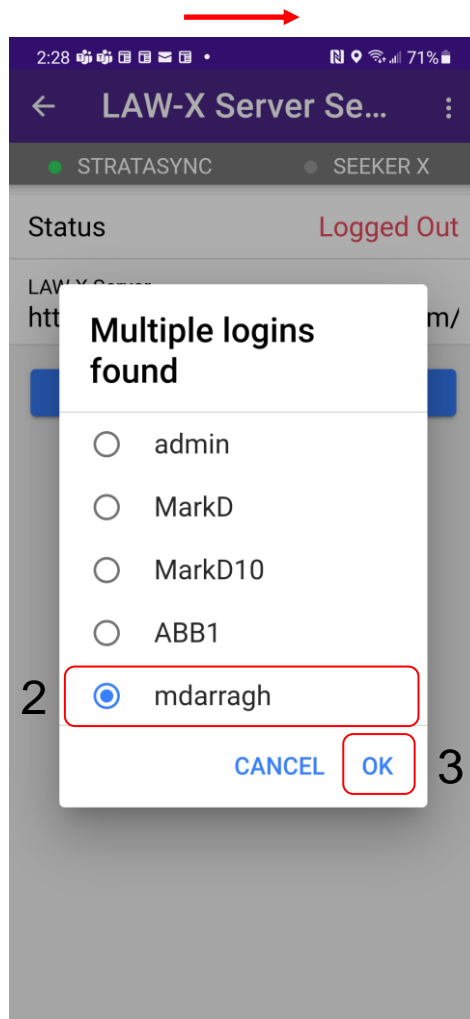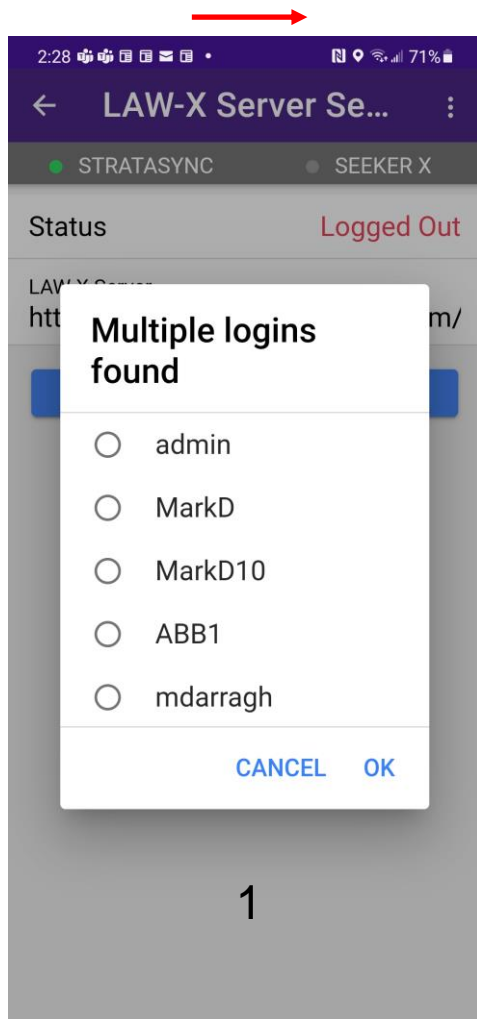
Assigning Assets in StrataSync

Deploying Seeker X using StrataSync and LAW-X

StrataSync Tech ID and LAW-X User Name Must Match

Seeker X requires synchronization to StrataSync through the VIAVI Mobile Tech app for Configuration changes and firmware upgrades

The StrataSync **Tech ID** is used in the Seeker X when communicating to LAW-X, therefore, there must be a matching **User Name** in LAW-X.

StrataSync User Information

	Login Name	First Name	Last Name	Tech ID	Email
☐			dillon		
☑	daniel.dillon@viavisolution	dan	dillon	dd610620	daniel.dillon@viavisolutions.com

MUST MATCH

	User Name	F... me	Last Name	Tech Id	E-mail
+	dd610620	dan	dillon	dd610620	daniel.dillon@viavisolutions.com

LAW-X User Information

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StrataSync Tech ID = LAW-X Username for Seeker X

Data uploads to LAW-X
SS Tech ID = LAW-X Username

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Assigning Seeker X to a Technician in StrataSync

1. Once Seeker X syncs to StrataSync thru VIAVI Mobile Tech select the Holding in StrataSync

2. Locate the Seeker X Serial No in the Holding Bin and select it with the check box

3. Right click or press Actions and select "Reassign"

4. Select the technician from the People list

5. Press Reassign

6. Confirm on the verification page

7. See that the asset was successfully assigned to a technician

Note: The SS Tech ID will be the Seeker X Tech ID when synchronized through VIAVI Mobile Tech App. For this reason, create a LAW-X Username to match

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Create LAW-X Username to match StrataSync Tech ID

1. Under Administration/Manage Users

2. Create New User

3. Select Meter User

4. Select Maintenance User

5. Enter

   a. Username

   b. Password

   c. Confirm Password

   d. E-mail Address

6. Save Settings

Note: Community check-boxes provide leak data visibility for this User's login

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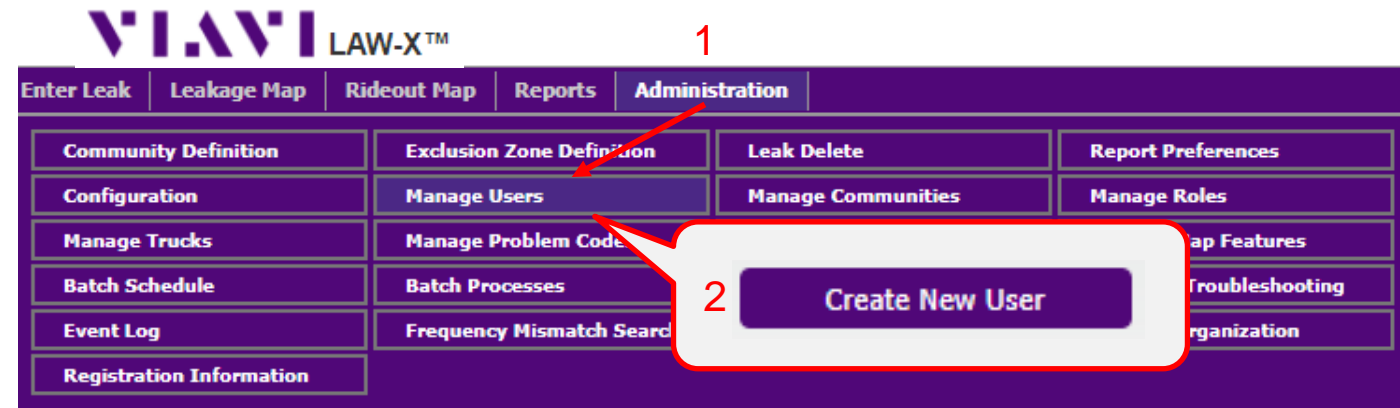
Managing Firmware Updates

Updating Seeker X and MCA III Firmware

The Seeker X can update its firmware deployed from StrataSync through its Bluetooth LE connection to the Mobile Tech application

- Upgrades to the Seeker X may take longer than 10 mins
- Ensure the Seeker X's battery is not low or ensure the Seeker X is docked in the mobile mount or the MMC-1 fast charger is connected to the Seeker X
- The Seeker X will not communicate with the Mobile Tech app when connected / charging via USB

MCA III firmware updates are deployed to the Seeker X – not directly to the MCA III itself – the Seeker X will push the firmware to the MCA III automatically when it is docked in the mobile mount with an MCA III connected

- The MCA III will take the firmware, update itself, then reboot to take effect
- Firmware version 5.05 or higher must be present on the MCA III to understand this firmware update process and apply the newer version

Deploying Firmware from StrataSync to Seeker X

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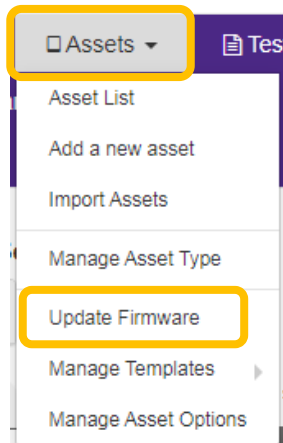
MCA III Firmware is deployed as part of the Seeker X firmware package

- Firmware updates can be found under the Assets tab

- Select "Update Firmware"

- Ensure the "Online updates" circle is enabled then select the Seeker X as the Asset Type

- Next to the desired firmware press the deploy button that looks like a rocket and displays "Deploy Now" when hovered over

- Then Select the Seeker X or group of Seeker Xs that should get the firmware update

Seeker X Firmware Update Process

Preparing to Upgrade

- After firmware deployment in StrataSync, connect the Seeker X to the Mobile Tech application

- Mobile Tech will show that a Firmware Update is available just below the last sync time

- Press the "Upgrade Firmware" button at the bottom to see what firmware is to be installed
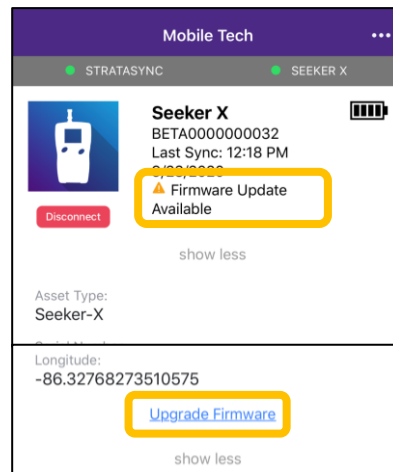
Starting the Upgrade

- Current firmware version will be displayed

- Upgrade version to be installed is displayed

- Press the "Start Upgrade" button to begin the upgrade download and installation
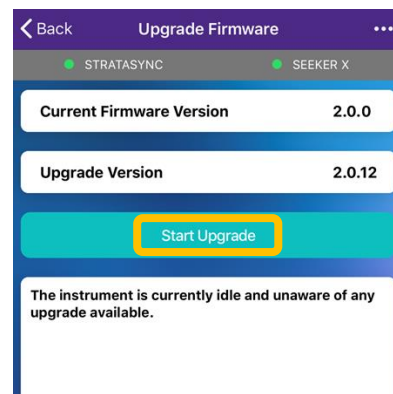
Downloading & Installing

- Keep the Seeker X and the mobile device near each other to avoid disrupting the Bluetooth LE connection

- First the firmware file will be downloaded then automatically installed

- The overall process could take 10 – 15 mins

- The Seeker X will shut off when finished

- Press the power button to turn the Seeker X on and finish the upgrade
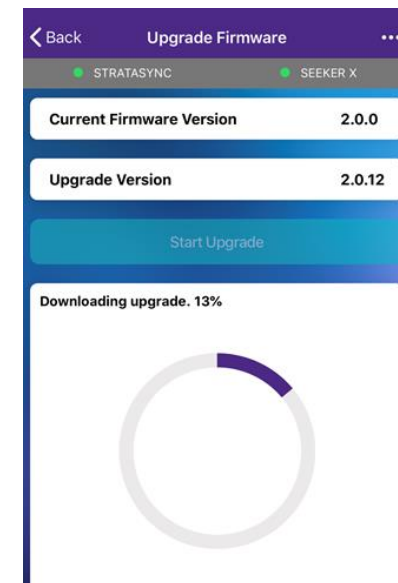
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MCA III Firmware Update

- The MCA III Firmware will be synced to the tech connected to the Seeker X

- Once the Seeker X syncs via the Mobile Tech application the MCA III firmware will be stored on the Seeker X

