CPAT FLEX

user manual

DRV3 *Lite*
Digital Leakage Receiver

Please direct all questions to your local CPAT Flex sales office representative, or distributor, or contact CPAT Flex technical support at: www.cpatflex.com.

CPAT Flex User Manual (DRV3 *Lite*)

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Contents

1. GENERAL INFORMATION

1.1 About this Manual

This manual describes the features, operation and setup of the DRV3 *Lite* portable digital leakage detection meter.

You will find important safety information in this manual. We strongly recommend that all users read this manual. Use of this product other than for its intended application may compromise the unit's safety features.

1.2 Explanation of Symbols Used

The following symbols are used on the DRV3 *Lite* label and in this Manual:

Caution. Indicates that operations or procedures, if carried out without caution, may cause personal injury or damage to the unit.

Note. Indicates additional information about the product.

1.3 Certification

This section describes the certifications that the DRV3 *Lite* complies with.

1.3.1 Test Specifications

FCC part 15 (2013) subpart B, Class B
ICES-003 (2012), Class B
Electrical equipment for measurement, control, and laboratory use – EMC requirements – Part 1: Generic requirements.

1.3.2 Compliance

This Class B digital apparatus complies with Canadian ICES-003(2012).
This Class B digital apparatus also complies with European CISPR11 (2009) A1 (2010).

1.3.3 Note

This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

NOTE
This equipment has been tested and found to comply with the limits for a Class B digital device, according to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used according to the instruction manual, it may cause harmful interference to radio communications. Operating this equipment in a residential area is likely to cause harmful interference. In such cases, the user will need to correct the interference at their own expense.

NOTE
Any modifications made to this device that are not approved by CPAT Flex may invalidate the user's authority granted by the FCC to operate this equipment.

1.4 Technical Support

CPAT Flex Technical Support Service is available Monday through Friday from 9:00 AM to 5:00 PM Eastern Time.

Toll-free from the U.S. and Canada: 1-888-307-2728 / International: +1-514-307-2728

support@cpatflex.com

1.5 Calibration

Your DRV3 *Lite* unit has been calibrated and tested at the factory and does not need further calibration before use. However, if the unit suffers damage or is repaired, it is recommended that the unit be tested by an authorized CPAT Flex service center.

Also, if your company requires regular calibration of all equipment, or requires a calibration certificate for the DRV3 *Lite*, a calibration service is available through CPAT Flex. For more information on our calibration service, please contact your CPAT Flex representative.

1.6 CPAT Flex Website

CPAT Flex's website contains product specifications, information, press releases, brochures, downloads, and Frequently Asked Questions (FAQ). Please visit our website at: www.cpatflex.com

2. System Components

The DRV3 *Lite* is a portable dual-band signal leakage detection meter designed to operate as a find-and-fix meter for all digital and hybrid cable networks.

It can operate in “system mode”, detecting leakage carriers produced from the DSG1 signal generator located at the headend location, in “pressure test” mode, detecting high-level carriers generated by the DSG1 Lite, or in “spectrum mode”, working as a simplified spectrum analyzer.

The DRV3 *Lite* is frequency agile from 118 to 140 MHz (Mid-band tuner, external antenna) and from 600 to 860 MHz (LTE band tuner, internal antenna). It can easily be set up via its intuitive user interface.

This section describes the DRV3 *Lite* unit in detail, including its accessories, feature set, button usage, powering, and data interfaces.

2.1 Initial Verification

Your DRV3 *Lite* unit is charged, calibrated, and ready to use right out of the box. Upon delivery, visually inspect each item for any damage that may have occurred during shipping.

If you notice any physical damage, please contact CPAT Flex:

- Toll-free from the U.S. and Canada: 1-888-307-2728
- International callers can dial: +1-514-307-2728

If there are no apparent signs of physical damage, turn on the unit by pressing the button for approximately three (3) seconds, and ensure the unit boots up properly.

Check that your package contains all ordered items. If you ordered the DRV3 *Lite* Portable Leakage Detection Meter kit, the following items are included:

- DRV3 *Lite* meter, including its rechargeable battery pack
- Rubber duck antenna for mid-band measurement with SMA connector
- AC adapter

If any of the standard accessories are lost or damaged, you can order a replacement. Please quote the following DRV3 *Lite* part numbers when ordering:

To order, please contact CPAT Flex at + 1-888-307-2728 or + 1-514-307-2728

Part No.	**Accessory Description**
1 110-00005-001	AC adapter
2 008-00006-001	Battery pack
3 111-00031-001	Mid-band rubber duck antenna (SMA connector)
4 150-00033-001	DRV3 *Lite* leakage detection receiver

2.2 DRV3 *Lite* Settings Application

A DRV3 *Lite* Settings Application is available to configure the DRV3 *Lite*. This PC-based software is used to configure several DRV3 *Lite* units with the same operational parameters. You can download the latest version of the DRV3 Settings Application by visiting our website at: https://www.cpatflex.com/en/support/.

In order to use the DRV3 *Lite* Settings Application, you will need to connect the DRV3 *Lite* to your PC via a Micro-B USB to a USB cable or a USB-to-serial cable (cables not provided).

2.3 Features

The DRV3 *Lite* is a dual-band find-and-fix leakage detection meter that offers many features including:

- The device has three functional modes:

1. “Pressure test" mode using the DSG1 *Lite* transmitter with mid-band and LTE band frequency presets of 126 and 612 MHz in Mid and LTE.

