Technical Publications

VeriFinder™

Operator Manual

symetrica

Discovery Technology ®

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SECTION 1 GENERAL

1.1 Acronyms and Abbreviations

Acronym / Abbreviation	Definition / Description
AC	Alternating Current
APN	Access Point Name
BIT	Built in Test
CCID	Chip/Smart Card Interface Device
c/s	Counts per Second
DU	Depleted Uranium
FWHM	Full-Width Half Maximum.
GLONASS	Global Navigation Satellite System
GPS	Global Positioning System
HEU	Highly Enriched Uranium
HTML	Hypertext Markup Language
ID	Identification
IP	Internet Protocol
LED	Light Emitting Diode
NORM	Naturally- Occurring Radioactive Materials. Radioactive materials (minerals and raw materials) containing radionuclides of a natural origin.
Non-NORM	Non-Naturally Occurring Radioactive Materials. Radioactive materials that have increased concentrations of radionuclides due to human intervention.

Acronym / Abbreviation	Definition / Description
n/s	Neutrons per Second
PDF	Portable Document Format
RDD	Radiological Dispersal Devices
RGPu	Reactor Grade Plutonium
RIID	Radio Isotope Identification Device
RN	Radionuclide – (radioactive nuclide, radioisotope or radioactive isotope). An atom that has excess nuclear energy making it unstable, which often results in the emission of neutron or gamma ionizing radiation.
RNDIS	Remote Network Driver Interface Specification
SIM	Subscriber Identity Module
SNM	Special Nuclear Materials
SSH	Secure Shell
TLS	Transport Layer Security
UI	User Interface
USB	Universal Serial Bus
WGPu	Weapons Grade Plutonium
Wi-Fi	Wireless Fidelity
WMI	Web Management Interface

1.2 Contacting Symetrica

Contact Method	UK Office	USA Office
Address	**Symetrica Security Limited** Roman House 39 Botley Road North Baddesley Southampton SO52 9AE United Kingdom	**Symetrica Inc** 4 Lyberty Way Suite A Westford MA 01886 United States of America
Telephone	+44 2380 111 580	+1 (508) 718-5610
Fax	+44 2380 111 581	+1 (978) 897-9900
Email / Website	info@symetrica.com / www.symetrica.com	

1.3 Warnings, Cautions and Notes

WARNING

Any operating procedure, practice, or condition which, if not strictly complied with, may result in personal injury or loss of life.

CAUTION

Any operating procedure, practice, or condition which, if not strictly complied with, may result in damage to the system or equipment.

Note

Any operating procedure, practice, or condition that requires emphasis.

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SECTION 2 SYSTEM OVERVIEW

2.1 What is VeriFinder?

VeriFinder is the latest hand-held Radio Isotope Identification Device (RIID) from Symetrica, built with Discovery Technology®, the market leading technology for scintillator-based detector systems.

VeriFinder has been designed for ease of use, offering an intuitive interface for simple operator / user interaction.

The system can be managed as a standalone unit or can be managed from a web based user interface (refer to page 129 – Using the Web Management Interface).

2.2 System Overview

VeriFinder is designed to:

- Detect nuclear materials.
- Rapidly and reliably discriminate between Innocent and Threat sources such as Special Nuclear Materials (SNM) and Radiological Dispersal Devices (RDD), as described in ANSI N42.34.
- Locate and identify potentially dangerous nuclear radiological materials in unsuspected locations.

Example operational environments include:

- Emergency responders and force protection (Hazmat or Defence response teams).
- Searching for radiological and nuclear material at ports of entry and checkpoints during Custom and Border Protection operations.
- Line-up screening of specific objects identified by other means, such as: primary detectors or intelligence information.
- Screening of people, cars, trucks, containers, railcars, and other conveyances.
- Scanning wide areas such as accident scenes, special events, buildings, ships, public/open areas, container/yard checkpoint areas, piers, aircraft, and so on.

Verifinder can store up to 500 events, which are over written on a first in, first out basis. ~20 GB of storage space is allocated for these events.

Note: VeriFinder functions exceptionally well in the operational environments described above, however it has not been tested in an explosive environment.

2.2.1 Main Features

VeriFinder typically operates for up to 8-10 hours on a fully charged Li-Ion battery at 25°C (ambient), and for 7 hours at -20°C (ambient).

The display is a high-contrast, high-resolution LCD that displays color-coded backgrounds and messages that provide all relevant data for the operator.

Figure 1: VeriFinder Main Features

Item	Description
1	Light sensor for automatic brightness adjustment
2	640 x 480 3.7" LCD display screen
3	Gamma detector
4	3-button keypad
5	Neutron detector
6	Power connection (behind a protective cover)
7	Headphone connection (behind a protective cover)

Item	Description
8	USB port (mini-B) (behind a protective cover)
9	LED indicators
10	Speaker for audio alerts and microphone
11	Battery and 3G SIM access (bottom of VeriFinder)

2.2.2 Display Screen

The display is a high-resolution LCD display with an auto-dimming backlight. The backlight can also be adjusted manually. The landscape display has a resolution of 640 pixels wide by 480 pixels high, which contains a User Interface (UI) that is split into seven main areas.

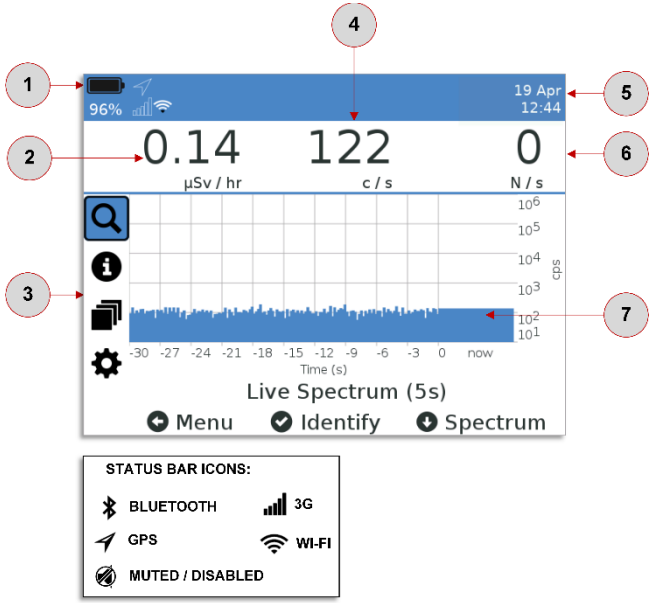


Figure 2: VeriFinder UI

Item	Display Area	Description
1	Battery / Power indicator	Percentage power remaining
2	Dose Rate	µSv/h or mrem/h