- When docked into the mobile mount with an MCA III connected the Seeker X will deploy the firmware update to the MCA III automatically

- The MCA III will then update its firmware and reboot

Deploying Firmware from StrataSync to MCA III

Click here to return to the beginning of this section

- **MCA III firmware is deployed to the Seeker X as part of the Seeker X firmware package when deployed to the meter**

- MCA III firmware is upgraded automatically when a Seeker X with a higher version of MCA III firmware is docked in the mobile mount

- You will see the following on the displays of the Seeker X and MCA III if an MCA III firmware upgrade is taking place

MCA III Screens

SHUTTING DOWN
MCA III BOOTER
MCA III BOOTER LOADING APP…
INITIALIZING
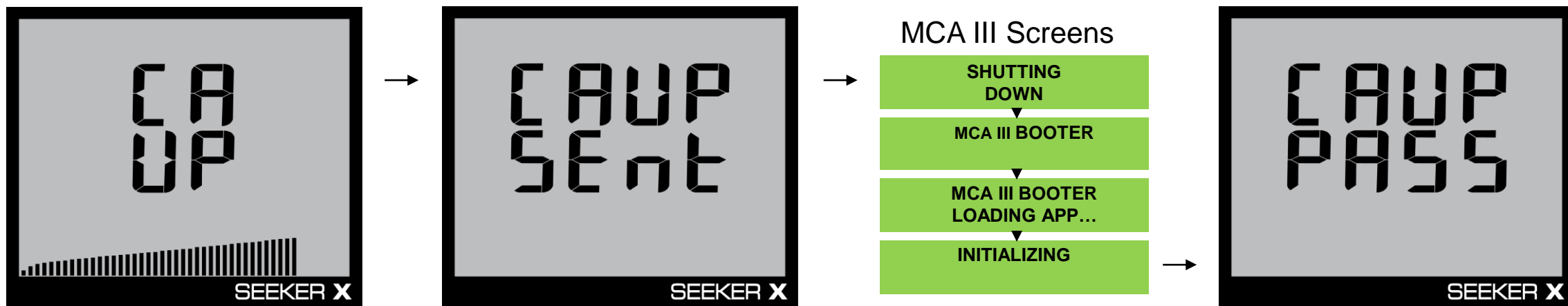
Deploying Firmware from StrataSync to MCA III (explained)

Click here to return to the beginning of this section

- CA = Communications Adapter
- UP = Upgrade
- Firmware file is transferring to the MCA III
- Progress bar (can take a few minutes)

- CA = Communications Adapter
- UP = Upgrade
- SEnt = Sent
- Transfer of firmware file is complete, MCA III will automatically reboot and apply the upgrade

MCA III Screens

SHUTTING DOWN

MCA III BOOTER

MCA III BOOTER LOADING APP…

INITIALIZING
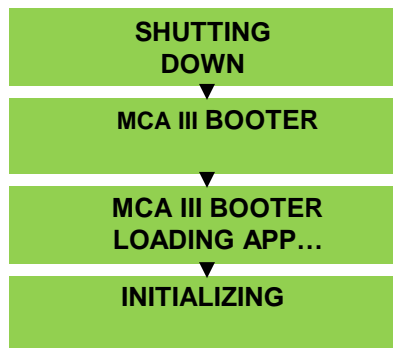
- MCA III Rebooting (Automatic)
- Upgrading Bootloader
- Loading Application File
- Starting up the new application

- CA = Communications Adapter
- UP = Upgrade
- PASS = Upgrade was successful

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Managing Software Options

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Managing Software Options

Click here to return to the beginning of this section

- To deploy options to the Seeker X or Mobile Tech Application perform the following steps.

- To access a list of your Seeker X meters in StrataSync press the Assets Tab at the top of StrataSync and select Asset List from the dropdown menu.

- To access software options for the Seeker X in StrataSync right-click the Seeker X from the Asset List and select Software Options from the Options sub-menu of the dropdown menu.

- The Assign Software Options window will appear, from here you can select the options to deploy to the Seeker X Meter or Mobile Tech Application.

Software Options for Seeker X Leakage Management System

There are two different software options available for the Seeker X Leakage Management System

- OUDP Tag – This software option is sent to the Seeker X to enable the detection of OUDP tagged signals.

- X-Connect – This software option is sent to the Mobile Tech Application to enable:
    - Geolocation using your smartphone as a replacement and/or companion to the MCA III
    - Direct uploads of leakage records and pre/post fix snapshots to LAW-X
    - Collection and upload of walkout leakage records to LAW-X
    - Display of both historical and live rideout & walkout data within the LAW-X Mobile map display

X-Connect Features

Live Rideout

Live Walkout

Historical Rideout

Historical Walkout

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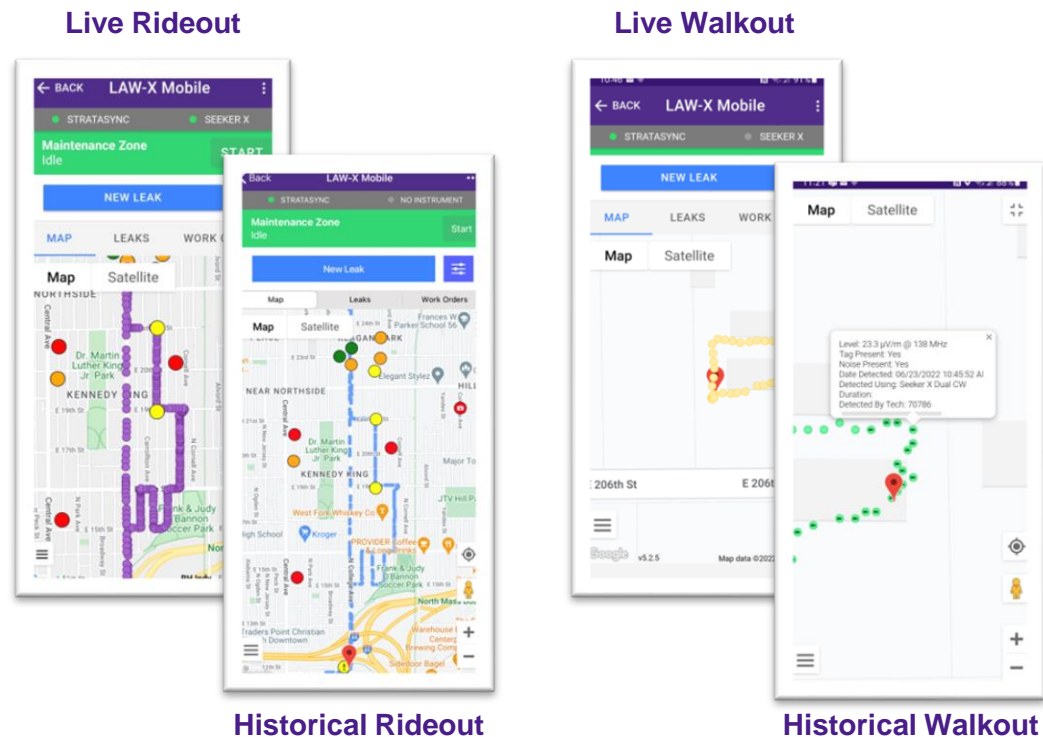
Managing Configurations

Configuration Deployment in StrataSync

Seeker X Configuration

Copy →

MCA III General Configuration (same for all techs)

Copy →

Template: Contains multiple configurations for deployment to Seeker Xs

MCA III Truck Configuration Unique per Tech (WiFi hotspot)

Deploy WiFi settings to individual techs →
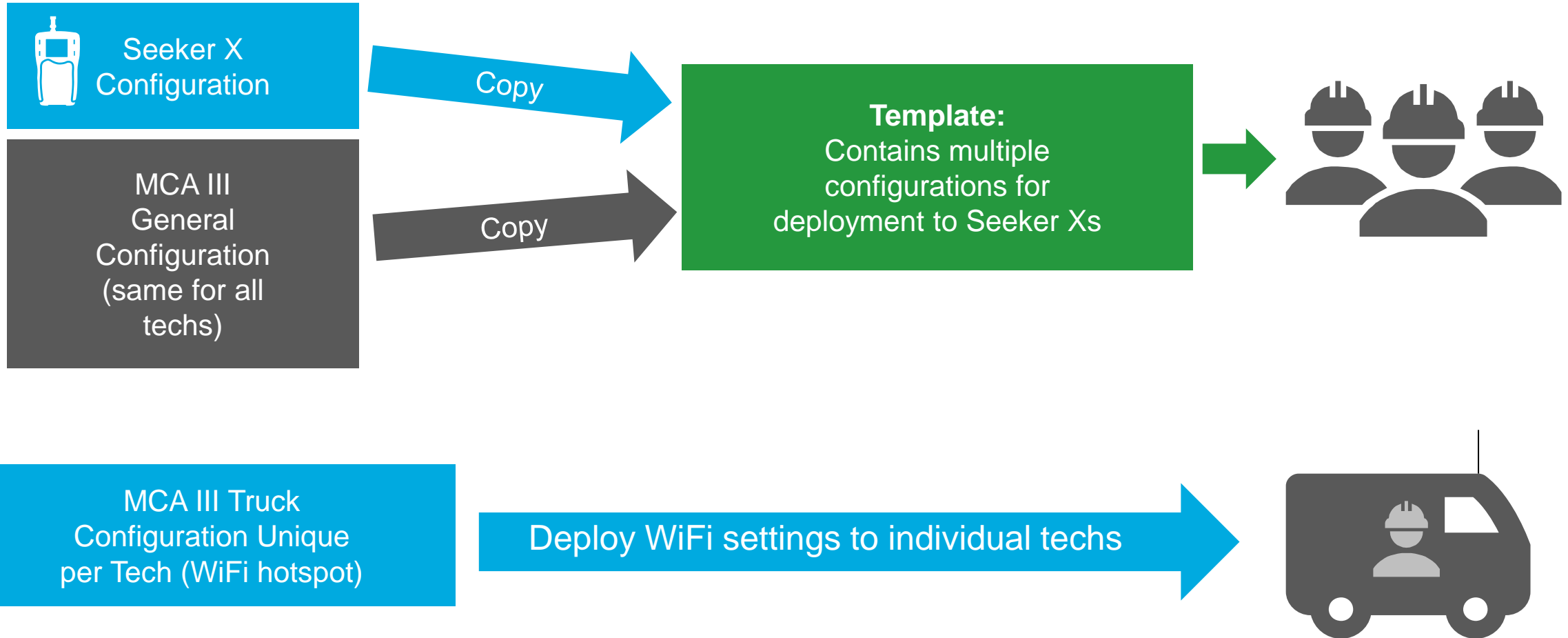
Accessing Seeker X Configurations in StrataSync