2. “System mode” detecting leakage carriers produced from the DSG1 signal generator located at the headend. When operating in "system mode", the DRV3 *Lite* is fully agile from 118-140 MHz (Mid-band tuner) and 600-860 MHz (LTE band tuner).

3. “Spectrum mode” is used for on-the-spot diagnosis by CPAT support team but is also available for normal users. In this mode, the DRV3 *Lite* can work as a simplified spectrum analyzer with a fixed 56KHz span and a configurable center frequency. Both mid-band spectrum and LTE spectrum will be displayed on the screen. The DRV3 *Lite* can also display AM modulations from 3Hz to 110 Hz on the chosen frequencies.

- The user-adjustable frequency is displayed in 1 kHz steps.
- The device has Bluetooth and Micro USB connections.
- The device has a multi-function button.
- Based on CPAT Flex’s leakage monitoring system technology

NOTE
Leakage detection is based on signal tag recognition to differentiate real signal leakage from electrical noise. Monitored frequencies must be tagged in order to detect signal leakage. Please review the documentation on the DSG1 and DSG1 *Lite* modules for more details on carrier tagging.

2.4 Physical Overview

2.4.1 Startup

When you press the on/off button (hold ~3 sec.), the DRV3 *Lite* begins to load its operating software and parameters. During this process, the power light on the top left of the DRV3 *Lite* is orange (when charging battery) or green. The battery indicator light indicates power status as follows:

	Green	Battery fully charged
	Orange	Battery discharged
	Red	Indicates battery pack fault

2.4.2 Multi-Function Button and Display

The DRV3 *Lite* is equipped with a unique front panel multi-function button, which allows you to:

- Power on/off the unit: Press and hold the button for ~3 seconds.
- Toggle audio feedback on/off: Press the button once.
- Toggle the unit's detection modes between "system test" and "pressure test": Press the button twice.
- Display DRV3 number and hardware information (briefly replace the AERO and LTE frequency lines): Press the button three times.
- Set the DRV3 *Lite* in spectrum mode: Press the button four times. While in spectrum mode, press the button once to switch to a new screen displaying AM modulations found on the chosen carriers (only available if the former mode was pressure test or in system test with an AM tag). To exit spectrum mode, press the button once again

Go to the "Setup" section for more details on how to pre-configure the operation parameters.

2.4.3 Power Interface

The DRV3 *Lite* has one circular power pin interface at the bottom of the unit. Connect the AC adapter (supplied by CPAT Flex) to the power interface to recharge the battery and power the DRV3 *Lite*.

2.4.4 Data Interface

The DRV3 *Lite* has two data interfaces: a Micro-B USB connector and an integrated Bluetooth module.

The USB connection is used for firmware upgrades and configuration changes.
The Bluetooth module is a 4.0 BLE version module. It can be used by a third-party application to configure and extract readings from the DRV3 *Lite*.

NOTE
The development of a third-party application must be based on the DRV3 *Lite* Commands Set. Contact CPAT Flex Support for more details.

2.4.5 Antenna Connector

The connector at the top of the unit is designed for the rubber duck mid-band antenna.

NOTE
The LTE antenna is integrated on its own PCB within the DRV3 *Lite* and located just above the LCD display.

2.4.6 Speaker

The DRV3 *Lite* is equipped with a transducer, which emits an audio tone through the front unit openings to provide audio feedback of the RF measurements. Most of the time, the RF levels from both bands will be different. The audio tone will always reflect the highest leakage measurement.

2.4.7 Battery

The DRV3 *Lite* is powered by a 7.2V 2000 mAh lithium-ion battery with a 4-pin connector. The battery pack is partially charged and ready to use when the DRV3 *Lite* is shipped. For more information on charging the battery, see Section 4.5.

3. DRV3 *Lite* Settings Application

The following section describes how to use the DRV3 *Lite* Settings application to configure the DRV3 *Lite* from a computer operating under Windows.

NOTE
This installation of DRV3 *Lite* Settings is required only if operating parameters need to be modified. This can also be performed using the CPAT Mobile application described in Section 4.

3.1 Installing the PC-based DRV3 *Lite* Settings Application

CPAT Flex provides a PC-based settings application to configure the DRV3 *Lite* unit. The software is required to configure your DRV3 *Lite* from your Windows PC. It is also useful to consider the following. You can configure several DRV3 *Lite* units with the same settings.

The DRV3 *Lite* Settings Application can read the settings of a configured DRV3 *Lite* unit and copy these settings to other DRV3 *Lite* units.

NOTE
The DRV3 *Lite* Settings Application is a required system component for any modifications to the DRV3 *Lite* settings. Another option is to use a third-party module, which was developed with the DRV3 *Lite* Commands Set application programming interface (API). This API can be obtained upon written request to a CPAT Flex representative.

The application can be downloaded from the following link:

https://www.cpat-solution.com/CPAT

1. Login into CPAT WEB using your “User” and “Password”.

2. Select “Downloads” from the “Need help" menu.

3. Download the Settings-Application-DRV3 *Lite*.zip file, which contains Settings-Application- DRV3 *Lite*.exe and .xml file with the default configuration of the DRV3 *Lite* device.

