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DRV3 Lite User Manual
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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 in this manual:

Symbol | Explanation
--- | ---
! | Direct current.
! | 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 Certifications

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).

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.
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 head-end 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 see any signs of physical damage, please contact Effigis:

- Callers from the U.S. and Canada can dial +1-888-495-6577 (toll-free number)
- International callers can dial +1-514-495-0018

If there are no apparent signs of physical damage, turn on the unit by pressing the button, approximately three (3) seconds, and make sure 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
- User Manual

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:
2.2 DRV3 Lite Settings Application

A DRV3 Lite Settings Application is available in order 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 Web site: http://effigis.com/CPAT-FLEX-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 an USB-to-serial cable (cables not provided).

2.3 Features

The DRV3 Lite is a high-performance dual band find-and-fix leakage detection meter, which offers many features including:

- Three functional modes:
  1. “Pressure test” mode using the DSG1 Lite transmitter with mid-band and LTE band frequency presets (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 screen. The DRV3 Lite can also display AM modulations from 3Hz to 110 Hz on the chosen frequencies.
- User-adjustable frequency displayed in 1 kHz steps
- Bluetooth and Micro USB connections
- Multi-function button
- Based on Effigis’s CPAT Flex leakage monitoring system technology

**NOTE**
Leakage detection is based on signal tag recognition to differentiate real signal leakage from electrical noise. We must ensure that monitored frequencies are tagged in order to detect signal leakage. Please review your documentation on the DSG1 and DSG1 Lite module 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 powering as follows:

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

To order, please contact Effigis at +1-888-495-6577 or +1-514-495-0018
2.4.2 Multi-Function Button and Display

The DRV3 Lite is provided 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 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 Effigis) 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 Effigis 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 over 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 an 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 4-pin connector battery pack. 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

Effigis provides a PC-based settings application to configure the DRV3 Lite unit. This software is required to configure your DRV3 Lite from your Windows PC. It is also useful to configure several DRV3 Lite units with the same settings.

The DRV3 Lite Settings Application can read the setting 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 sent upon written request to an Effigis representative.

The application can be downloaded from the following link:
https://www.cpat-solution.com/CPAT

1. Login into CPAT Web Connection using your “User” and “Password”.
2. Select “Downloads” from the “Need help” button.
3. Download the Settings-Application-DRV3Lite.zip file, which contains Settings-Application-DRV3Lite.exe and .xml files with 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, just double click on the executable file named Settings-Application-DRV3Lite.exe. The main window will appear.

3.2 Connecting the DRV3 Lite

1. Turn the DRV3 Lite on.
2. Connect the DRV3 Lite to the PC using a USB cable. 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 on the ‘Device installation Settings’ button. Windows should automatically detect the DRV3 Lite device connected to your computer. The application automatically detects the port on 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 appears beside the “DRV3 Lite” button:

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.

5. When a DRV3 Lite is connected, the interface automatically displays 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.
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 unit.

**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.

**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 corresponding field:
- **Mid**: Clicking the Mid icon allows you to toggle to 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. 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. 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. 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, 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 corresponding field:

- **LTE**: Clicking the LTE icon allows you to toggle to ON/OFF the LTE measurement.
- **Frequency**: From 600-860 MHz.
- **Leak threshold**: Minimum leakage detection level in µV/m, from 1 to 200 µV/m. 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. Offset is calculated using the QAM_Level Generated level. As an example, if the DSG1 signal is set at -25dB 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. 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, which are under his 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 varying 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 may be needed when working in different areas.

To disable the channel tag detection feature, select the OFF button. The others 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, the DS spacing to match the generator. The value entered in the Hz numerical box (0-9960 Hz), by 40 Hz step. 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 that uses the parameters defined in the DRV3 Lite Settings Application.
• PT ("pressure test"): Mode that uses the same parameters of 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.