Click here to return to the beginning of this section
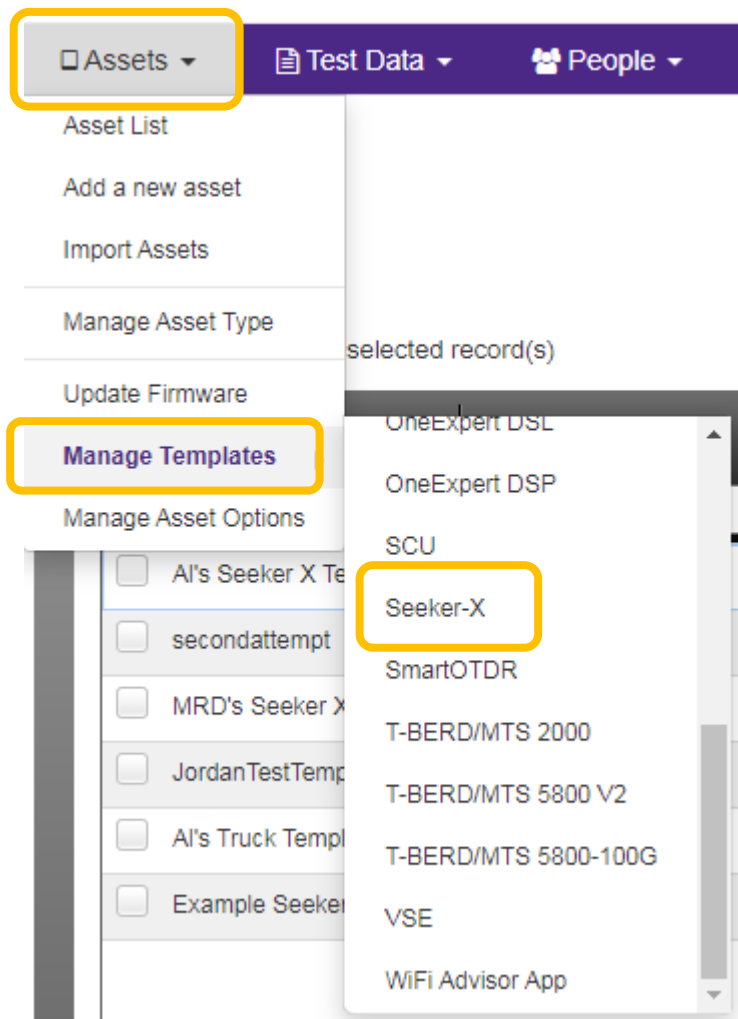
- To access configurations for the Seeker X in StrataSync press the Assets Tab at the top of StrataSync

- Then select the "Manage Templates" to open the list of instruments

- Scroll down to, and select, "Seeker X"

- This will open the "Manage Templates: Seeker X" view

StrataSync Seeker X Configurations Overview

Manage Templates: Seeker-X

Current Filters   Remove all

Global Archives

Seeker-X Configuration

MCA III General Configuration

MCA III Truck Configuration

- Individual configurations for the Seeker X can be set independently from the two MCA III configurations

- The "MCA III General Configuration" is likely is common configurations that all technicians in the same system would use like LAW-X server info, EDN settings, Upload interval, meter display units, etc.

- The "MCA III Truck Configuration" is more specific and deals with setting up Wi-Fi and Ethernet configurations specific to each technician.

- The MCA III has two configurations which can be deployed via a Seeker X sync with StrataSync which will then update any MCA III the Seeker X is docked with

Seeker X Configuration

Seeker X Configuration Overview

Click here to return to the beginning of this section

The Seeker X configurations include the Squelch level and units of measurement

It also includes the configurations to set Tag signal frequencies and types for any of the available four separate configurations

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General Seeker X Settings

1. The Squelch level determines at what signal strength level the Seeker X will begin to make an audible tone so technicians can hear when a leak has been detected

2. The Meter Units are the units of measurement the Seeker X will use when reporting leak levels

Off-Air Survey Settings

The Off-Air Survey Settings are used to enable monitoring of off-air energy during rideouts.

This feature can be enabled/disabled within this view

- When disabled the Frequency and Interval settings are ignored
- When enabled the Frequency can be set to a value between 130 and 1220 MHz
- When enabled the Interval can be set to a value between 10 and 120 seconds

Off-Air Survey Settings

Off-Air Survey	Enable	⌄
Frequency	757	MHz
Interval	10	sec

Carrier Configurations – Overview

Click here to return to the beginning of this section

The Carrier Configurations entered in StrataSync must match the tag frequencies of the source tagger

- Dual CW == VIAVI CT-4 or CT-X channel taggers, CMTS, or R-Phy devices

- Chirp == VIAVI CT-X channel tagger

- OFDM == CMTS or R-Phy devices

- OUDP == Modems

Enable – Enables or Disables the specific carrier from the list of carriers the Seeker X will use

Signal Type – Choose from Dual CW, Chirp, OFDM, or OUDP carriers that the Seeker X will use

Config 1	Config 2	Config 3	Config 4						
Custom Name	Config 1								

Carrier Configurations

	Enable	Frequency	Signal Type	Tag	OFDMA Center Frequency	Level to Adjacent	Adjacent Type	Truck Antenna	Walkout Antenna
1	Enable	138 MHz	Dual CW	1	5 MHz	-30 dB	Digital	AVM-3	WFS-1
2	Disable	612 MHz	Dual CW	1	5 MHz	-30 dB	Digital	WVM-2	WFS-2
3	Disable	138.9 MHz	OUDP	50kHz, 256	156 MHz	0 dB	Digital	AVM-3	WFS-1
4	Disable	690 MHz	OFDM	50kHz, 512	5 MHz	0 dB	Digital	WVM-2	WFS-2

Carrier Configurations – Signal Type

Click here to return to the beginning of this section

Once the Signal Type has been selected the following settings will need to be entered for each type of enabled carrier.

Signal Type	Frequency	Tag	OFDMA Center Frequency	Level to Adjacent	Adjacent Type
Dual CW	Center Frequency of First Carrier	See CW Tag Spacing Chart	N/A (default = 5)	-30 -36	Digital Analog
Chirp	Center Frequency of First Carrier	See Chirp Tag Spacing Chart	N/A (default = 5)	-24 -30	Digital Analog
OFDM	PLC Center Frequency	See OFDM Tag Chart	N/A (default = 5)	0	Digital or Analog
OUDP	OUDP Center Frequency	See OFDMA Tag Chart	Frequency of OFDMA Sub-Carrier 1024	0	Digital or Analog

See the following online resources for more information on installation and setup of the CT-4 and CT-X channel taggers;

CT-X Installation Guide

CT-X User Guide

CT-4 Setup Using ONX CATV

CT-X Setup Using ONX CATV

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Carrier Configurations – Tag Settings (Dual CW)

Click here to return to the beginning of this section

- **Dual CW Settings**

  - When the Signal Type is set to Dual CW, the Tag dropdown allows for the selection of spacing between the two carriers of the Dual CW tag.

  - The Seeker X supports the following tag spacings

    - 1 – Sets the spacing to 156.25 Hz

    - 2 – Sets the spacing to 625 Hz

    - 3 – Sets the spacing to 312.5 Hz

    - 4 – Sets the spacing to 468.75 Hz

    - 5 – Sets the spacing to 781.25 Hz

    - 6 – Sets the spacing to 937.5 Hz

    - 7 – Sets the spacing to 1093.75 Hz

    - 8 – Sets the spacing to 1250 Hz

Tag Spacing
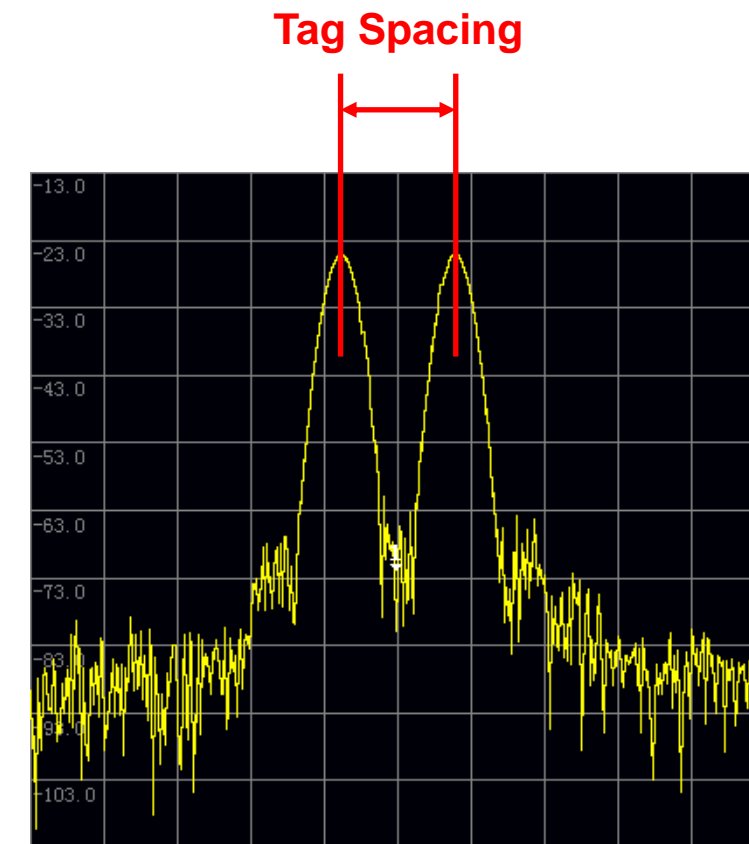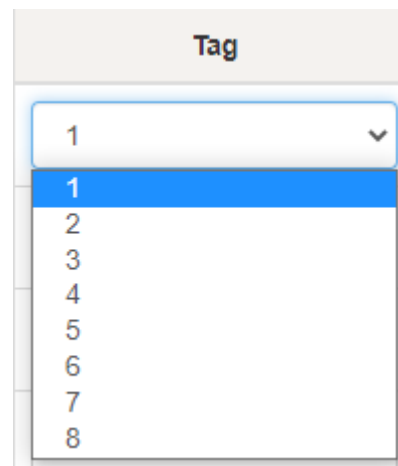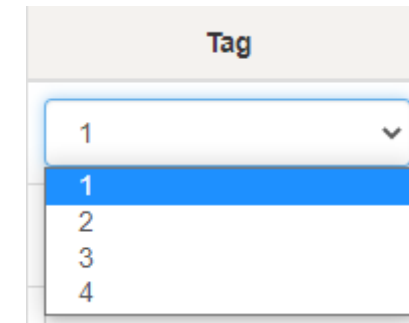
Dual CW Tag

Carrier Configurations – Tag Settings (Chirp)

Click here to return to the beginning of this section

- **Chirp Settings**
  - Chirp is a Digital Spread Spectrum technology that is designed to provide the following improvements over traditional dual CW leakage tags
    - Robust tag identification to minimize false detection
    - Increased immunity to high levels of off-air interference/noise of up to 30 dB over Dual CW leakage tags
    - Increased sensitivity of 6 dB over Dual CW leakage tags
  - VIAVI provides four distinct patterns to allow unique signatures in the case of adjacent providers using the same VIAVI technology and tagging.
    - 1 – Chirp Type 1
    - 2 – Chirp Type 2
    - 3 – Chirp Type 3
    - 4 – Chirp Type 4

Carrier Configurations – Tag Settings (OFDM)

Click here to return to the beginning of this section

Downstream OFDM Settings

- When the Signal Type is set to OFDM, the Tag dropdown allows for the selection of subcarrier spacing and cyclic prefix settings.

- The Seeker X supports IDFT Sizes of 4K or 8K with 50 kHz and 25 kHz subcarrier spacing, respectively.

- The Seeker X supports all cyclic prefixes shown in the table to the right.

Dropdown: 50kHz, 256
- 50kHz, 192
- 50kHz, 256
- 50kHz, 512
- 50kHz, 768
- 50kHz, 1024
- 25kHz, 192
- 25kHz, 256
- 25kHz, 512
- 25kHz, 768
- 25kHz, 1024

Parameter	Downstream OFDM	
	microseconds (us)	number of samples @ 204.8 MHz sampling rate
Cyclic Prefix (CP)	0.9375	192
	1.2500	256
	2.5000	512
	3.7500	768
	5.0000	1024

Click here for more detailed information on how to configure the OFDM tag settings.