4. Unzip the .zip file on your Windows PC. You are now ready to use DRV3 *Lite* Settings Application.

5. To launch the application, simply double-click the executable file named "Settings-Application-DRV3 Lite.exe". The main window will appear.

3.2 Connecting the DRV3 *Lite*

Turn the DRV3 *Lite* on.

1. Connect the DRV3 *Lite* to the PC using a USB cable.

2. The interface on the DRV3 *Lite* is Micro-B USB. To be automatically detected, the Windows 'Device Installation Settings' must be set to 'Yes, do this automatically (recommended)'. This can be set through 'Start menu > right-click on 'My Computer' > select Properties'. In the window, select 'Advanced System settings'; In the advanced settings window, select the 'Hardware' tab; In the hardware section, press the 'Device Installation Settings' button. Windows should automatically detect the DRV3 *Lite* device connected to your computer. The application automatically detects the port to which the DRV3 *Lite* is connected.

3. When you click the "DRV3 *Lite*" button, the application will try to find every DRV3 *Lite* unit connected to the Windows PC, and all found units are put in the drop-down menu beside the "DRV3 *Lite*" button. When several DRV3 *Lite* devices are found, the DRV3 *Lite* Settings Application is connected by default to the first device in the drop-down menu.

4. When a DRV3 *Lite* unit is detected, the name of DRV3 *Lite* unit and the communication port appear beside the “DRV3 *Lite*” button.

5. When a DRV3 *Lite* is connected, the interface automatically displays the main parameters and RF measurements. To refresh this information, click the “Read” button icon.

6. If no DRV3 *Lite* unit is detected, an error icon appears on the button. If the application is trying to detect a DRV3 *Lite* unit, the icon is outlined in grey.

3.3 Reading, Copying, Saving and Recalling Parameters

The following section describes the basic procedures for transferring data to and from the DRV3 *Lite* and for managing the settings files. For detailed information on each parameter, please refer to Sections 3.4. With a DRV3 *Lite* unit turned to “On” and connected to the PC, select the “Read” icon. The current settings are now loaded into the DRV3 *Lite* Settings Application.

You can save these settings to a file, using the “Export” icon, so that they can be copied later to another DRV3 *Lite*, or you can edit them before saving. To use settings from a file, use the “Import” icon, and select the file, which contains the settings to be uploaded in the Application. Once uploaded in the main interface, the settings can be edited prior to being downloaded in the DRV3 *Lite* Unit.

DRV3 *Lite* readings in System mode

DRV3 *Lite* readings in PT (Pressure Test) mode

Lastly, to store the settings in the DRV3 *Lite*, use the “Write” icon.

NOTE 1
The “DRV3 *Lite* firmware management" section, located at the bottom of the interface, provides information on the firmware version used by the DRV3 *Lite*.

NOTE 2
The Application allows configuring settings for the “system mode” only. The "pressure test" mode is factory set and cannot be modified since it needs to match the DSG1 *Lite* fixed operating parameters.

NOTE 3
When pressed, the recycle button will refresh the RF readings.

3.4 DRV3 *Lite*’s Parameters

This section details each configuration parameter.

3.4.1 Backlight

This section describes the backlight functionality:

- OFF: Backlight is always OFF.
- 10s: Backlight will turn ON if the main button is pressed, and then will turn OFF after 10 seconds.
- 30s: Backlight will turn ON if the main button is pressed, and then will turn OFF after 30 seconds.
- 60s: Backlight will turn ON if the main button is pressed, and then will turn OFF after 1 minute.
- ON: Backlight is always ON.

3.4.2 Contrast

This parameter controls the screen contrast on the DRV3 *Lite*'s display. Contrast values vary from 0 (least contrast) to 9 (highest contrast). The default value is set at 5.

3.4.3 Mid-Band Parameters

- These parameters define how the DRV3 *Lite* detects leakage in the Mid band. In most cases, they must match those of the DSG1 signal generator located at the headend. There are four parameters, which can be set using the up/down arrow, or directly entered into the corresponding field:
- Mid: Clicking the Mid icon allows you to toggle it ON/OFF the Mid measurement.
- Frequency: From 118-140 MHz.
- Leak threshold: Minimum leakage detection level in uV/m, from 1 to 200 µV/m. The default value is set at 20 µV/m. When a leak is detected, a sound will be generated from the speaker, if the function is enabled.
- QAM offset: Relative level in dB of the generated DSG1 signal at the HE location compared to the adjacent QAM level. The offset is calculated using the QAM Level Generated level. As an example, if the DSG1 signal is set at -25dBc from the adjacent QAM level measured in a 6 MHz bandwidth, the DRV3 *Lite* QAM offset setting will be set at -25. The QAM offset can be adjusted from -99 to 99 dB. The default value is set at 0 dB.

NOTE 1
At least one band (MID or LTE) must be toggled to the ON position.

NOTE 2
When only one band is in operation, the DRV3 *Lite* RF reading will be recentered in the display for the selected band.

3.4.4 LTE Band Parameters

These parameters define how the DRV3 *Lite* detects leakage in the LTE band. In most cases, the LTE band parameters must match those of the DSG1 signal generator located at the headend. There are four LTE band parameters, which can be set using the up/down arrow or directly entered into the corresponding field.