Item	Display Area	Description
3	Menu Bar	Menu options: Detection Mode (see page 45 - Detection Modes) Information Menu (see page 53 - System Status) Event Viewer (see page 62 - Event Viewer) Settings (see page 66 - Settings) The menu bar will pop up when pressing the back arrow. It will disappear once an option is selected, or the back arrow is pressed to enter the locate mode.
4	Gamma rate	c/s (counts per second)
5	Status bar	Shows status of the connectivity, the battery and time. This bar also indicates any alarms or alerts. The color will change for detection alarms (gamma - yellow, neutron - red) and system warnings (amber, non-critical faults - grey) and remain changed until the condition is removed.
6	Neutron Rate	n/s (neutrons per second)
7	Gamma history	Provides a historical graph of count rate to assist in locating hot spots. This window shows screens corresponding to the selected menu option and shows warnings that need to be acknowledged with instructions.

2.2.3 Status Bar Icons

Status bar icons that may be visible are summarized as follows:

Icon	Description
	Bluetooth: ▪ Black - enabled and connected ▪ White - enabled
	Muted / Disabled: ▪ Audio has been set to mute and / or tactile indicator has been disabled. ▪ No icon - indicates audio and tactile indicator are on.
	Cellular (3G): ▪ Black - indicates the signal strength from cellular network ▪ White - indicates the maximum number of signal strength indicator bars
	GPS: ▪ Black - enabled and GPS lock achieved ▪ White - enabled and waiting for GPS lock
	Wi-Fi Signal strength: ▪ Black - indicates the signal strength from Wi-Fi network ▪ White - indicates the maximum number of signal strength indicator bars ▪ No icon - indicates Wi-Fi is off or the VeriFinder is not connected to a Wi-Fi network now.

2.2.4 Menu Overview

The menu options are displayed as icons on the left side of the UI.

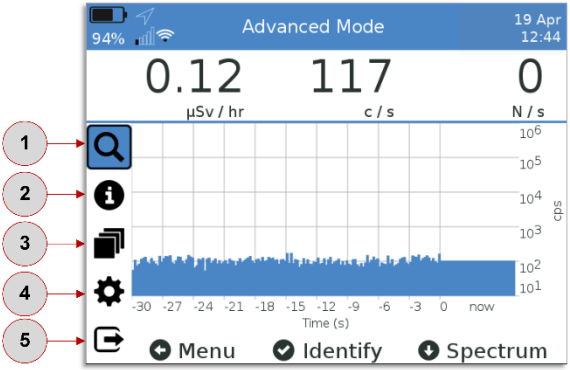


Figure 3: VeriFinder Menu Overview

Item	Title	Description
1	Operating mode	Operating mode selectable by the user: ▪ Locate. ▪ Spectrum. ▪ Dose.
2	System status	Used to view key device information. Useful to confirm correct device operation.
3	Event viewer	Used to: ▪ View all recent events. ▪ View all archived events (that is, those that have been manually downloaded). ▪ Specify which event you wish to view.
4	Settings	View and change device settings.

Item	Title	Description
5	Exit Advanced mode	Select this to exit Advanced mode. **Note:** This icon only shows when Advanced Mode has been entered (refer to page 81 – Advanced Mode Login).

2.3 Keypad Operation

Control of the VeriFinder User Interface is through the 3-button keypad.

Figure 4: VeriFinder 3-Button Keyboard

Each button has two functions:

- Primary function – Push and release.
- Secondary function – Push and hold for three seconds.

Functions are summarized as follows:

Button	Primary Function	Secondary Function
Select/Power ✔	Press and release to: ▪ Initiate Identification from locate mode. ▪ Select highlighted menu option. ▪ Acknowledge alarms and warnings.	Press and hold to: ▪ Power On / Shutdown

Button	Primary Function	Secondary Function
Back	Press and release to: ▪ Move focus from locate window to main (icon) menu. ▪ Scroll up through tables or menu options. ▪ When the main menu is in view, press to enter locate mode.	Press and hold to: ▪ Mute/unmute Speaker and enable/disable Tactile Indicator. **Note:** On selection, the system cycles through in a loop as follows: Speaker on, Tactile Indicator on, Speaker on, Tactile Indicator off, Speaker off, Tactile Indicator off. Advanced mode only: ▪ Speaker off, Tactile Indicator off.
Down	Press and release to: ▪ Select the next menu option. ▪ Scroll down through tables or menu options. ▪ Adjust integer value inputs or levels on applicable screens.	Press and hold to: ▪ Open Tutorial mode for basic help on the system.

2.4 Connection Points

The connection points for VeriFinder are located behind the protective cover on the rear of the unit.

Figure 5: VeriFinder Connection Points

Item	Description
1	Mini-B USB 2.0 port for communication
2	3.5 mm headphone connection
3	Power connection
4	LED indicators

2.5 Audio Indicator

The alert and alarm audio indicators are emitted from a speaker, which is located to the left of the keypad.

The beeper source can be switched on or off as required (refer to page 83 - Adjust Alarm Thresholds).

Event	Pitch	Audio Sequence
Fault	High	1 beep per second
Gamma detection	High	1 beep per second
Neutron detection	High	2 beeps per second
Personal hazard	Low/high/low	3 beeps (low, high, low pattern) per second

2.6 Tactile Indicator

The vibrating tactile indicator automatically switches on when an alert or alarm occurs and remains on until the alarm is acknowledged. The different vibration frequency patterns for each type of alert or alarm type are shown below.

The tactile indicator can be switched on or off as required (refer to page 83 - Adjust Alarm Thresholds).