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Carrier Configurations – Tag Settings (OUDP)

Click here to return to the beginning of this section

- **Upstream OUDP Settings**

  - When the Signal Type is set to OUDP, the Tag dropdown allows for the selection of subcarrier spacing and cyclic prefix settings.

  - The Seeker X supports IDFT Sizes 2K (2048) with 50 kHz subcarrier spacing.

  - The Seeker X supports all cyclic prefixes shown in the table to the right.

50kHz, 128 ▾
50kHz, 96
50kHz, 128
50kHz, 160
50kHz, 192
50kHz, 224
50kHz, 256
50kHz, 288
50kHz, 320
50kHz, 384
50kHz, 512
50kHz, 640

Parameter	Upstream OFDMA	
	microseconds (us)	**number of samples @ 102.4 MHz sampling rate**
Cyclic Prefix (CP)	0.9375	96
	1.2500	128
	1.5625	160
	1.8750	192
	2.1817	224
	2.5000	256
	2.8125	288
	3.1250	320
	3.7500	384
	5.0000	512
	6.2500	640

Click here for more detailed information on how to configure the OUDP tag settings.

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Carrier Configurations – Antenna Gain Settings

Click here to return to the beginning of this section

Once the Frequency has been entered the Truck and Walkout Antennas will be automatically selected and the appropriate antenna gain settings is will be used.

To determine what antenna gain settings are used at a specific frequency, select the Truck or Walkout Antenna dropdown and choose Custom. The antenna gain setting will be displayed below the dropdown menu. This setting corresponds to the appropriate VIAVI truck or walkout antenna. Custom settings can be entered for non-VIAVI antennas.

Walkout Antenna

Custom	
5.0	dBi

Walkout Antenna Gain

WFS-1 = AFS-2   WFS-2   AFS-7   Low Band Duck   High Band Duck

Vehicle Mount Antenna Gain

WVM-2   AVM-3   AVM-4

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Distance Settings

The Seeker X supports up to 8 distance correction values to account for differences in distance between the Seeker X and the cable plant.

The following settings can be adjusted within the Distance Settings area of the Seeker X configuration page

- The Distance Correction feature can be enabled and disabled

- The Distance Units can be toggled between feet and meters

- Each correction factor (1 to 8) can be individually enabled and disabled.

- Each correction factor (1 to 8) can have a user-defined distance correction factor.

Distance settings		
Enable Distance Correction	Disable	Distance Units Feet
Enable		**Correction**
1	Enable	10 feet
2	Disable	30 feet
3	Disable	50 feet
4	Disable	75 feet
5	Disable	100 feet
6	Disable	150 feet
7	Disable	200 feet
8	Disable	250 feet

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MCA III General Configuration

MCA III / X-Link General Configuration - Overview

- The MCA III General Configuration is a collection of MCA III configurations which would likely be identical for every MCA III in a group

- This configuration could be deployed as part of a StrataSync configuration Template so all MCA III devices in that group will have the same configuration

MCA III General Configuration

General Configuration

Display Units	uV/m
Enable Peak Hold	☑
Vehicle Power Timer (Hours)	1
Max Speed (MPH)	None
Wi-Fi Region	North America

Early Detection Notification (EDN) Configuration

Enable Leak EDN	☑
Enable Snapshot EDN	☑
EDN Threshold	100 uV/m
EDN Trigger Percentage	50%

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MCA III / X-Link General Configuration – General Configuration

The MCA III / X-Link General Configuration includes the following settings

- Display Units – Choose the measurement units desired - µV/m, dBµV/m, dBµV

- Enable Peak Hold – If checked will log the peak value detected by the Seeker since the last logging interval

- Vehicle Power Timer (Hours) – Sets how long after the truck has been turned off that the MCA III will power down

  – This duration should be set to allow enough time for the sync timer to trigger a sync prior to powering off

- Max Speed (MPH) – If selected will not track leakage if traveling above the speed configured

- Wi-Fi Region – Determines which MCA III Wi-Fi channels to use based on Geographic location and regional Wi-Fi signals (MCA III only)

MCA III General Configuration

General Configuration

Display Units	uV/m
Enable Peak Hold	☑
Vehicle Power Timer (Hours)	1
Max Speed (MPH)	None
Wi-Fi Region	North America

MCA III General Configuration – EDN Configuration

The Early Detection Notification (EDN) Configuration section will configure how the MCA III handles EDNs and Snapshots

Enable Leak EDN – If checked will tell the MCA III to immediately upload leaks that have been discovered that exceed the EDN threshold value.

Enable Snapshot EDN – When checked will immediately upload any Snapshot taken on the Seeker while in the field when the meter is docked

EDN Threshold – While driving, if the Seeker has detected a leak that exceeds the "EDN Threshold" level, this leak will be tracked for the maximum peak leak level until the leak has dropped below the Peak value's calculated EDN Trigger Percentage, then this EDN will be immediately uploaded to LAW so a Work Order can be created.

EDN Trigger Percentage – Helps determine when an EDN leak has been fully discovered and triggers when the EDN is to be considered completely captured. Only after the EDN leak level has decreased below the calculated EDN Trigger Percentage of the tracked peak level, will the EDN be sent to LAW.

Early Detection Notification (EDN) Configuration

Enable Leak EDN	☑
Enable Snapshot EDN	☑
EDN Threshold	100 uV/m
EDN Trigger Percentage	50%

MCA III General Configuration – LAW-X Connection

Click here to return to the beginning of this section

- To send data from the MCA III to LAW-X a few items need to be configured

- Connection Method – Select either <u>Hostname </u>(preferred) if using a known URL or select IP address if using a known IP address

- Port Number – Enter the TCP IP port number that the MCA III will use to communicate with the LAW-X Server

URL Connection Method

LAW	
Connection Method	Hostname
Hostname	lawdemo.viavisolutions.com
Port #	24027

IP Address Connection Method

LAW	
Connection Method	IP Address
IP Address	123.45.67.89
Port #	24027

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MCA III General Configuration – Remote Upload and Vehicle Tracking Configurations

Click here to return to the beginning of this section

Remote Upload Configuration

- Enable Remote Upload – Enable this checkbox to sync the MCA III data to LAW-X via Wi-Fi – otherwise the data will remain on the MCA III so it can be manually uploaded using the manual data upload procedure

- Upload Interval (Hours) – Determines how much time will elapse before the MCA III will attempt to upload its leakage and ride-out data

Vehicle Tracking Configuration (Not yet implemented)

- Currently this configuration can be ignored

Press the Save Button when finished

MCA III Truck Configuration

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MCA III Truck Configuration – Overview

Click here to return to the beginning of this section

The second MCA III configuration available in StrataSync is the MCA III Truck Configuration

These settings will be more unique per each truck or technician, which may require individual configurations

The Truck ID should match what is set in LAW-X for the Truck ID

Specific Wi-Fi connections may only be available to individual techs

- For example, all techs might utilize a Wi-Fi network at a specific garage, check "Home Access Point" for this scenario,

- However, individual techs may have a Wi-Fi hotspot on their phone that has a unique SSID to that tech's phone, do not check "Home Access Point" for this scenario

MCA III Truck Configuration

Truck ID | exampletruck1

Ethernet and WiFi Access Points
Descending Priority

Ethernet ⬤ RWep1_5.0GHz ⬤ WiFi_Garage_2 ⬤

Wi-Fi 10 ⊗

Access Point Configuration

Change Priority ◄ ►

Enable ☑

SSID | RWep1_5.0GHz

Home Access Point ☐

Wi-Fi Band | 5.0 GHz

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MCA III Truck Configuration – General Information

Click here to return to the beginning of this section

Truck ID: Identifies the truck connected to the Seeker X

- This aids in reporting purposes

Ethernet and Wi-Fi Access Points:

- 10 Wi-Fi Access Points can be programmed
- Can be reordered based on desired connection priority
  – MCA III will try each connection in order until a connection is established, and the upload takes place

MCA III Truck Configuration

| Truck ID | exampletruck1 |

Ethernet and WiFi Access Points
Descending Priority

Ethernet ⊘   RWep1_5.0GHz ⊘   WiFi_Garage_2 ⊘

Wi-Fi 10 ⊗

Access Point Configuration

Change Priority ‹ ›

Enable ☑

SSID RWep1_5.0GHz

Home Access Point ☐

Wi-Fi Band 5.0 GHz

MCA III Truck Configuration – Ethernet Configuration

Click here to return to the beginning of this section

For Ethernet Communications

- Check the "Enable" box if the MCA III should be expected to communicate over Ethernet

- If using a Static IP check that box and enter the IP information

- If no Static IP address is selected the MCA III will use DHCP when connecting

Ethernet and WiFi Access Points
Descending Priority

| Ethernet ⊘ | RWep1_5.0GHz ⊘ |
| Wi-Fi 8 ⊗ | Wi-Fi 9 ⊗ |

Ethernet Configuration

Change Priority ❯

Enable ☑

IP Configuration

Use Static IP ☐

Static IP Address

Subnet

Gateway

MCA III Truck Configuration – Access Point Configuration

Wi-Fi Access Point Configurations:

- To configure the Wi-Fi Access Points, select one of the ten Wi-Fi configuration tabs and enable those desired to be used changing the priority to arrange for the more common Access Points to be first

- Configure the SSID, Wi-Fi Band, Security protocol, and Password (ASCII Key) to match the desired Wi-Fi Access Point

Home Access Point: Home Access Point is designed to be used with external access points mounted on buildings, not constantly available mobile access points inside the vehicle. When checked, the MCAIII will constantly look for all access points designated as a "Home Access Point" and will connect to and upload leakage data whenever the SSID is recognized. DO NOT check "Home Access Point" for access points that will always be active in the vehicle.