- LTE: Clicking the LTE icon allows you to toggle it ON/OFF the LTE measurement.
- Frequency: From 600-860 MHz.
- Leak threshold: Minimum leakage detection level in uV/m, from 1 to 200 µV/m. The default value is set at 20 µV/m. When a leak is detected, a sound will be generated from the speaker if the function is enabled.
- The QAM offset is the relative level in dB of the generated DSG1 signal at the headend location compared to the adjacent QAM level. The offset is calculated using the QAM Level ñ Generated level. As an example, if the DSG1 signal is set at -25dBc from the adjacent QAM level measured in a 6 MHz bandwidth, the DRV3 *Lite* QAM offset setting will be set at -25. The QAM offset can be adjusted from -99 to 99 dB. The default value is set at 0 dB.

3.4.5 Tag Mode

In order to use the DRV3 *Lite*'s channel tag detection feature, you must have a channel tagger device, such as the DSG1 or DSG1 *Lite*, which inserts a tag into the specified frequencies carried on the CATV network. Channel tagging is commonly used in areas where more than one cable operator is active, allowing each operator to identify the leaks that are under their responsibility.

In order to allow the DRV3 *Lite* to recognize channel tags, you must configure the DRV3 *Lite* channel tag detection parameters to the same settings used by the headend channel tagger. The DRV3 *Lite* supports AM tag detection with modulation frequencies ranging from 20 Hz to 110 Hz. You can also adjust the detection sensitivity of the channel tag to allow the DRV3 *Lite* to discriminate between channel noise and the tag signal (Sens: from 1 to 99. Recommended value = 21). The DRV3 *Lite* also supports DSB-SC tag detection with modulation frequencies varying from 3500Hz to 7000Hz. Once properly set up, you can enable and disable the channel tag detection feature as needed when working in different areas.

To disable the channel tag detection feature, select the OFF button. If the channel tag detection feature is disabled, the other related fields will be ignored.

To enable the AM channel tag detection feature, select the AM button. Also, set the Sens. and modulation frequency to match the signal generator. The value entered in the Hz numerical box (3-110 Hz).

To enable DSB-SC mode, select the DS button. Also, set the DSB spacing to match the signal generator. The value entered in the Hz numerical box (0-9960 Hz), in 40 Hz steps. In this mode, the Sens value is ignored.

A DRV3 *Lite* can also be configured to detect leaking NTSC video signals in mid-band. To enable this mode, select the VD (Video DSB-SC) button. The LTE band will look for a DSB-SC tag, and the tag can be set like in DSB-SC mode.

When the tag detection feature is enabled and the DRV3 *Lite* detects a leak, the letter 't' appears on the main measurement mode screen. If the measured leak level is greater than the leak threshold, the letter 't' is replaced by the speaker symbol, and the DRV3-*Lite* emits a sound.

3.4.6 Proximity

The proximity setting is used to apply a distance correction factor when detecting leaks. The proximity setting corresponds to the estimated distance between the DRV3 *Lite* and the leakage source, in order to provide a reading equivalent to a 10ft/3m distance. When a proximity setting is used, the DRV3 *Lite* calculates the appropriate gain to provide a normalized reading as if measured at a 10ft/3m distance. Possible distance values are 10ft/3m (default value), 30ft/10m and 80ft/25m.

3.4.7 Sound

Select the sound level by clicking the ON/OFF button:

- OFF: Speaker is disabled.
- ON: Speaker is enabled when a leak is detected.

3.4.8 Mode at Startup

Define the operation mode when the DRV3 *Lite* is started:

- System Mode: uses the parameters defined in the DRV3 *Lite* Settings Application.
- PT ('pressure test') Mode: uses the same parameters as the DSG1 *Lite.*

NOTE
In PT mode, the RF measurements are displayed in reverse contrast (background is black, with white characters), while in system mode, the RF measurements are displayed in normal contrast (background is white with black characters).

NOTE
Rules Governing Sound
In addition to the detection threshold criteria, there are some tag detection rules associated with the DRV3 *Lite*'s audible tone function. If you are using channel tags for specific CATV network identification, the DRV3 *Lite* will take these tags into account before generating a tone when leakage is detected at a given frequency.

Tag Detection	Aero/LTE	Detection Threshold	Tone Generated
Enabled and Tag Detected	Both Active	Reached	Yes, on strongest signal detected (Either Band)
Carrier Only	Both Active	Reached	Yes, on strongest signal detected (Either Band)
Enabled and Tag Detected	Only one band active	Reached	Yes, on signal in active band (other band ignored)
Carrier Only	Only one band active	Reached	Yes, on signal in active band (other band ignored)

3.4.9 Units

Select the unit of measurement you want to use for leakage measurements (µV/m or dBµV/m) by clicking the proper unit button. By default, the DRV3 *Lite* uses µV/m as its unit of measurement.

3.4.10 DRV3 *Lite* Firmware Management

This section shows the current firmware of the MCU and FPGA parts of the DRV3 *Lite*. It also allows to upgrade the firmware using files provided by the CPAT support team.

4. CPAT Mobile Application

The following section describes how to use the CPAT Mobile Application to configure the DRV3 *Lite*.