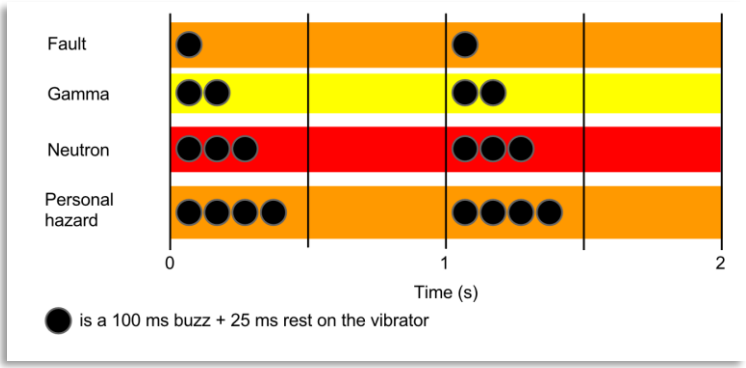


Figure 6: Tactile Indicator Vibration Frequency Patterns

2.7 Stabilization Module

The stabilization module is a tamper-proof, smart calibration device internal to the instrument, which maintains a constant calibration of the gamma detector. It uses a triple encapsulated Na-22 source with a maximum activity of 1000 Bq.

2.8 LED Indicators

Three LEDs (red, green, and amber) are used to indicate alert and alarm states. The LEDs are located on the end panel and are marked with a warning symbol for the amber LED, trefoil for red, and shield for green.

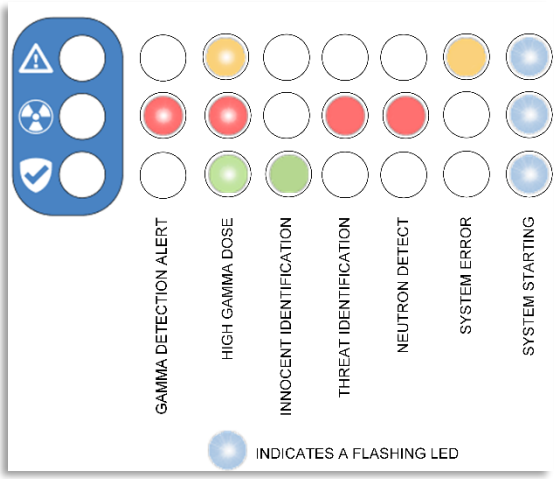


Figure 7: LED Indicator States

Alert / Alarm Condition	LED State
Gamma Detection Alert	Red on or Red Flashing
High Gamma Dose	All Flashing
Innocent Identification	Green On
Threat Identification	Red On
Neutron Detect	Red On
System Error	Amber On
System Starting	All Three Flashing
System Shutdown	All Three Flashing

2.9 Data Transfer to PC

VeriFinder has several methods of connecting to a PC to transfer data.

2.9.1 Wired Communications

Transfers data to a PC through the provided Mini-B USB to USB cable or via the (optional) Mini-B USB to RJ-45 adaptor and an Ethernet cable. It is also possible to transfer selected events onto a removeable media drive via the Mini-B USB to USB adaptor if required.

2.9.2 Wi-Fi Communications

Uses the Wi-Fi IEEE 802.11g standard, to upload data to a personal computer for the storing of historical data. Can also connect to b/g/n Wi-Fi networks. **Note:** VeriFinder will only connect to authorized networks, that is, networks with a saved security key.

2.9.3 Cellular Communications

Transfers data through a cellular network if a compatible SIM card is installed. For more information on installing a SIM card, refer to page 34 - Installing and Removing a SIM Card.

2.9.4 Bluetooth Communications

Enables connection to an Android device for access to the VeriFinder's Web Management Interface (WMI). Refer to page 123 - The VeriFinder Web Interface.

2.10 Battery

The VeriFinder uses a Lithium Ion rechargeable battery with built-in protection and a typical operational capacity of up to 8 - 10 hours. The battery is easily replaced without the use of tools.

WARNING - THE VERIFINDER MUST BE USED WITH THE BATTERY SUPPLIED BY SYMETRICA (PART NUMBER 172-0002-A) OR PURCHASED FROM INSPIRED ENERGY (PART NUMBER NB2037HD34).

2.10.1 Battery Disposal

Refer to local regulations for requirements on battery disposal, as regulations vary between different countries.

2.10.2 Battery Storage

The battery must be stored in an environment with low humidity, free from corrosive gas, at a recommended temperature of 21 °C (70 °F) and a minimum allowable storage temperature of -20 °C (-4 °F) and maximum allowable storage temperature of 60°C (140 °F).

Extended exposure to temperatures above 45 °C (113 °F) will degrade battery performance and life.

2.10.3 Battery Charging Restriction

Battery charging is inhibited at temperatures at or above 45 °C (113 °F).

2.10.4 General Battery Handling Precautions

- Do not immerse in water.
- Do not disassemble or deform the battery.
- Do not dispose of the battery in or expose the battery to fire.
- Avoid excessive physical shock or vibration.
- Never use a battery that appears to have been damaged.

2.10.5 Water Ingress

The battery chamber is IP65 sealed to prevent any residual water ingress, however, if the VeriFinder is fully submerged in water, then it is possible that water ingress into the battery chamber occurs, which can cause the battery to short.

In this scenario, corrective action is to ensure the unit is fully dried out in a powered off state with the battery door open and battery removed in a well-ventilated area until dry.

Note: For safety, the battery has internal shorting protection to prevent a conductive path to the operator. If the battery has been submerged in water, it should be discarded in line with local guidelines. Ensure the unit is fully dried out before inserting a new battery and powering the device on.

2.11 External Battery Charger

Although a single battery can be charged within the VeriFinder, the external charger allows you to also charge a battery through an AC mains supply. Included with the charger is the AC adapter. Each battery requires approximately 2.5 hours to fully recharge. Refer to page 32 - Charging the Battery in the Charger.

2.11.1 Cleaning the Battery Charger

Use an alcohol wipe to clean the battery charger. Alternatively, use a cloth dampened with a mild detergent mixed with water.

2.11.2 Storing the Battery Charger

The battery charger must be stored in temperatures between -20 °C to +70 °C (-4 °F to 158 °F).

2.12 AA Battery Caddy

VeriFinder offers (optional) support for using AA batteries (1.5V nominal) in place of the rechargeable Lithium-Ion battery.

An AA Battery Caddy (holding four AA cells) is available for use and fits into the normal battery compartment on the bottom of the unit. The caddy replaces the normal rechargeable battery.

When AA batteries are inserted into the caddy, the red LED is illuminated to indicate battery presence.