Access Point Configuration

Change Priority	‹ ›
Enable	☑
SSID	RWep1_5.0GHz
Home Access Point	☐
Wi-Fi Band	5.0 GHz

Security

Protocol	WPA2-PSK (AES)
ASCII Key	·········

MCA III Truck Configuration – IP & DNS Configuration

- When setting up the Access Points for either the Ethernet or Wi-Fi Access Points, if using a Static IP check that box when configuring the Access Point and enter the IP information

- If the "Use Static IP" box is not enabled the MCA III will use DHCP when connecting to this Access Point

IP Configuration

Use Static IP	☑
Static IP Address	10.0.0.150
Subnet	255.255.255.252
Gateway	10.0.0.1

Custom DNS (Blank for default)

DNS 1	8.8.8.8
DNS 2	

Deploying Configurations

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Seeker X Configuration – Deploy or Copy To Template

Click here to return to the beginning of this section

Once the Seeker X configuration is complete it needs to either be:

- Deployed directly to a Seeker X or group of Seeker X units

- Copied to a Template so groups of configurations can be deployed to a Seeker X or group of Seeker X units

Select the configuration and right click (Action button) to view the available actions that can be taken

- Select "Deploy" to directly deploy the configuration

- Select "Copy To Template" to add this Seeker X configuration to a Seeker X configuration Template

Name		Path
☑ Example Seeker Configuration.json		/internal/Example Seeker Configuration.json
☐ OfdmTest3.json	View	l/OfdmTest3.json
☐ AI Seeker X Config.json	Edit	l/AI Seeker X Config.json
	Rename	
☐ RyanTesting.json	Deploy	l/RyanTesting.json
☐ DK_LEAKAGE-X.json	Copy To Template	l/DK_LEAKAGE-X.json
☐ UnitConverTest.json	Delete	l/UnitConverTest.json

MCA III General Configuration – Deploy or Copy To Template

Once the MCA III General configuration is complete it needs to either be:

- Deployed directly to a Seeker X or group of Seeker X units

- Copied to a Template so groups of configurations can be deployed to a Seeker X or group of Seeker X units

Select the configuration and right click (Action button) to view the available actions that can be taken

- Select "Deploy" to directly deploy the configuration

- Select "Copy To Template" to add this MCA III General configuration to a Seeker X configuration Template

Name	Path
☑ Example MCA General Config.json	MCA General Config.json
☐ JDemo2.json	on
☐ Testing 2_0_12 Gen.json	0_12 Gen.json
☐ AI MCA Config.json	nfig.json
☐ RyanTestin505.json	1505.json
☐ RyanTesting2.json	1g2.json

View
Edit
Rename
Deploy
Copy To Template
Delete

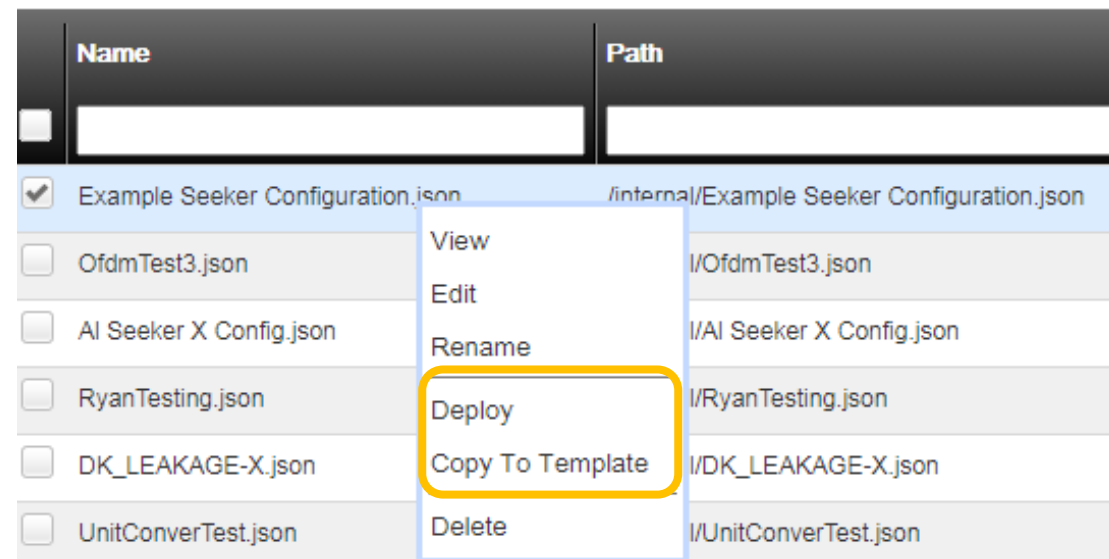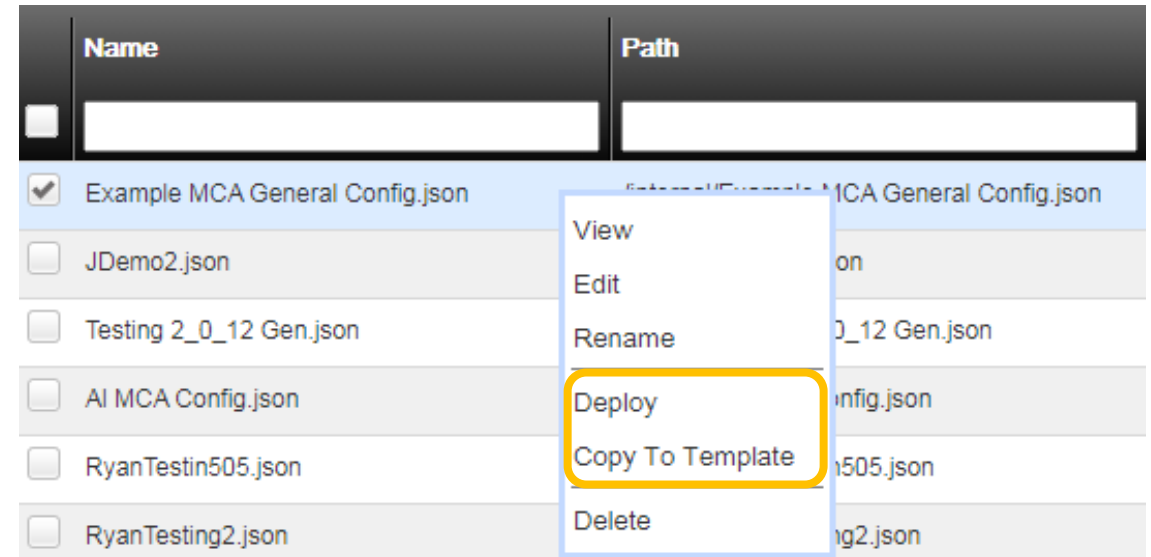# MCA III Truck Configuration – Deploy or Copy To Template

Click here to return to the beginning of this section

Once the MCA III Truck configuration is complete it needs to either be:

- Deployed directly to a Seeker X or group of Seeker X units

- Copied to a Template so groups of configurations can be deployed to a Seeker X or group of Seeker X units

Select the configuration and right click (Action button) to view the available actions that can be taken

- Select "Deploy" to directly deploy the configuration

- Select "Copy To Template" to add this MCA III Truck configuration to a Seeker X configuration Template
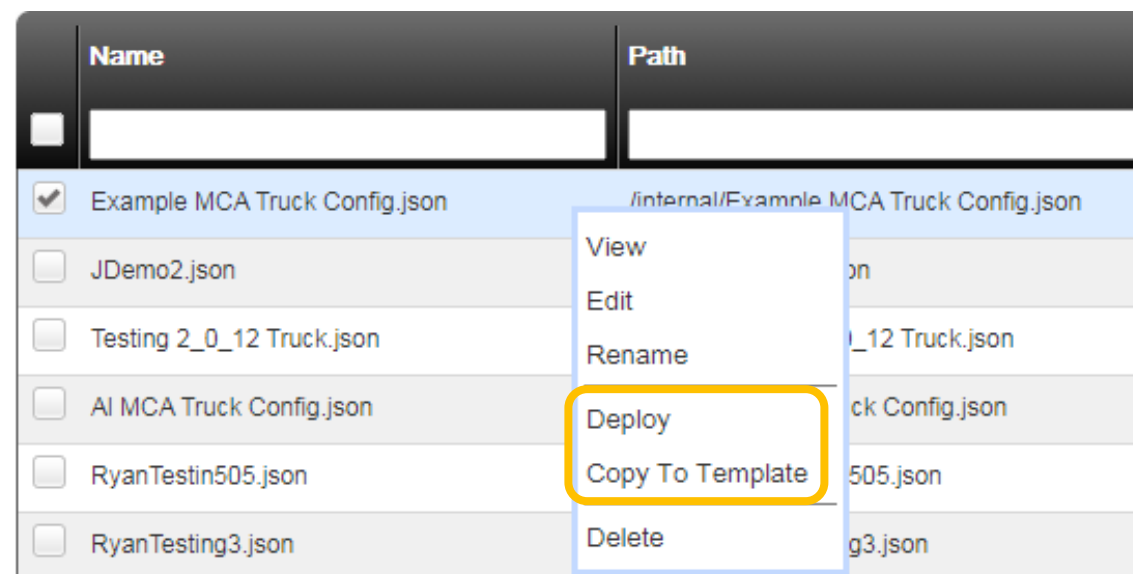
Name	Path
☑ Example MCA Truck Config.json	/internal/Example MCA Truck Config.json
☐ JDemo2.json	on
☐ Testing 2_0_12 Truck.json	_12 Truck.json
☐ AI MCA Truck Config.json	ck Config.json
☐ RyanTestin505.json	505.json
☐ RyanTesting3.json	g3.json

View
Edit
Rename
Deploy
Copy To Template
Delete

Configuration Template Deployment

If using a Seeker X Template and the template configuration is complete, this group of configurations can be deployed directly to a Seeker X or group of Seeker X units

Select the desired template and right click (Action button) to view the available actions that can be taken

- Select "Deploy" to deploy the configuration
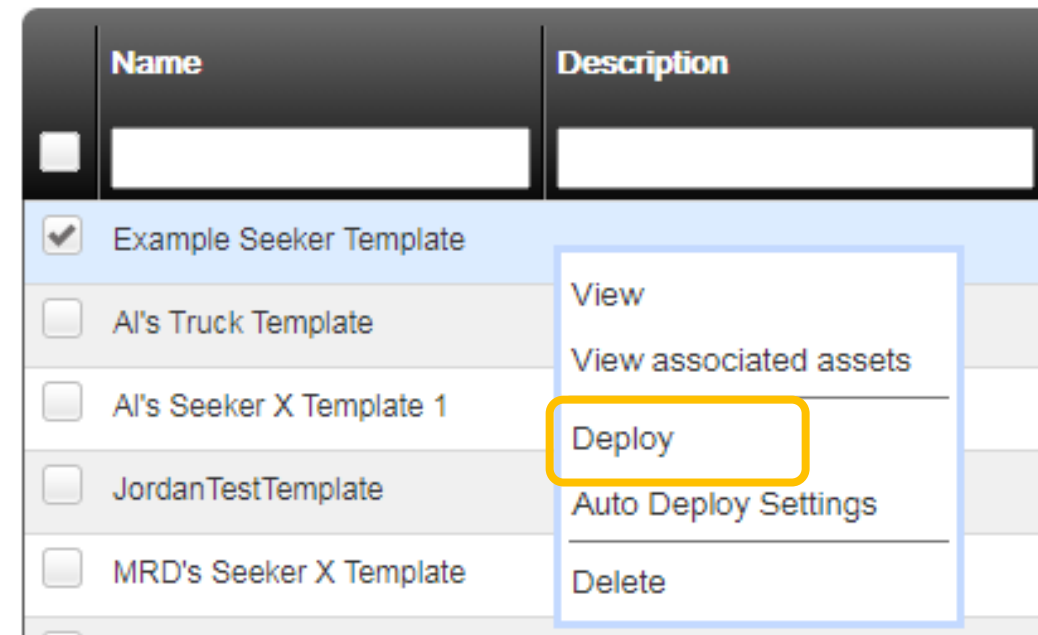
Syncing Configurations

Mobile Tech Connection with Seeker X

With the Seeker X near the mobile device – open the VIAVI Mobile Tech application

- The Seeker X and Mobile Tech communicate via Bluetooth Low Energy which typically has a range of less than 10ft / 3m

If the Seeker X has been connected before it will appear in the "My Devices" section of Mobile Tech

- If the Seeker X has not been connected before it should appear in the "Other Devices" list

If the Seeker X is not automatically connected press the "Connect" button to begin the communication process