4.1 Installing CPAT Mobile on your mobile

CPAT Flex provides the CPAT Mobile application for Apple and Android devices. CPAT Mobile is available directly from the App Store (Apple) and Google Play (Android). The following figures show how to find the CPAT Mobile application on an iPhone:

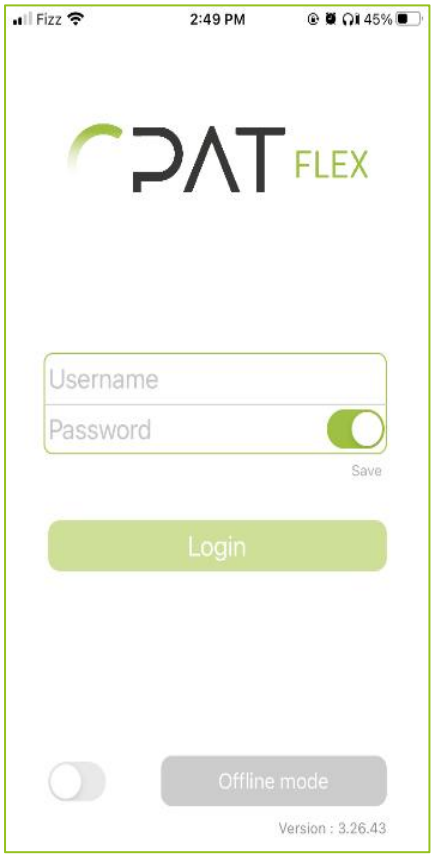
1. Go to the App Store.