Figure 8: AA Battery Caddy

2.12.1 AA Battery Handling Precautions

AA batteries will provide reliable and safe service when used correctly. In addition to the safety precautions detailed on page 27 - General Battery Handling Precautions, the following precautions should also be observed:

- Always make sure you fit batteries correctly, observing the 'plus' and 'minus' signs on the battery and appliance.
- Always replace batteries in your VeriFinder battery caddy with AA size batteries.
- Always use Alkaline or primary Lithium batteries.
- Never mix different types of batteries.
- Always remove dead batteries from equipment.
- Always replace the whole set of batteries at one time.
- Always remove batteries from equipment prior to storage.
- Always follow the battery manufacturer's safety instructions.

WARNING - PRECAUTIONS FOR STORAGE AND CHARGING - ENSURE ALL THE BATTERY MANUFACTURER'S INSTRUCTIONS ARE ADHERED TO.

2.12.2 VeriFinder Performance for Different Battery Types

VeriFinder is compatible with all alkaline and primary cell lithium battery types. The following brands and models have been tested. **Note:** Results may vary if other brands are used.

Manufacturer	Chemistry	Run Time (Approx)
Duracell, MN1500	Alkaline-Manganese Dioxide	1 hour 30 minutes
Energizer, L91	Lithium / Iron Disulfide	4 hours 15 minutes

Manufacturer	Chemistry	Run Time (Approx)
Inspired Energy, NB2037	Lithium-ion rechargeable	8 to 10 hours

When using the AA Battery caddy, the screen brightness is reduced. An icon is displayed to indicate that the unit is operating on AA batteries.

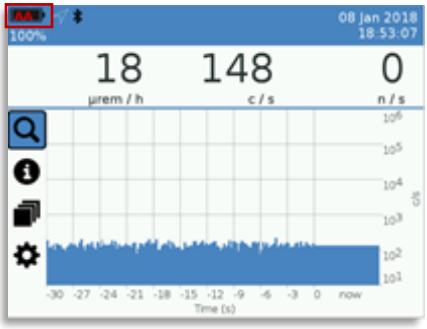


Figure 9: AA Battery Icon

2.12.3 Depleted AA Batteries

If VeriFinder is running on AA batteries and the low battery warning is shown, the unit should be powered off and the batteries replaced.

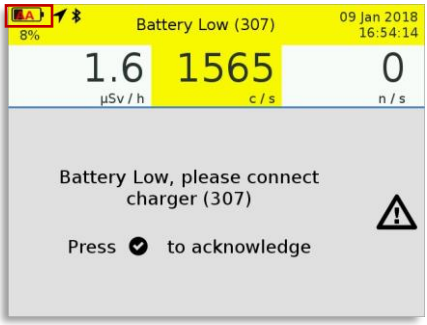


Figure 10: Low Battery Warning

2.13 Battery Removal and Replacement

This section applies to both the rechargeable Li-ion battery and the AA battery caddy.

CAUTION – LOSS OF DATA - Turn the VeriFinder off before removing the battery. Failure to do so could result in loss of data.

2.13.1 Removing the Battery

1. Open the battery compartment by rotating the latch counter clockwise on the underside of the unit.

Figure 11: Location of Battery Latch

2. Lift the battery cover to expose the battery.

Figure 12: Location of Battery Cover

3. Remove the battery from the battery compartment. Be careful not to let the battery drop out of the unit (see below Li-ion Battery (left); AA Battery Caddy (right)).

Figure 13: Removing Batteries

4. If using the AA Battery Caddy, remove all AA batteries from the caddy.

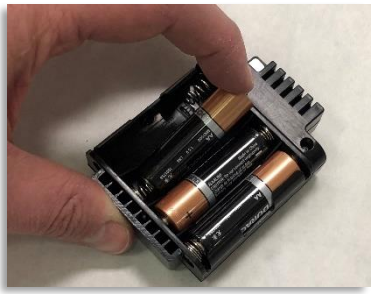


Figure 14: AA Battery Removal (Caddy)

2.13.2 Inserting the Li-Ion Rechargeable Battery

1. Insert the battery into the battery compartment so that its connectors align with the connectors inside the battery compartment.

Figure 15: Inserting and Aligning the Li-Ion Battery

2. Close the battery cover and secure it with the latch.

Figure 16: Securing the Battery Compartment Latch

3. Turn the latch clockwise and put it against the magnetic strip so that it rests flush with the underside of the VeriFinder.

Figure 17: Positioning the Battery Compartment Latch

2.13.3 Inserting the AA Battery Caddy

1. Install four new AA batteries into the Battery Caddy – make sure the polarity is correct by observing the markings in the caddy.
2. Insert the Battery Caddy into the battery compartment so that its connectors align with the connectors inside the battery compartment.
3. Close the battery compartment.
4. Turn the latch clockwise and put it against the magnetic strip so that it rests flush with the underside of the VeriFinder.

Figure 18: Installing the AA Battery Caddy

2.13.4 Charging the Battery in the Charger

Note: Charging applies only to the Li-ion rechargeable battery. It is not possible to charge batteries installed in the AA Battery Caddy; do not attempt to insert the AA Battery Caddy into the charger.

The external charger requires approximately 2.5 hours to fully charge each battery when connected to the AC mains.

To charge the battery in the charger:

1. Connect the cable from the AC mains adapter into the rear of the charger.

2. Connect the other end of the cable into the AC mains supply.
3. Insert the battery into the charger ensuring contact with the connectors in the charger.

Figure 19: Inserting the Battery into the Charger

4. The battery will start charging immediately. The battery charge indicators at the top of the battery show the level of charge (each of the five indicator bars represents 20% of charge).
5. When the battery is fully charged, remove it from the charger.

2.13.5 Low Battery Warning

The System Fault Low Battery warning is generated when the battery capacity falls below the low capacity threshold (5%). The low battery warning threshold can be changed to a different value (refer to page 87 - Low Battery Warning Threshold).

Note: A drained battery is also indicated by the 3 red LEDs on the boot of the device continually flashing. Batteries are not hot swappable.