NOTE: Seeker X's will only sync with StrataSync just after a successful connection has been made
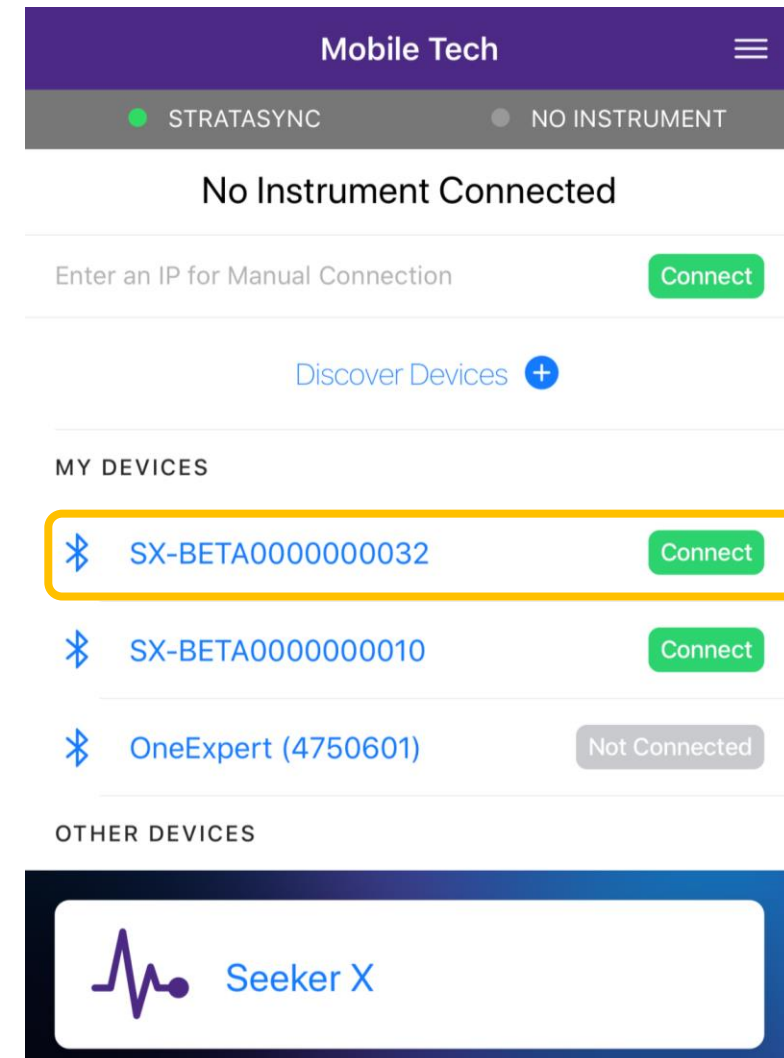
Deploying Configurations

Click here to return to the beginning of this section

- Just after the connection is established between Mobile Tech and the Seeker X the configurations (and/or Firmware files) will be synced down to the Seeker X

- These will then be immediately deployed and applied to the Seeker X

- MCA III configurations will be deployed when the Seeker X is docked with an MCA III connected
  - Any MCA III's that is docked with this Seeker X will be given the MCA III configurations (and firmware) that was previously deployed to this Seeker X
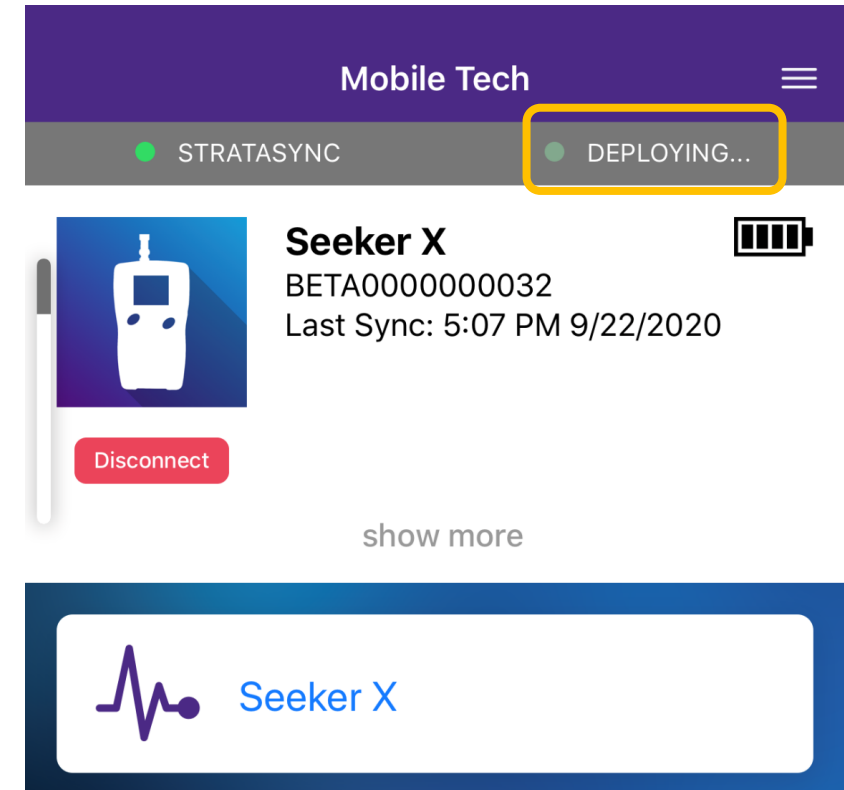
Mobile Tech

● STRATASYNC   ● DEPLOYING...

Seeker X
BETA0000000032
Last Sync: 5:07 PM 9/22/2020

Disconnect

show more

Seeker X

Seeker X Details on Mobile Tech

To see more information on the Seeker X press "Show more"

This will expand the display and will show:

- Asset Type: Seeker X

- Seeker X Serial Number

- Software Version on the Seeker X

- The Tech ID associated with that Seeker X

- Bluetooth Identifier Address

- Battery Level of the Seeker X
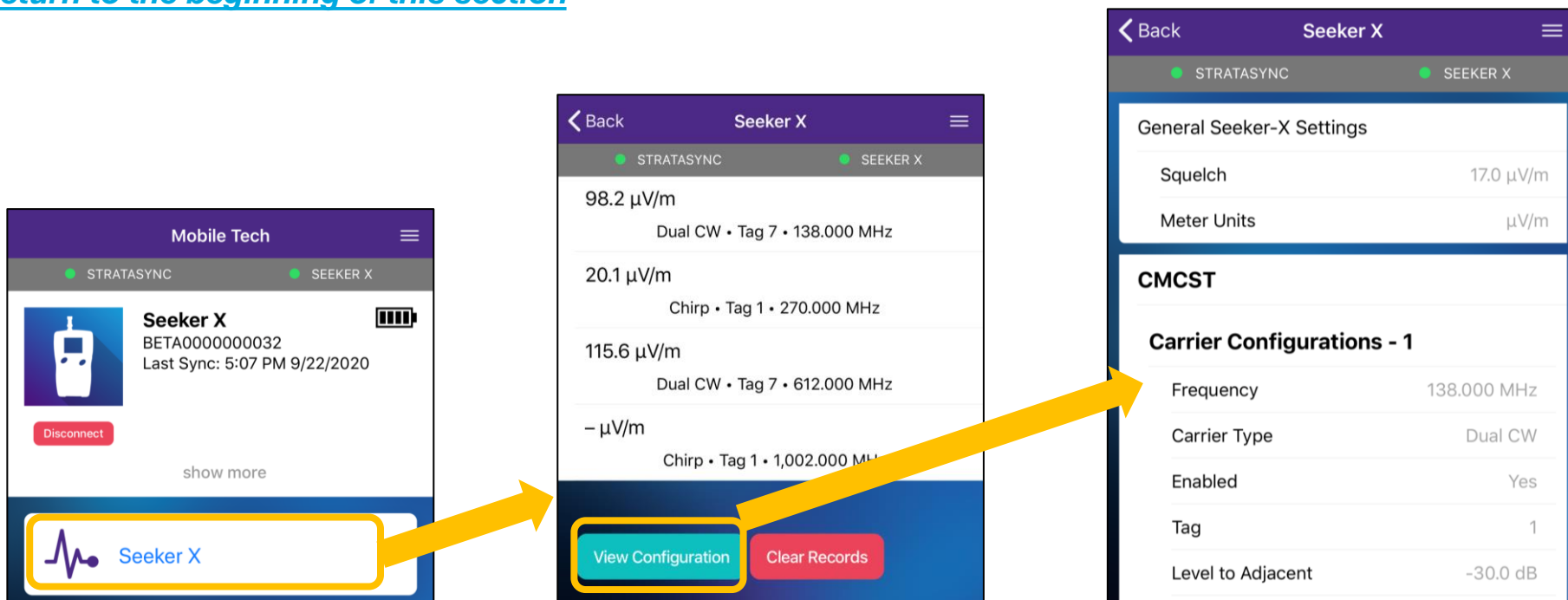
- Latitude and Longitude of the Mobile Tech app

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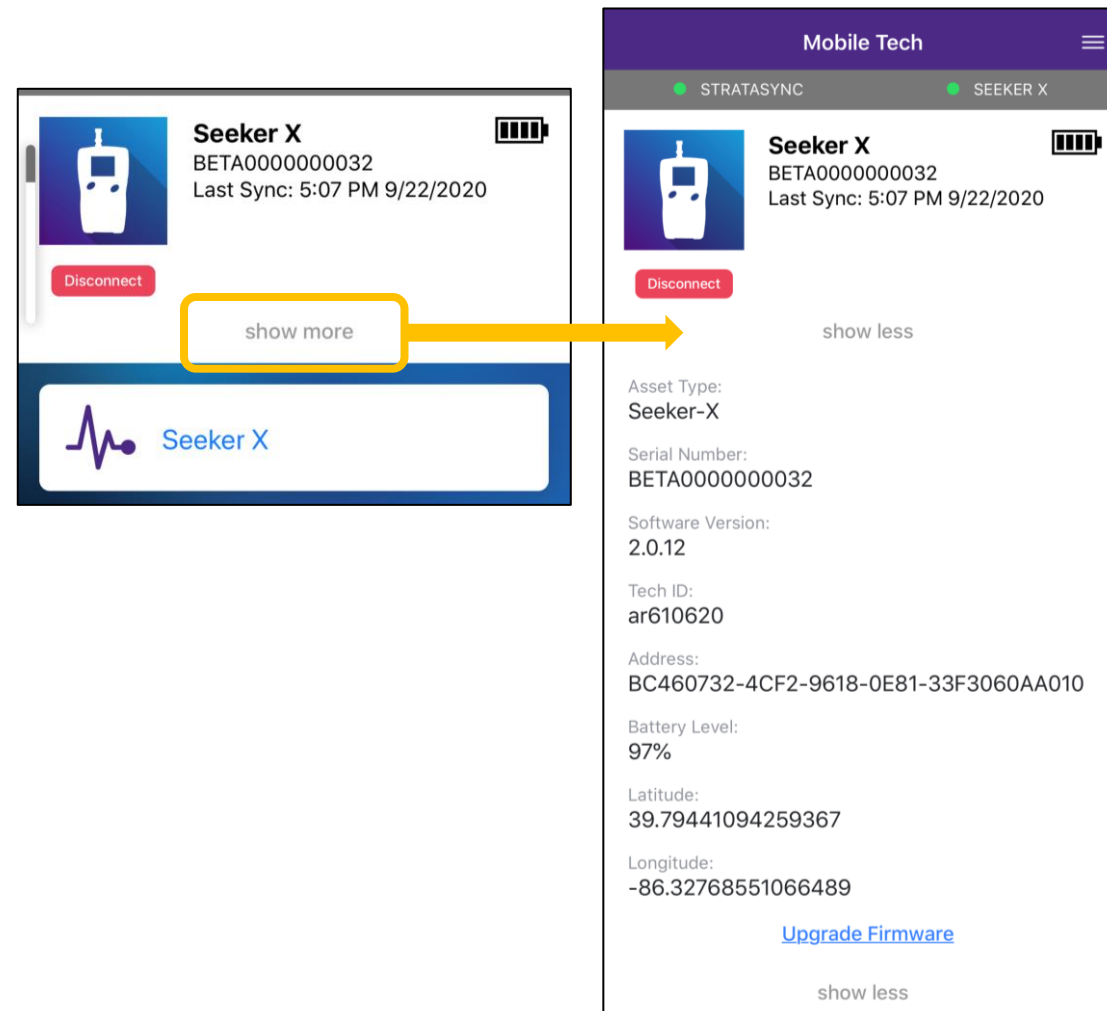
View Configurations