2. Search “CPAT mobile” in the App Store.

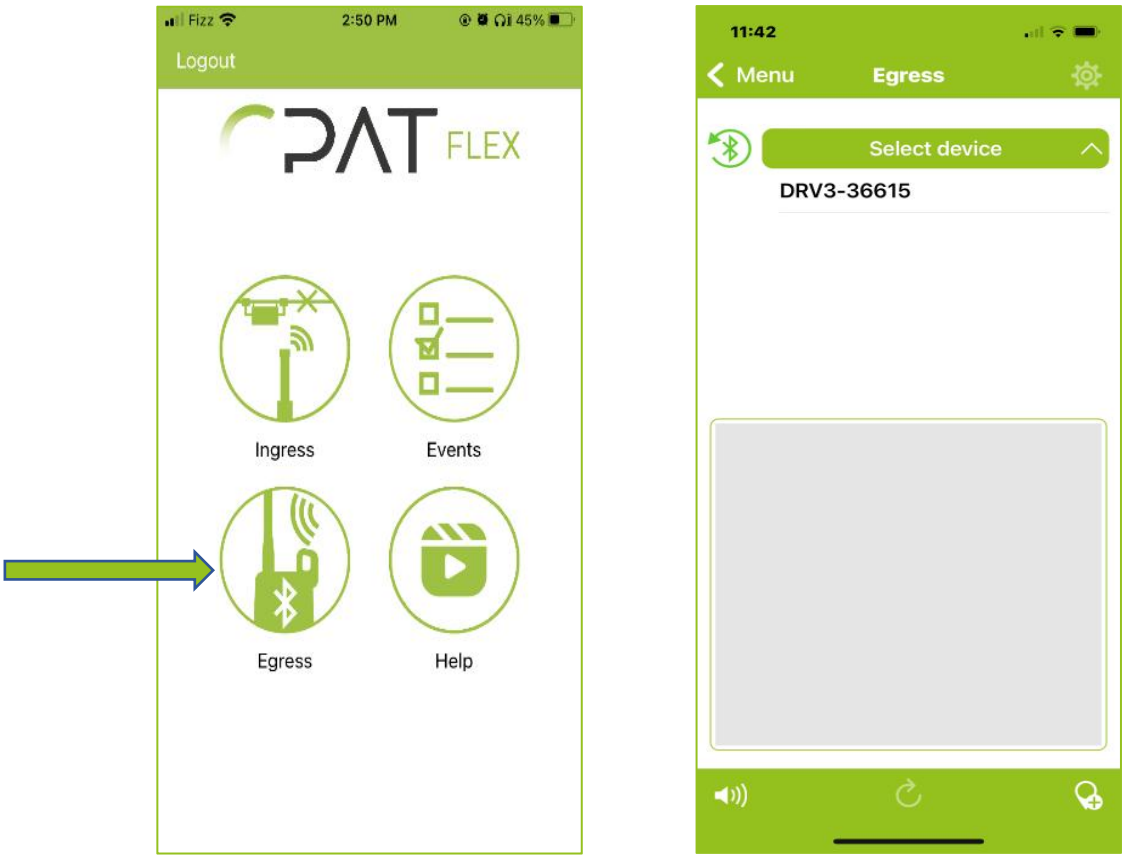
4.2 Connecting the DRV3 *Lite*

1. Turn the DRV3 *Lite* on and the Bluetooth icon appears (see section 5.2).

2. Open the CPAT Mobile application and enter your username and password. There is an offline mode without login.

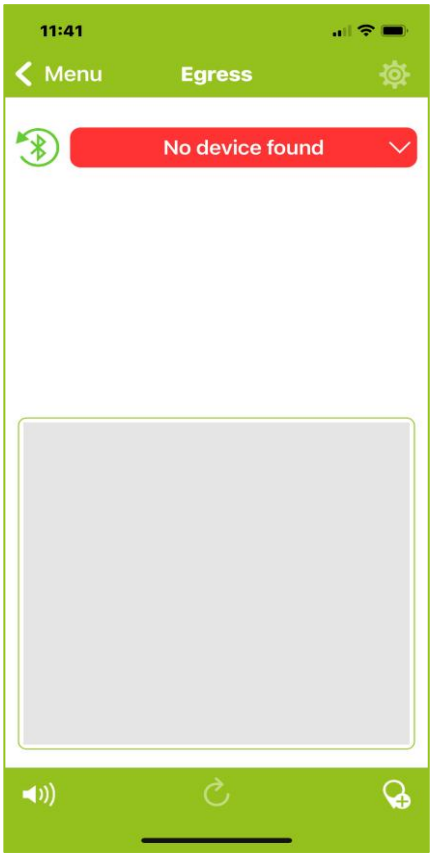


3. Go to “Egress” icon.



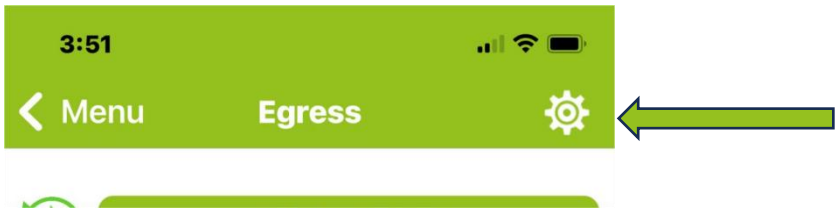
4. Automatically, the application will try to find Bluetooth-ready DRV3 *Lite* around. All found units are listed in the drop-down menu.

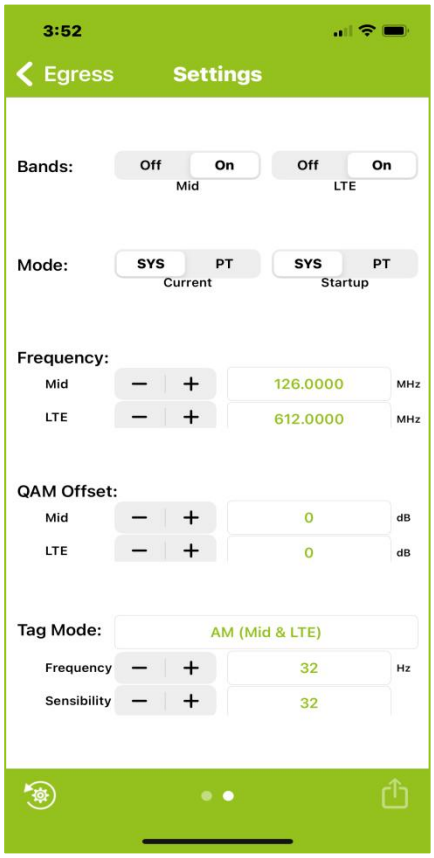
If there is no available DRV3 *Lite*, the application shows a red drop-down menu. Just beside the drop-down menu, press the Bluetooth refresh icon if you want to find Bluetooth-ready DRV3 *Lite* around. If a DRV3 *Lite* is connected to a computer via USB, its Bluetooth port will be disabled. Be sure there is no USB connection on your DRV3 *Lite*.

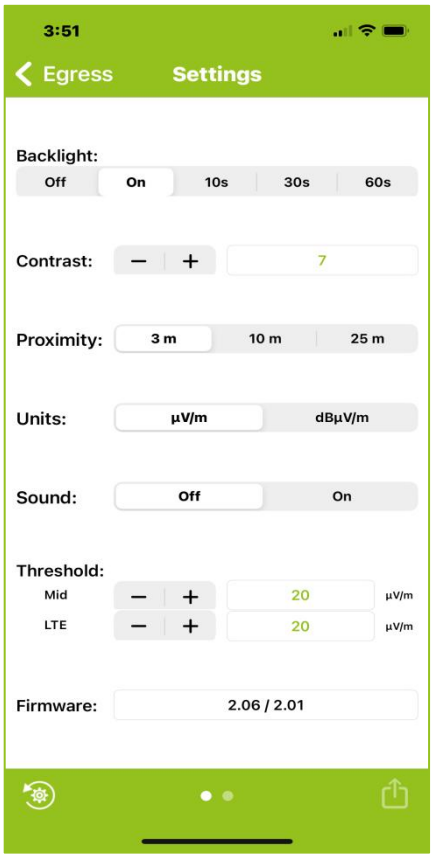


5. Select the DRV3 *Lite* in the drop-down menu. The application will connect to the selected unit and display its measurements. The application's graphic interface colors are different according to the current DRV3 *Lite* mode: System or Pressure Test (PT).

6. Press the top-right icon to access the DRV3 *Lite* Settings. The parameters are similar to those described in the DRV3 *Lite* Settings Application in Section 3.4.







5. Operation and Maintenance

5.1 DRV3 *Lite* Parameters

The DRV3 *Lite* parameters are configured using an external application, such as the DRV3 *Lite* settings, via the USB or Bluetooth connection. The following sections describe how to set up the DRV3 *Lite* parameters.

5.2 Reading the Measurement Mode Screen

DRV3 *Lite* starts up in measurement mode by default. It simultaneously monitors the selected frequencies in the mid-band and the LTE band, unless the DRV3 *Lite* was configured for single-band detection. When the tag detection feature is enabled and the DRV3 *Lite* detects the tag in the monitored frequency, the speaker symbol appears on the screen if the level exceeds the detection threshold. The top portion of the screen displays the following information from left to right.