1. Press the Select ✔ button to acknowledge the alarm.

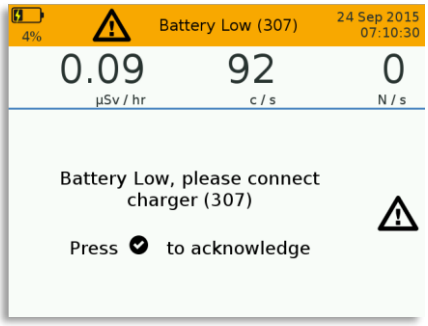


Figure 20: Battery Low Warning

2. The VeriFinder returns to the operation it was performing before the alarm.
3. Recharge the battery in the VeriFinder or replace it with a fully charged battery.

2.13.6 Attempted Power on with Drained Batteries

Attempting to power on VeriFinder using drained batteries (AA Battery Caddy or standard Lithium Ion), results in the rear LEDs flashing red six times indicating no power.

2.14 Connecting VeriFinder to AC Power

Connecting VeriFinder to the AC power supply, recharges the battery without having to power down or remove the battery from its compartment.

1. Insert the power connector into the receptacle (1).
2. Plug the electric outlet into the wall.
3. Once the battery is fully charged remove the connector and unplug from the wall.

Figure 21: Location of the Power Receptacle

2.15 Installing and Removing a SIM Card

VeriFinder has a SIM card tray located under the battery. If a SIM card is installed, VeriFinder can connect to a cellular network.

To install or remove a SIM card:

1. Make sure the VeriFinder is powered off.
2. Remove the battery (refer to page 30 - Removing the Battery) to access the SIM card tray.
3. Remove the SIM compartment cover to see the SIM card tray. For ease, a space is provided so you can pry open the SIM compartment cover using either your finger nail or small slotted screwdriver.

Figure 22: Removing the SIM Compartment Cover

4. With your finger nail, carefully slide down and lift up the SIM card tray cover.

Figure 23: Opening the SIM Card Tray Cover

5. Remove the SIM card, or if installing a SIM card, ensure connection with the SIM card connectors.
6. Close the SIM card tray cover, slide to lock, and install the SIM compartment cover.

Figure 24: Installing the SIM Compartment Cover

7. Reinstall the battery. (Refer to page 31 - Inserting the Li-Ion Rechargeable Battery).

2.16 Transportation of the VeriFinder

Always place VeriFinder in its protective Ruggedized Transit Case whenever transporting it to a different location. The case is designed to securely hold VeriFinder and all its ancillaries (refer to page 41 – VeriFinder Kit Contents).

2.17 Technical Specifications

Specification	Value
Input voltage	12 VDC
Operation time of batteries	Approximately 8 to 10 hours
Dimensions (L x H x W)	28.98 cm x 13.05 cm x 13.72 cm (11.41” x 5.15” x 5.40”)
Water and dust ingress	IP65
Weight	1.99 kg (4.4 lb)
Environmental: Temperature Relative Humidity	 -20 °C (-4 °F) to 50 °C (122 °F) Up to 93% relative humidity, non-condensing at 35 °C (95 °F).
Altitude	For use below 2000 meters
Gamma detector	1.5” x 1.5” NaI or $LaBr_3$
Neutron detector	^{6}Li:ZnS (^{3}He-free)
Energy range	25 keV to 3 MeV
Start-up duration including stabilization	75 seconds
Calibration and stabilization	Automatic and continuous
Drop	1 meter
Communications	Mini-B USB 2.0, USB 2.0 (via adaptor), Cellular (2/3G), Bluetooth, GPS, WiFi, Ethernet (via USB, optional), removable media (via USB)

2.18 Detectable Isotopes

Appendix 1 - Isotope Library, lists the standard detectable Isotopes programmed into the VeriFinder.

Although not explicitly list in the Isotope Library, VeriFinder provides the capability to identify isotopes associated with the following materials:

- DU – Depleted Uranium
- HEU – Highly Enriched Uranium
- WGPu – Weapons Grade Plutonium
- RGPu .- Reactor Grade Plutonium

The isotopes associated with the materials are:

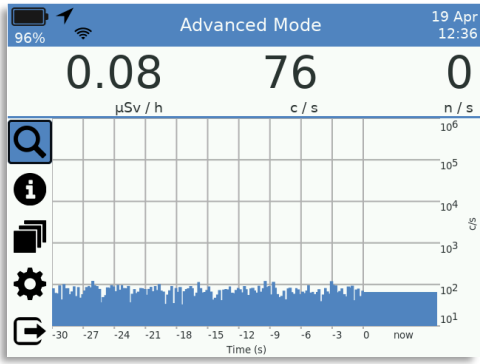
- DU = U-238
- HEU = U-235
- WGPu = Pu-239
- RGPu = Pu-239/Pu-241

Functionality is provided for the Advanced user to change display names of isotopes in the library to suit needs for identifying materials (refer to page 137 – Isotope Library)

2.19 Operational Modes

VeriFinder has two operational modes – Normal and Advanced.

Mode	Description
Normal	Basic operation functions including event viewing, reach-back, common user settings like brightness and volume, and activating / deactivating alert indicators like audio and visual feedback outside of the display. For more information regarding the procedures performed in Basic and Normal modes, refer to page 43 - Normal Mode of Operation.

Mode	Description
Advanced	Adds additional capabilities, including spectrum view with a manual acquisition feature, threshold adjustments, advanced settings. Advanced mode can control the parameters that can affect the result of a measurement (for example, radionuclide library, routine function control, calibration parameters, alarm thresholds). An exit icon provides a shortcut to exit the Advanced mode and return to the normal mode.  For more information regarding the procedures performed in Advanced mode, refer to page 81 - Advanced Mode of Operation.

2.20 Menu Tree

The VeriFinder UI has a navigable menu tree structure for Normal and Advanced modes.

Menu tree structures are navigated using the 3-keypad buttons as described on page 21 - Keypad Operation.