Click here to return to the beginning of this section

- Below the Instrument information is the "Seeker X" measurement mode

- Press the Seeker X button will display the active configuration and current measurement values

- Press the "View Configuration" button to see and scroll through all the configurations that were deployed to the Seeker X

Note: The "Clear Records" button should only be used when troubleshooting connectivity issues. Clear Records only erases the records located in the Seeker X. To clear the records from the MCA III, first synchronize the data from the MCA III to the Seeker X prior to pressing "Clear Records"

Common Questions

Seeker X & MCA III Hardware Information

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Seeker D vs Seeker X Mobile Mounts

Early Seeker X Models are black

Rule of thumb, don't mix brands with meters

- Seeker D (Trilithic Brand)
  - Will charge in Seeker X MMT
- Seeker X (VIAVI Brand)
  - Will <u>not</u> charge in the Seeker D MMT
  - Do not use a Seeker D Mobile Mount for Seeker X

MCA III Trilithic Branded is the exception

- Will work with both the Seeker D and Seeker X Mobile Mount

MCA III Interchangeable

Seeker D MMT
Trilithic Branded

Seeker X MMT
VIAVI Branded

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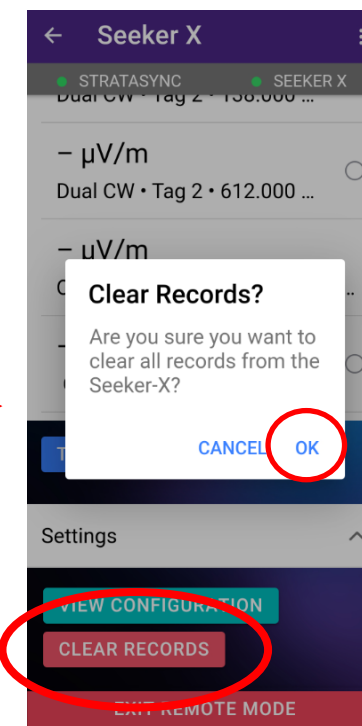# Erasing Data from the MCA III

Power on the Seeker X and MCA III

With the Seeker X in the Mobile mount synchronize the data into the Seeker X

- Press the "camera" button and hold until you see "SYNC"

- Once the Seeker X displays "DONE", the data has been transferred to the Seeker X and has been deleted from the MCA III

Connect with the VMT and "CLEAR RECORDS" in the Seeker X

LAW-X Configuration

LAW-X Minimal Configurations (getting started)

Create Users

- User accounts to authenticate equipment uploads

  – Since the Seeker X is assigned and configured using StrataSync, the StrataSync Tech ID is used as the Seeker X Tech ID. For this reason, a username must be created in LAW-X to match the SS Tech ID

- User accounts to Manage the LAW-X software

  – StrataSync and LAW-X user accounts must also share the same e-mail address
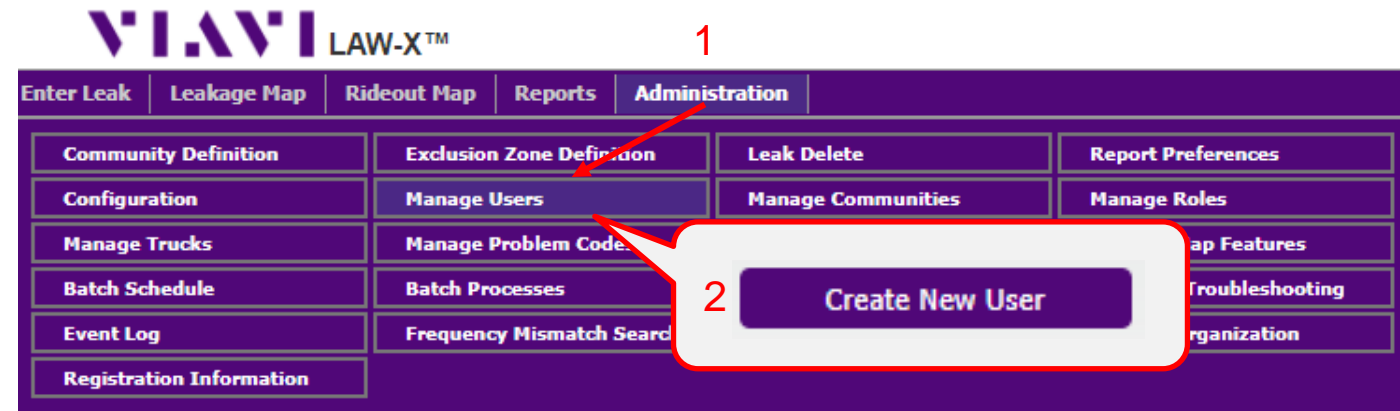
Build Communities in the desired location

- Communities is where LAW-X will accept data from equipment

- Can be very simple 4 dot communities, or elaborate many dots communities

Important information

- Customer has a login username and password

- Wi-Fi port number – Information provided on the "View Active Connection" page within LAW-X

  – This is the Wi-Fi port that LAW-X is listening on for MCA III data during uploads

- LAW-X DNS name – Obtain this information from TAC or from the LAW-X website URL

  – This is needed for MCA III's to connect to the LAW-X server and upload data

LAW-X Configurations (Add User Accounts)

1. Under Administration/Manage Users

2. Create New User

3. Select Meter User

4. Select Maintenance User

5. Enter

   a. User Name

   b. Password

   c. Confirm Password

   d. E-mail Address

6. Save Settings

Note: Community checkboxes provide leak data visibility for this User's login

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LAW-X Configurations (Build Communities)

- Under Administration/Community Definition/ **Add New Community**

- Fill in the Name, Owner, and miles of plant

- On the **Map** page, draw basic community surrounding the location to be monitored

- The default community refinement variables are typically fine

- Additionally, on the **Details** page, you can setup auto processing and emailing of work orders

- Once all settings are done **Save Community**

Additional Support
trilithic.support@viavisolutions.com, or call +1-844-468-4284, prompts 3-1-3

LAW-X Configurations (Obtaining Wi-Fi Port assignment)

- Under Administration/View Active Connections

- Wi-Fi connection port for MCA III programming

- As part of the MCA III General Configuration, the LAW-X server Hostname and this port # direct the data uploads from the MCA III to the correct LAW-X server

- MCA III General Config in StrataSync
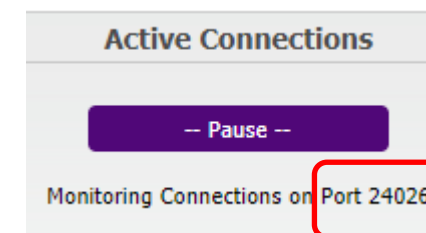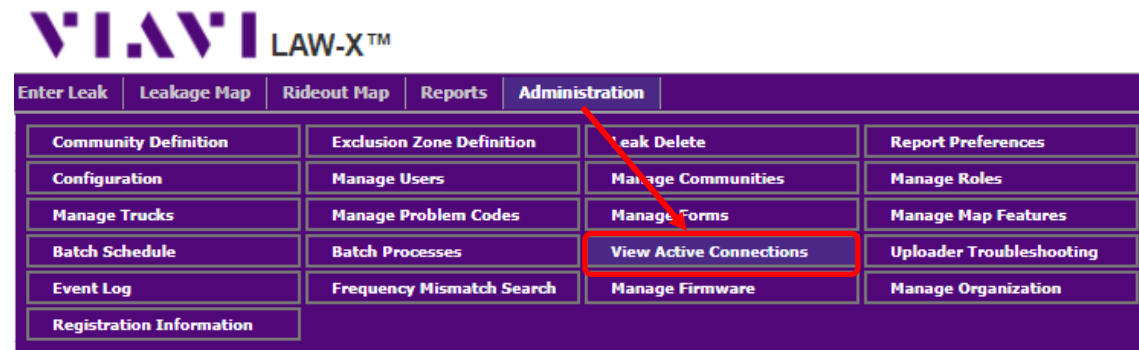
OFDM Configuration Details

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OFDM Carrier Configuration

The necessary OFDM carrier information can be determined with the ONX meter by selecting the downstream OFDM carrier

Below the Channel View graph is the OFDM channel's PLC frequency and Cyclic Prefix (CP)

Using the table allows for conversion of Cyclic Prefix from time to samples

Parameter	Downstream OFDM	
	microseconds (us)	number of samples @ 204.8 MHz sampling rate
Cyclic Prefix (CP)	0.9375	192
	1.2500	256
	2.5000	512
	3.7500	768
	5.0000	1024

Example: Carrier Frequency = 690.000 MHz
Tag for this carrier = 50k, 512

OUDP Configuration Details

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Leakage Detection Using OUDP - Prerequisites

The following VIAVI software and firmware prerequisites must be met in order to perform OUDP leakage measurements with the Seeker X Leakage Management System in 204 MHz high split networks.

- **StrataSync v14.5.0** – Used for OUDP software option deployment to the Seeker X and creation of configuration profiles for OUDP leakage tags

- **MobileTech v4.9.1** – Used for delivery of Seeker X firmware, OUDP software option, OUDP configuration profiles, and OUDP leakage measurement display and GPS logging.

- **LAW X v5.3.0** – Must be installed before the Seeker X and MCAIII or X-Link is able to upload, display, and report OUDP leakage measurements with geolocation.

- **Seeker X Firmware v4.1.69** – Must be installed to enable OUDP software option and detect OUDP leakage tags.

- **OUDP Software Option** – Must be deployed to Seeker X via StrataSync and MTA before the Seeker X is able to detect OUDP leakage tags.

Leakage Detection Using OUDP – Setup Steps

1. Verify that your StrataSync, MobileTech App, and LAW X software have been updated to the versions shown in the prerequisites.

2. Deploy the Seeker X firmware v 4.1.69 to the Seeker X from StrataSync via the MobileTech application.

3. Once the new Seeker X firmware has been installed, deploy the OUDP software option to the Seeker X from StrataSync via the MobileTech application.

4. In StrataSync, create a Seeker X configuration profile with OUDP leakage tag setup that matches the configuration of the network that is being monitored.

5. Deploy the Seeker X configuration profile to the Seeker X from StrataSync via the MobileTech application.

Leakage Detection Using OUDP – Seeker X Configuration

The Seeker X is designed to detect the following types of OUDP signals

- Frequency Range = 130 to 150 MHz

- IDFT Size = 2K (2048)

- Subcarrier Spacing = 50 kHz

- Pilot Pattern = 4

- Cyclic Prefix = All

- Roll-Off-Period = All

Parameter	Upstream OFDMA	
	microseconds (us)	number of samples @ 102.4 MHz sampling rate
Cyclic Prefix (CP)	0.9375	96
	1.2500	128
	1.5625	160
	1.8750	192
	2.1817	224
	2.5000	256
	2.8125	288
	3.1250	320
	3.7500	384
	5.0000	512
	6.2500	640

The following configuration parameters must be entered into the Seeker X configuration profile for OUDP leakage detection

- Frequency = Center Frequency of OUDP

- Signal Type = OUDP

- Tag = 50 kHz with Cyclic Prefix to match system settings

- OFDMA Center Frequency = Center Frequency of the OFDMA Channel *(Frequency of subcarrier 1024)*

Leakage Detection Using OUDP – OUDP Test Burst Configuration

The following OUDP test burst configuration parameters are not required but some of these settings will affect how often a modem transmits. If the modem is set up so that it transmits too infrequently then driveouts may not detect the signals if they aren't active when the vehicle is in the area. The following settings are provided as a reference to the best practices several MSOs have adopted for OUDP leakage detection.