Volume
Displays if the reference level for audible alert is On or Off when leaks are detected, which exceed the detection threshold criteria.

Button Feedback
Button Feedback is useful to change one function to another. See section 5.4. When the multifunction button is pressed, the volume icon is replaced by a “click” counter button to provide user feedback. If there is a Bluetooth or USB connection, the button is not disabled.

Bluetooth
Displays the status of the Bluetooth connection. When Bluetooth connectivity, the icon appears in black. When there is no Bluetooth connectivity, the Bluetooth icon appears in white with a black background.

USB
USB logo appears at the same location as the Bluetooth logo. It displays the USB connectivity. USB connection takes precedence over Bluetooth connection.

Pressure Test
Displays if the DRV3 *Lite* is in “pressure test" mode. In PT mode, readings are shown in white on a black background.

Battery
Displays the battery charge level. If there is no battery status icon displayed, this indicates that the battery pack is charged. The battery icon is displayed only when the battery level is low, in charge, or defective.

5.3 Mute Volume during Normal Use

In "pressure test" mode, the DRV3 *Lite* emits an audible tone to help locate the leakage source. The tone increases with signal strength. You can enable or disable the audio functionality by pressing the multifunction button once.

5.4 Switching Mode

The DRV3 *Lite* can operate in three modes:

- System mode using the DSG1 signal generator
- “Pressure test” mode using the portable DSG1 Lite signal generator

You can toggle between those modes by pressing the multifunction (on/ off) button twice.

- The third mode is “spectrum mode” for on-the-spectrum analysis. To activate this mode, press the button four times.

5.5 Charging the Battery

The DRV3 *Lite* can operate on battery power for hours when fully charged (see Appendix A.2). To maintain good battery health and ensure extended battery life, you must follow these recommendations for charging the battery.

- Only use the battery pack provided by CPAT Flex.
- Only purchase replacement battery packs sold by CPAT Flex.
- Only use the charger available through CPAT Flex. The DRV3 Lite's status LED will turn green when the battery is fully charged.
- Charge the unit at room temperature (see Appendix A). Do not place the unit in a physical location where temperature extremes occur during charging.

5.6 Replacing the Battery Pack

The rechargeable Li-Ion battery pack is accessible via the DRV3 *Lite*'s rear panel. Battery pack access is not necessary unless the batteries can no longer be recharged.

To change the battery pack:

- Unscrew the Rubber duck (mid-band) antenna from the top of the unit.
- Unscrew the DRV3 Lite nut on the SMA antenna connector located on the top of the unit.
- Unscrew the two DRV3 Lite rear panel screws using a Philips head screwdriver and remove the panel.
- Disconnect the 4-pin mating on the cable between the battery pack and the DRV3 Lite PCB. Replace the defective battery pack with a new battery pack provided by CPAT Flex.
- Plug in the 4-pin connector and place the panel back on the battery compartment. Secure the panel with the screws and place the nut and the Rubber duck antenna back on the antenna connector. In order to avoid damaging the DRV3 Lite's housing, do not overtighten the screws.

CAUTION
Please avoid damaging the LCD cable during reassembly.

5.7 Updating the DRV3 *Lite* Firmware

From time to time, firmware updates may be available for the DRV3 *Lite*. The update will be uploaded using the DRV3 *Lite* Settings Application.

When a new firmware update becomes available, the CPAT Flex support team will plan the firmware upgrade with your internal CPAT manager.

To validate the currently installed version on the DRV3 *Lite*, use the DRV3 *Lite* Settings Application.

5.8 Cleaning

Clean your DRV3 *Lite* unit using a damp cloth. Do not immerse the unit in water. Avoid solvents and commercial cleaners.

Appendix A – Specifications

TECHNICAL	DETAILS
Detector type	Dual-band digital receiver/demodulator
Channel tuning	Configurable via USB port and/or Bluetooth
Frequency range	Agile from 118 to 140 MHz (mid-band)
Frequency range	Agile from 600 to 860 MHz (LTE-band)
Tuning resolution	100 Hz
Level range	2 to 4,000 µV/m @ 3 meters (mid-band) 5 to 4,000 µ/Vm @ 3 meters (LTE-band)
Measurement units	µV/m and dBuV/m
Level accuracy	±1.5 dB (mid-band) ±2.5 dB (LTE-band)
Communication port	USB serial port and Bluetooth
Adjustable audible tone	Yes, varies with leak intensity. Can be muted
System tag	AM modulation 20-110 Hz DSB-SC modulation 3480-7000 Hz Video NTSC (mid-band only)
Level scale display	Single scale from 0 to 4,000 µ/Vm
Operation Time	6 hrs. continuous on battery power
Operating temperature*	-20°C to +40°C (-4°F to +104°C)
Charging temperature*	0°C to 45°C (32°F to 110°C)
Battery charge time	2.25 hrs. for full charge
Storage temperature	-20°C to +45°C (-4°F to +113°C)
Maximum relative humidity	80% for temperatures up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F)
Dimensions	17 cm x 8 cm x 6.7 cm / 6.7” x 3.1” x 1.6” [H x W x D]
Weight	450 g / 16 oz

** Specifications subject to change without prior notice.*

Appendix B. Our Services

CPAT Flex offers a range of services to deploy and support purchased equipment through its Customer Support organization. Customer Support is included with every product sale and comprises business hour technical assistance, in-warranty repair, and calibration.