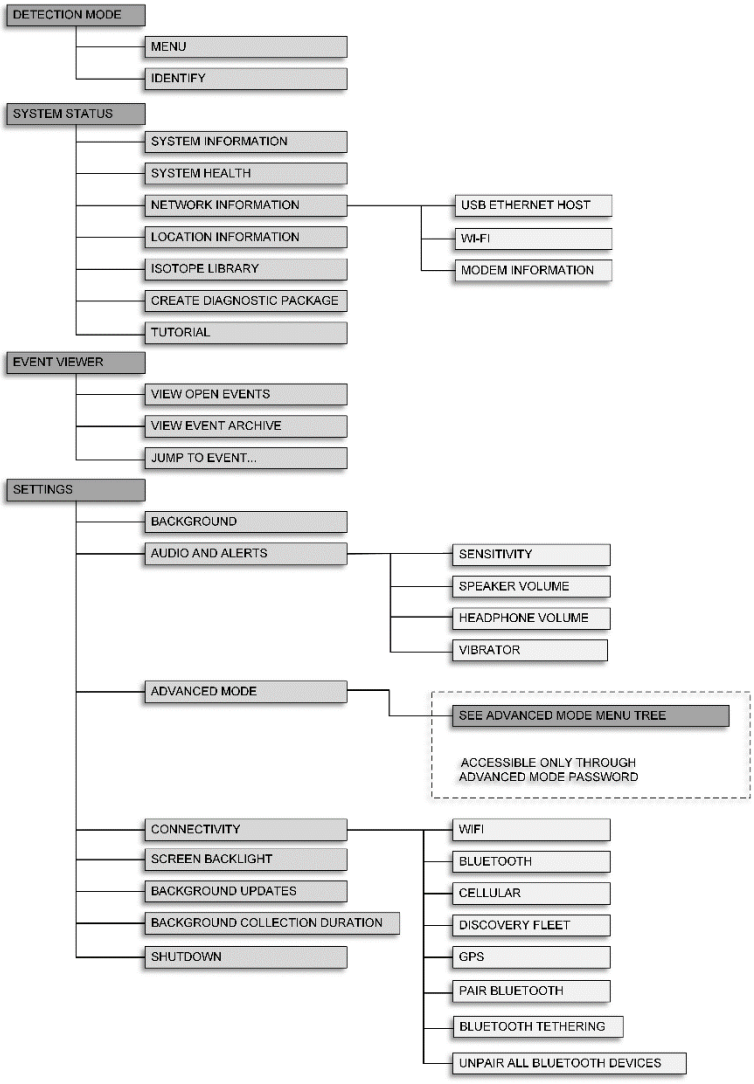


Figure 25: Normal Mode Menu Tree

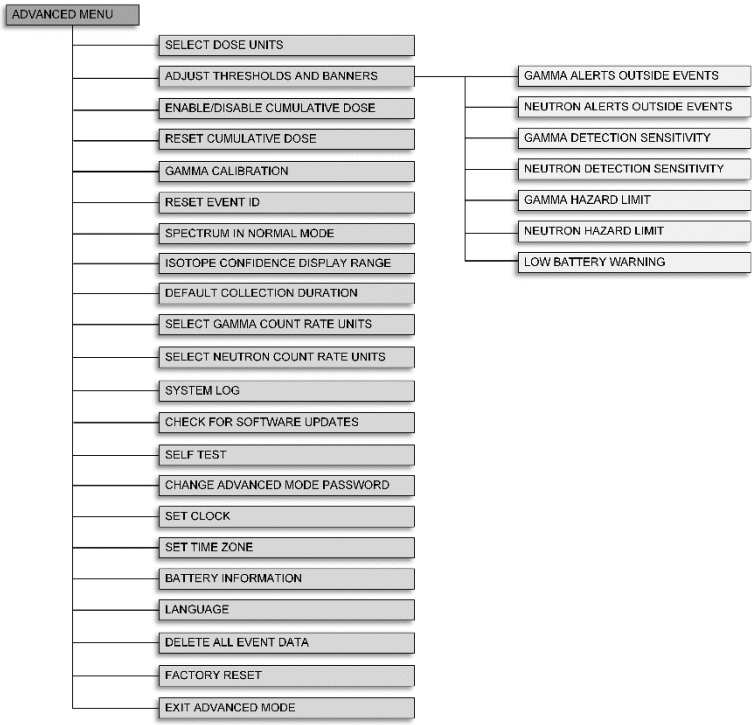


Figure 26: Advanced Mode Menu Tree

2.21 VeriFinder Kit Contents

The VeriFinder kit comprises a Ruggedized Transit Case containing the equipment shown below.

Figure 27: VeriFinder Kit Contents

Item	Description
1	VeriFinder
2	Power supply
3	Shoulder strap
4	Batteries (x2)
5	Battery charger
6	Battery charger power supply
7	Car charger
8	Quick Start Guide and battery safety information sheet
9	Mini-B to USB data cable, Mini-B to USB adapter and IEC cable (x2), RJ-45 Adaptor (optional)
10	AA Battery Caddy (optional)

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SECTION 3 NORMAL MODE OF OPERATION

3.1 Start Up

On start up the system powers in the last configuration and then boots into normal mode of operation.

To start up:

1. Push the Select button for 3 seconds. After a short while, the splash screen is displayed followed by the stabilizing screen.

Figure 28: VeriFinder Splash Screen

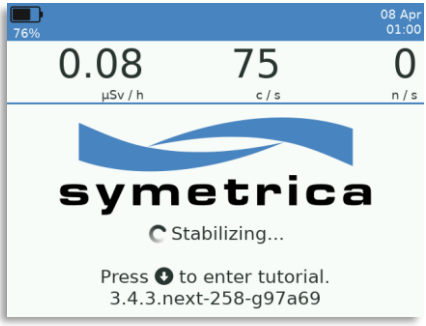

Figure 29: Stabilizing Screen

Notes: During stabilization, the system also conducts a Self Test (refer to page 44 – VeriFinder Self Test – Alarm and Messages).

If required, you can enter **Tutorial** mode by pressing the Down button. Tutorial mode provides information on how to operate VeriFinder (refer to page 62 – Tutorial). The system will continue to stabilize whilst in this mode and will only interrupt should an alert be generated by a system error or threat alarms.

2. Once VeriFinder has completed stabilization it enters into **Locate Mode**. The system is now ready for operations (refer to page 45 – Detection of Radionuclide Sources).

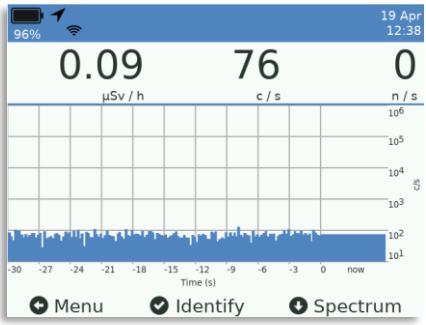

Figure 30: Locate Mode

3.1.1 VeriFinder Self Test – Alarm and Messages

If any part of the Self Test fails during stabilization, a system alarm is generated and an applicable message is displayed:

1. Press the Select ✔ button to acknowledge the alarm. Follow any instructions provided in the error message after acknowledgment. **Note:** The results are displayed on the screen and written to the system log.