- Transmit Burst Gap = 0 frames *(Note 1)*
- Transmit Duration = 8 frames
- Transmit Cycle Gap = 4 frames *(Note 2)*
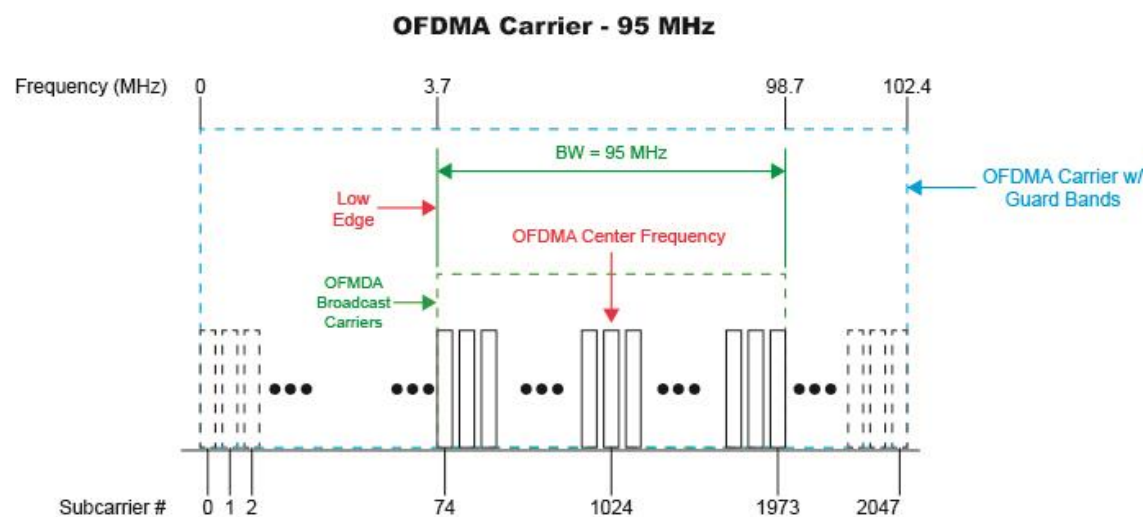- Minislots = 4 (1.6 MHz Upstream Bandwidth)

Note 1: If Transmit Burst Gap does not support configuration of 0 frames then use the lowest possible value supported

Note 2: Alternatively max-cycle time can be configured on some platforms. Max-Cycle time should be set to 800ms.

Leakage Detection Using OUDP – OFDMA Center Frequency Details

StrataSync OFDMA Center Frequency = Center Frequency of Subcarrier 1024

- In StrataSync the OFDMA Center Frequency setting is always equal to center of subcarrier 1024. Note that OFDMA Center Frequency as defined in the StrataSync setup parameters is not the actual center frequency of the broadcasted OFDMA channel.

- CMTS vendors have designated that broadcasted OFDMA subcarriers always start at subcarrier #74 and end at a maximum of subcarrier #1973 for full bandwidth channels. The subcarriers numbers 0 to 73 and 1974 to 2047 are never broadcasted which provides a guard band within these frequencies at the beginning and end of the OFDMA channel.

- For OFDMA channels with a high edge frequency that is lower than the frequency of subcarrier number 1024, the OFDMA Center Frequency that you enter in StrataSync will be outside of the broadcasted OFDMA channel.

Leakage Detection Using OUDP – Setup Steps for Commscope CMTS/R-Phy Devices

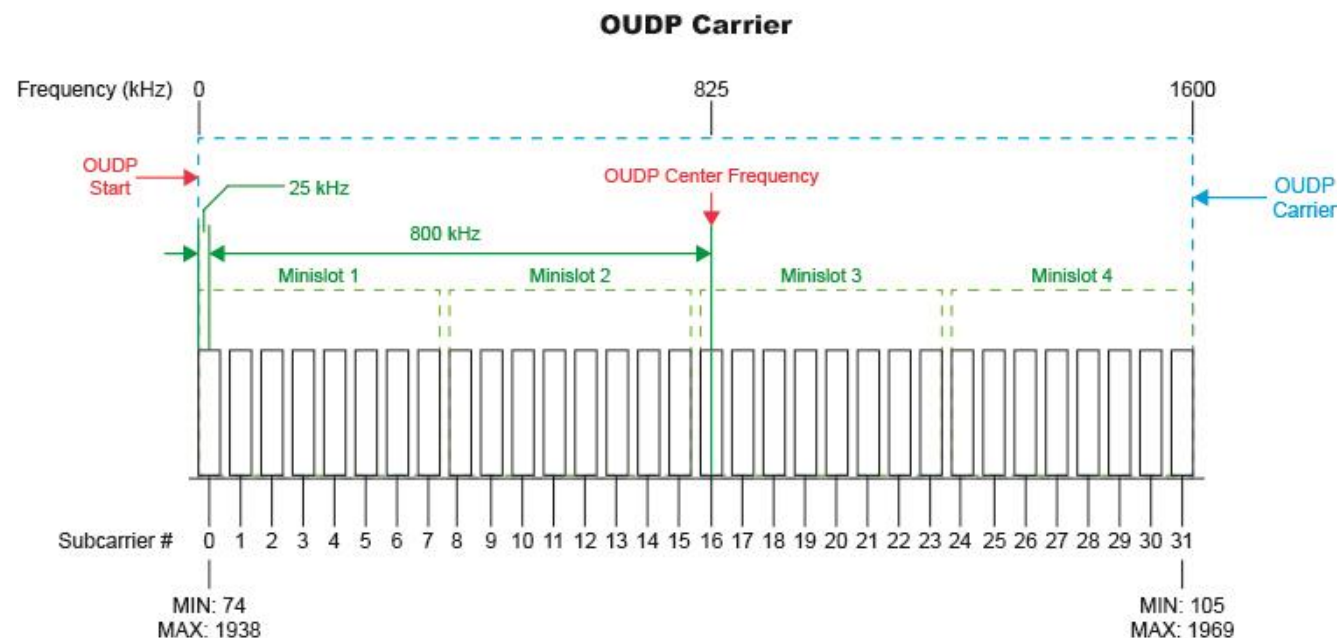*StrataSync "OFDMA Center Frequency" = Center Frequency of Subcarrier 1024*

- Run the following command from the Commscope command line interface; "show interface cable-upstream <S*/CG*/CH*> detail | i edge"

```
trilithic_e6000# show interface cable-upstream 1/1/24 detail | i edge
Frequency (Hz) low-edge:                    108475000
Frequency (Hz) high-edge:                   201275000
```

  - The variable <S*/CG*/CH*> is defined as <slot[/conn-grp[/channel]]>

- The output of this command will return the "low-edge" frequency of the OFDMA carrier as shown in the image above.

- From this information we can calculate the center frequency of the 1st active subcarrier by adding half the subcarrier width (0.025000 MHz) to the "low-edge" value returned from the CMTS.

  - 1st Active Subcarrier Center Frequency = "low-edge" + 0.025000
  - 1st Active Subcarrier Center Frequency = 108.475000 + 0.025000
  - 1st Active Subcarrier Center Frequency = 108.500000

- Next, we must calculate the center frequency of subcarrier 0 by subtracting 3.7 MHz (74 subcarriers @ 0.050000 MHz) from the calculated value of the 1st Active Subcarrier Frequency.

  - Center Frequency of Subcarrier 0 = 1st Active Subcarrier Center Frequency – 3.7 MHz
  - Center Frequency of Subcarrier 0 = 108.500000 MHz – 3.7 MHz
  - Center Frequency of Subcarrier 0 = 104.800000 MHz

- Finally, we will calculate the center frequency of Subcarrier 1024 (OFDMA Center Frequency in StrataSync) by adding 51.2 MHz (1024 subcarriers @ 0.050000 MHz) to the calculated value of Subcarrier 0.

  - Center Frequency of Subcarrier 1024 = Center Frequency of Subcarrier 0 + 51.2 MHz
  - Center Frequency of Subcarrier 1024 = 104.800000 + 51.2 MHz
  - **Center Frequency of Subcarrier 1024 = 156.000000 MHz**

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Leakage Detection Using OUDP – OUDP Center Frequency Details

StrataSync "Frequency" = Center Frequency of OUDP Carrier

- Each OUDP carrier is comprised of 32 subcarriers (1.6 MHz) divided into 4 minislots of 8 subcarriers a piece.

- The OUDP carrier must start at the beginning of a minislot boundary.

- For an OFDMA carrier that is set to the maximum allowable bandwidth, the OUDP channel must start at or below the minislot boundary at subcarrier number 1938.

- In StrataSync the Frequency setting is always equal to the center frequency of OUDP subcarrier number 16 which is 825 kHz from the OUDP start frequency.

OUDP Carrier

Note: There are no gaps between subcarriers as shown in the image above, these gaps are for illustrative purposes only.

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Leakage Detection Using OUDP – Setup Steps for Commscope CMTS/R-Phy Devices

StrataSync "Frequency" = Center Frequency of OUDP Carrier

- Run the following command from the Commscope command line interface;
  "show interface cable-upstream <S*/CG*/CH*> ofdm oudp-leakage params"
  - The variable <S*/CG*/CH*> is defined as <slot[/conn-grp[/channel]]>

- The output of this command will return the "Start" frequency of the OUDP carrier as shown in the image below.


```
trilithic_e6000# show interface cable-upstream 1/1/24 ofdm oudp-leakage params

License Enabled  (system-oudp-leak-detect)

OUDP US
Interface    Tx      Tx     Cycle   -- Cycle Time (ms) --   ----- Frequency (Hz)* -----   Assoc
S/CG/CH     Frames   Gap     Gap    Max          Current    Start          End            CM Cnt
----------  ------  -----  ------- --------      --------   ---------    ---------        ------
1/1/24          8      1       4       500            7     138075000    139675000            2

* Frequencies used are configured frequencies expanded to appropriate mini-slot boundaries
```

- From this information we can calculate the center frequency of the 1st subcarrier of the OUDP carrier by adding half the subcarrier width (0.025000 MHz) to the "Start" frequency value returned from the CMTS.
  - 1st OUDP Subcarrier Center Frequency = "Start" + 0.025000
  - 1st OUDP Subcarrier Center Frequency = 138.07500 + 0.025000
  - 1st OUDP Subcarrier Center Frequency = 138.100000

- We will calculate the center frequency of the OUDP carrier by adding 800 kHz (16 subcarriers @ 0.050000 MHz) to the calculated value of the 1st OUDP Subcarrier Center Frequency.
  - Center Frequency of OUDP Carrier = 1st OUDP Subcarrier Center Frequency + 800 kHz
  - Center Frequency of OUDP Carrier = 138.100000 + 0.800000 MHz
  - **Center Frequency of OUDP Carrier = 138.900000 MHz**

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