B.1 Customer Support
Customer Support is available with the sale of every CPAT Flex product. Customer Support services include:

- Product and Service *Lite*rature
- Technical Assistance (Business Hour)
- Equipment Repair (Under Warranty Repair and Calibration Services)
- Equipment Return Authorizations (RA)

Contact a Customer Support representative through your local distributor or by accessing www.cpatflex.com for information on calibration and warranty policies.

B.1.1 Equipment Return Instructions

Please contact your local Customer Support location via telephone for a Return Authorization to accompany your equipment. For each piece of equipment returned for repair, attach a tag that includes the following information:

- Owner's name, address, and telephone number
- The serial number, product type, and model
- Warranty status (If you are unsure of the warranty status of your instrument, contact CPAT Flex's Customer Support.)
- A detailed description of the problem or service requested
- The name and telephone number of the person to contact regarding questions about the repair
- The return authorization (RA) number

If possible, return the equipment using the original shipping container and materials. If the original container is not available, pack the unit carefully to prevent damage during transit. If necessary, suitable packing materials can be obtained by contacting CPAT Flex Support.

CPAT Flex is not responsible for any damage that may occur during shipping. The customer should clearly mark the RA or reference number issued by CPAT Flex on the outside of the package and ship it prepaid and insured to CPAT Flex.

Equipment repaired or replaced under warranty will be returned at CPAT Flex's expense to the Customer (Canada/USA) or CPAT Flex's representative (all other countries).

All other non-warranty repairs will be returned at the customer's expense to the customer (Canada/ USA) or CPAT Flex's representative (all other countries).

B.2 Limited Product Warranty

B.2.1 Hardware

CPAT Flex warrants to the original end user (Customer) that the new CPAT Flex branded products will be free from defects in workmanship and materials, under normal use, for one (1) year from the date of original shipment.

CPAT Flex warrants repaired products for ninety (90) days from date of shipment. Any Product repaired or replaced under warranty is only warranted for the period of time remaining on the original warranty for the Product.

Any third-party products, including software, included with CPAT Flex products are not covered by this CPAT Flex warranty, and CPAT Flex makes no representations or warranties on behalf of such third parties. Any warranty on such products is from the supplier or licensor of the product.

B.2.2 Software

CPAT Flex warrants to the customer that new CPAT Flex branded software and firmware will perform in substantial conformance to program specifications for a period of ninety (90) days from the date of original shipment.

CPAT Flex warrants the media containing software against failure during the warranty period.

CPAT Flex makes no warranty or representation that the operation of the software products will be uninterrupted or error-free, or that all defects in the software products will be corrected.

B.2.3 Exclusions

This warranty excludes:

- Damage to the physical surface of the product, including cracks or scratches to any part.
- Damage caused by misuse, neglect, improper installation or testing, unauthorized attempts to open, repair, or modify the product, or any other cause beyond the intended use.
- Use of the product with any non-recommended device or service if such device or service causes the problem.
- Installation or maintenance of the product by someone other than CPAT Flex or persons certified by CPAT Flex.
- Changes to the customer environment in which the product was installed.
- Damage caused by accidents, fire, power changes, other hazards, or acts of nature.
- Consumable product or parts thereof (e.g., parts with an expected useful life of less than ninety (90) days, such as certain batteries).
- Product not returned following CPAT Flex's RA procedure.

B.2.4 Refurbished Parts and Prior Testing

The product may include reconditioned or refurbished parts or subassemblies and may have undergone testing before being sold.

B.2.5 Exclusive Remedies

If any product materially fails to conform to the limited warranty set forth in this section (Limited Warranty) and actually fails during the applicable warranty period and under normal use, CPAT Flex shall, at its sole discretion, (i) repair or replace the non-conforming product to remedy the nonconformity identified by the customer in accordance with this section (Limited Product Warranty); or (ii) issue a credit to the customer for the amounts paid for the product in exchange for the return of the non-conforming product, in which case the customer's licenses to any firmware shall be automatically revoked. The customer hereby transfers to CPAT Flex title and ownership of any parts that CPAT Flex replaces.

B.2.6 Disclaimer

THE REMEDIES EXPRESSLY PROVIDED IN THIS SECTION WILL BE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES AND SHALL BE IN LIEU OF ANY OTHER RIGHTS OR REMEDIES CUSTOMER MAY HAVE AGAINST CPAT FLEX WITH RESPECT TO ANY NON-CONFORMANCE OF PRODUCTS. EXCEPT AS SPECIFIED IN THIS LIMITED PRODUCT WARRANTY, CPAT FLEX MAKES NO EXPRESS REPRESENTATIONS OR WARRANTIES WITH REGARD TO ANY PRODUCT.

CPAT FLEX DISCLAIMS ALL IMPLIED WARRANTIES, CONDITIONS, AND REPRESENTATIONS INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT, REGARDLESS OF THE LEGAL THEORY ON WHICH SUCH IMPLIED WARRANTY MAY BE BASED, INCLUDING, WITHOUT LIMITATION, CONTRACT, COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

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