2. Failure messages are shown in rotation in the top bar and the dose / count rate bar remains highlighted in an alert color (red, yellow, amber or grey) until the system has determined that the problem has been resolved.

Note: If VeriFinder reports a **Low Battery** error, charge the battery before operating (refer to page 34 – Connecting VeriFinder to External Power).

3.1.2 Audio Checks

Once VeriFinder has successfully booted, a constant clicking noise will indicate that audio is working correctly if the **Audible Rate Indicator** has been enabled with **High** sensitivity. If this is not the case, carry out the following audio checks:

- Check that **Mute** is not enabled (look for the mute icon on the status bar).
- Check that the **Speaker Volume** is on (i.e. **≥ 10%**).
- Check that the **Sensitivity** option is set to **High**.

Refer to page 74 – Audio and Alert Settings for the above audio checks.

3.2 Shutdown

1. Press and hold the Select button for five seconds.
2. If a hard reboot is required, press and hold the Select button for 15 seconds.

3.3 Detection of Radionuclide Sources

This section provides an overview of the VeriFinder radionuclide detection process. For full details of the different Alerts and Alarm processes associated with detections, refer to page 103 – Alerts and Alarms.

VeriFinder will detect a radionuclide source instantaneously and identify the type within 60 seconds, assuming a 30 second collection period. The identification process can be initiated from either the **Locate**, **Spectrum** or **Dose** screens. **Note:** Spectrum needs to be enabled in normal mode for this screen to be visible (refer to page 90 – Spectrum in Normal Mode).

Locate screen is usually the main operating screen for most users, however screen view can be changed by pressing the Down button until the required screen is displayed.

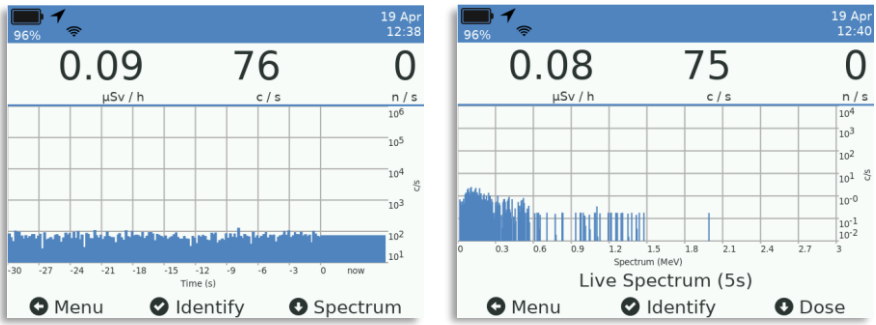

Figure 31: (Left to Right) – Locate Screen and Spectrum Screen

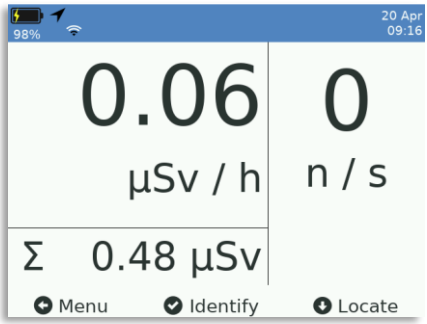

Figure 32: Dose Screen

3.3.1 Detect and Identify a Source (Locate Screen View)

Note: To describe the detection and identification process of a source, the **Locate** screen option is used in the following section, although the identification process is the same for both the **Spectrum** and **Dose** screen options.

The Locate screen view is used to pinpoint a radiation source (gamma or neutron) by moving towards areas that see increased count rates. The displayed graph provides a 30 second window of historical counts assisting in the locate capability. The graph is used to localize the radiation source(s), by determining if the source is getting closer or further away.

The measurement units displayed (Rem and Sieverts) are configurable (refer to page 83 Selecting Dose Units).

3.3.2 Identification

To perform an identification:

1. From the either the **Locate**, **Spectrum** or **Dose** screen, press the Select button to initiate detection and identify if radionuclides are present.
2. The detector collects spectrum data for the user set period (default 30 seconds).

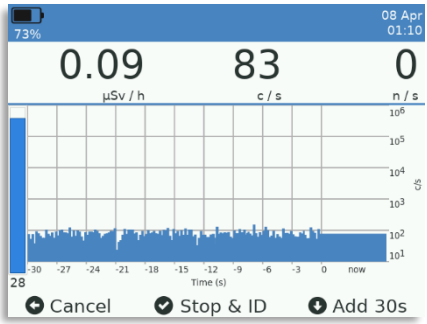

Figure 33: VeriFinder Locate Screen

Note: At any time during the collection period, more time can be added by pressing the Down button. This adds time in increasing amounts for a single event. Typically, this would be done in the following situations:

- Low signal or low certainty result
- SNM result
- Multiple isotopes
- Unexpected results

Added Time Increments (seconds)	Added Time Increments (minutes)
30	0.5
60	1
120	2
300	5
600	10
900	15
1800	30
2700	45
3600	60
5400	90
7200	120

Remaining collection time is automatically updated and shown on the screen with the progress bar on the left.

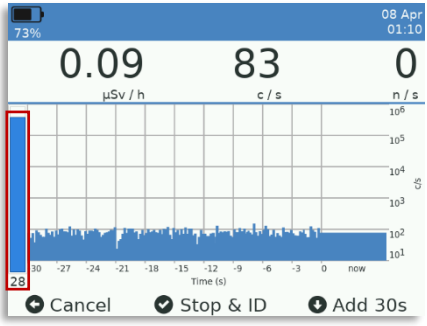

Figure 34: Remaining Collection Time Progress Bar

3. On completion of the data collection, VeriFinder runs through the identification process and presents the results.

Note: The collection can be manually stopped at any time by one of the following methods:

a. Press the Select button to stop and identify the isotopes with data already captured.

b. Press the Back button to cancel the data collection and return to the Locate screen.