<table>
<thead>
<tr>
<th>Tag Detection</th>
<th>Aero/LTE</th>
<th>Detection threshold</th>
<th>Tone Generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled and tag detected</td>
<td>Both active</td>
<td>Reached</td>
<td>Yes, on strongest signal detected (either band)</td>
</tr>
<tr>
<td>Carrier only</td>
<td>Both active</td>
<td>Reached</td>
<td>Yes, on strongest signal detected (either band)</td>
</tr>
<tr>
<td>Enabled and tag detected</td>
<td>Only one band active</td>
<td>Reached</td>
<td>Yes, on signal in active band (other band ignored)</td>
</tr>
<tr>
<td>Carrier only</td>
<td>Only one band active</td>
<td>Reached</td>
<td>Yes, on signal in active band (other band ignored)</td>
</tr>
</tbody>
</table>

### 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 DRV3Lite 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
Effigis provides the CPAT Mobile application for Apple and Android devices. CPAT Mobile is available directly from App Store (Apple) and Google Play (Android). Following figures show how to find the CPAT Mobile application on an iPhone:

1. Go in 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 too.

3. Go in “DRV3 Lite” icon.
4. Automatically, application will try to find Bluetooth ready DRV3 Lite around. All found units are put in the drop-down menu.

If there is no available DRV3 Lite, application shows a red drop-down menu. Just beside the drop-down menu, press on Bluetooth refresh icon if you want to find again Bluetooth ready DRV3 Lite around. If a DRV3 Lite is connected through USB to a computer, its Bluetooth port is disabled. Be sure, there is no USB connection on your DRV3 Lite.
5. Select the DRV3 Lite in the drop-down menu. Application will connect to selected unit and will show its measurements. Application graphic interface colors is different according to current DRV3 Lite mode: System or Pressure Test (PT).

6. Press on top-right icon to access to DRV3 Lite Settings. Parameters are similar to DRV3 Lite Settings Application described at section 3.4.
5. Operation and Maintenance

5.1 DRV3 Lite Parameters
The DRV3 Lite parameters are set 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 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 set up for single band detection. When the tag detection feature is enabled and the DRV3 Lite detects the tag in the frequency it is monitoring, the symbol speaker appears on the screen when the level is superior to detection level.

The top portion of the screen displays the following information from left to right:

**Volume**
Displays if the reference volume level for audible alert is On ( Speaker ) 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, button is disabled.

**Bluetooth**
Displays the status of the Bluetooth connection. When there is 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 than 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 defect.

5.3 Mute Volume during Normal Use
The DRV3 Lite emits an audible tone to help you locate the leakage source. The tone increases with signal strength. You can enable or disable the audio functionality by pressing once on the multifunction button.

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 twice on the multifunction (on/ off) button. The third mode is “spectrum mode” for on-the-spot 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:
1. Only use the battery pack provided by Effigis.
2. Only purchase replacement battery pack sold by Effigis.
3. Only use the charger available through Effigis. The DRV3 Lite's status LED will turn green when the battery is fully charged.
4. Charge the unit at room temperature (see Appendix A.2). 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:
1. Unscrew the Rubberduck (mid-band) antenna from the top of the unit.
2. Unscrew the DRV3 Lite nut on the SMA antenna connector located on the top of the unit.
3. Unscrew the two DRV3 Lite rear panel screws using a Philips head screwdriver and remove the panel.
4. Disconnect the 4-pin mating on the cable between the battery pack and the DRV3 Lite PCB. Replace the defective battery pack by a new battery pack provided by Effigis.
5. Plug in the 4-pin connector and place the panel back on battery compartment. Secure the panel with the screws and place the nut, and the Rubberduck antenna, back on the antenna connector. In order to avoid damaging the DRV3 Lite's housing, do not overtighten the screw.

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 Effigis support team will plan the firmware upgrade with your internal CPAT manager.

To validate which version is currently installed 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

A.1 Technical Specifications

<table>
<thead>
<tr>
<th>Detector type</th>
<th>Dual-band digital receiver/demodulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range</td>
<td>Agile from 118 to 140 MHz (Mid-band)</td>
</tr>
<tr>
<td></td>
<td>Agile from 612 to 860 MHz (LTE-band)</td>
</tr>
<tr>
<td>Channel tuning</td>
<td>Configurable via a USB port and/or Bluetooth</td>
</tr>
<tr>
<td>Tuning resolution</td>
<td>100 Hz</td>
</tr>
<tr>
<td>Level range</td>
<td>2 to 4,000 µV/m @ 3 meters (Mid-band)</td>
</tr>
<tr>
<td></td>
<td>5 to 4,000 µV/m @ 3 meters (LTE-band)</td>
</tr>
<tr>
<td>Level accuracy</td>
<td>± 1.5 dB Mid-Band</td>
</tr>
<tr>
<td></td>
<td>± 2.5 dB LTE-Band</td>
</tr>
<tr>
<td>System tag</td>
<td>AM modulation 20-110 Hz</td>
</tr>
<tr>
<td></td>
<td>DSB-SC modulation 3480-7000 Hz</td>
</tr>
<tr>
<td></td>
<td>Video NTSC (Mid-band only)</td>
</tr>
<tr>
<td>Audible tone</td>
<td>Yes, varies with leak intensity. Can be muted</td>
</tr>
<tr>
<td>RF level scale display</td>
<td>Single scale from 0 to 4,000 µV/m</td>
</tr>
<tr>
<td>Measurement units</td>
<td>µV/m and dBuV/m</td>
</tr>
<tr>
<td>Communication port</td>
<td>USB serial port and Bluetooth</td>
</tr>
</tbody>
</table>

A.2 Electrical and Environmental Specifications

| Power adapter                  | +12VDC 1.2A max                        |
| Battery                        | Pack of 2 rechargeable 7.2VDC lithium-ion batteries of 2000 mAh – 0.3A |
| Operation time                 | 6 hrs. continuous on battery power     |
| Operating temperature*         | -20°C to +40°C (-4°F to +104°F)        |
| Storage temperature            | -20°C to +45°C (-4°F to +113°F)        |
| Charging temperature*          | 0°C to 45°C / 32° to 110° F           |
| Maximum relative humidity      | 80% for temperature up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F) |
| Typical charge time (full charge) | 2.25 hrs.                              |
A.3 Physical Specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>17 cm x 8 cm x 4 cm / 6.7” x 3.1” x 1.6” [H X W X D], without the mid-band antenna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>16 oz / 450 g</td>
</tr>
</tbody>
</table>

* Specifications subject to change without prior notice.

Appendix B – Our Services

Effigis offers a portfolio of services to deploy and support purchased equipment through its Customer Support organization. Customer Support is standard with every product sale and consists of a phone technical support during business hours, repair and calibration center.

B.1 Customer Support

Customer Support is available with the sale of every Effigis product. Customer Support services include:

- Product and Service Literature
- Technical Assistance (business hours)
- Equipment Repair (Under Warranty Repair and Calibration Services)
- Equipment Return Authorizations

Contact a Customer Support representative through your local distributor or by accessing the effigis.com Web site for information on calibration and warranty policies.

B.1.1 Equipment Return Instructions

Please contact your local Customer Support location via telephone for 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
- Serial number, product type and model
- Warranty status (if you are unsure of the warranty status of your instrument, contact Effigis’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, the unit should be carefully packed so that it will not be damaged in transit; when needed, appropriate packing materials can be obtained by contacting Effigis’s Customer Support. Effigis is not liable for any damage that may occur during shipping. The customer should clearly mark the Effigis’s issued RA or reference number on the outside of the package and ship it prepaid and insured to Effigis.

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

All other non-warranty repairs will be returned at Customer’s expense to Customer (Canada/USA) or Effigis’s representative (all other countries).

B.2 Limited Product Warranty

B.2.1 Hardware

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

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

Any third party products, including software, included with Effigis products are not covered by this Effigis warranty, and Effigis 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

Effigis warrants to the Customer that new Effigis 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. Effigis warrants the media containing software against failure during the warranty period.

Effigis 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 range of 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 Product by someone other than Effigis or persons certified by Effigis.
- Changes to the Customer environment in which Product was installed.
- Damage caused by accident, 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 in accordance with Effigis’s RA procedure.

B.2.4 Refurbished Parts and Prior Testing

The Product may incorporate reconditioned or refurbished parts or subassemblies and may have been used in testing prior to sale.

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, Effigis shall, at its sole discretion, (i) repair or replace the non-conforming Product to remedy the non-conformity identified by 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 return of the non-conforming Product, in which case the Customer’s licences to any firmware shall be automatically revoked. The Customer hereby transfers to Effigis title and ownership of any parts that Effigis replaces.

B.2.6 Disclaimer

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

EFFIGIS 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, BUT WITHOUT LIMITATION, CONTRACT, COURSE OF DEALING, USAGE, OR TRADE PRACTICE.