4. If an identification is made, VeriFinder generates an alert. Press the Select button to acknowledge.

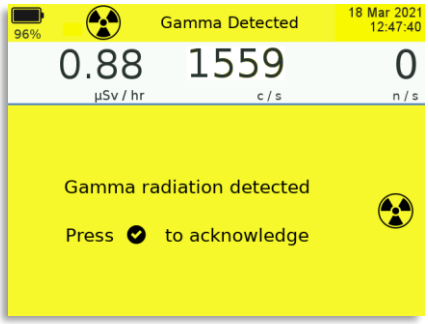

Figure 35: Threat Identification

5. The display then shows the radionuclide identification results, including an event number and the date and time of the event details created.

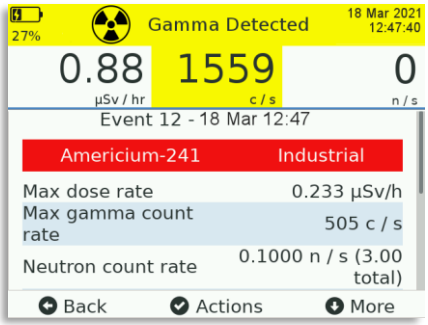

Figure 36: Threat Identification Results

6. If multiple radionuclides are identified, they are listed by priority (refer to page 111 – Simultaneous Alarms). Press the Select button to acknowledge.

Note: If the VeriFinder identifies more radionuclides than can fit on a single screen, use the Down button to scroll through the list. The Back button exits from the results screen.

7. Once the event has been acknowledged, press the Select button to display a list of actions (refer to page 49 - Event Actions).

8. If no radionuclides are found an information screen is displayed indicating the signal is too low for an ID.

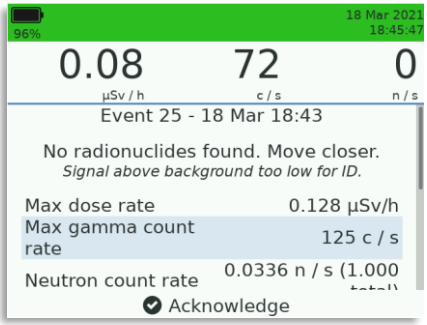

Figure 37: No Radionuclides Found

3.3.3 Additional Actions (Referral Data)

In order to obtain the highest certainty results after a threat radionuclide is detected, it is recommended that the following process is carried out:

1. Move back from the source and take a manual background.
2. Once done, move as close as safely possible to the source.
3. Reinitiate the identification.
4. Add at least an additional 30 seconds to the identification collection.

3.4 Event Actions

Once an event has been acknowledged, the following options are available from the **Actions** screen:

- Finish
- Email
- Send via Bluetooth
- Add Time (30s)
- Voice-tag
- Archive Event
- View Spectrum (advanced mode only)
- Save to USB Drive.

Figure 38: Event Actions

3.4.1 Event Actions –Finish

Finish - returns you back to the screen from where the identification was performed (Locate, Spectrum or Dose screen).

3.4.2 Event Actions – Email

Email - sends the configured data to all registered email addresses. If no email addresses are configured or communications are not available, the error message UNEXPECTED_RESPONSE is displayed. **Note:** Always acknowledge the outcome of any email sent, whether this has been a successful or failed attempt.

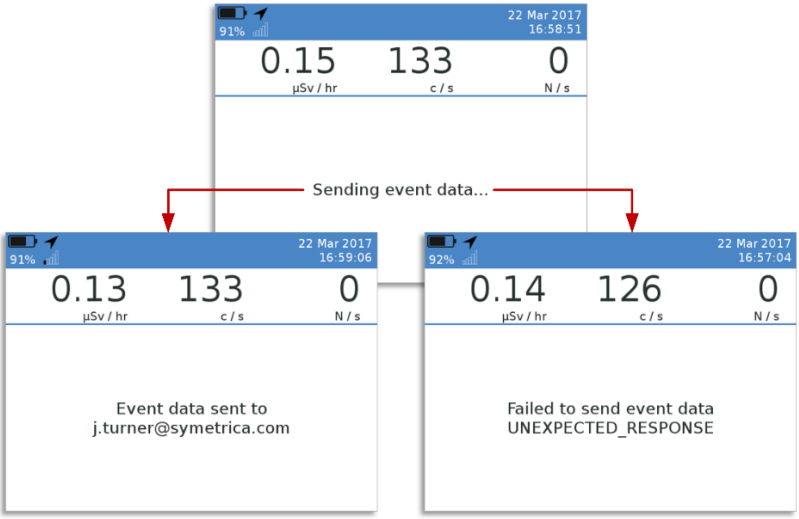

Figure 39: Event Actions - Finish and Email

3.4.3 Event Actions - Send via Bluetooth

Sends the configured data to a recipient via Bluetooth 4.0 to a paired Android device.

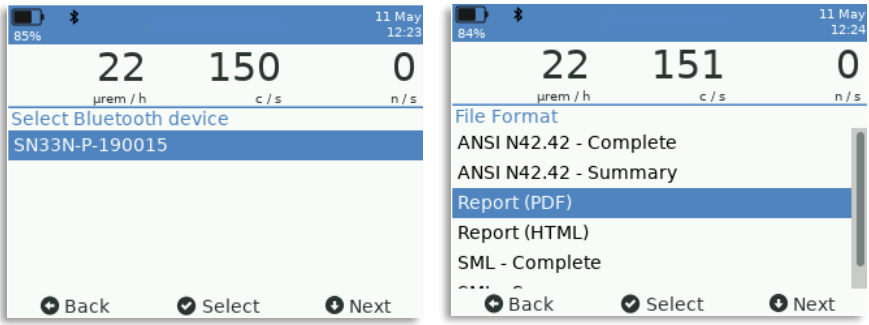

Figure 40: Event Actions - Send via Bluetooth

3.4.4 Event Actions – Add Time

To increase certainty of the isotope identification(s) you can add time after the initial collection. The default is 30 seconds and typically would be done in the following situations:

- Low signal or low certainty result
- SNM result
- Multiple isotopes
- Unexpected results

3.4.5 Event Actions – Add Voice-tag

A voice-tag can be added to events by speaking directly into the microphone.

Note: Only one voice tag can be added. Any additional voice tags recorded will not be saved.

Example voice-tag: ‘Container marked XY55253, 1-metre crate in far-right corner. Radiation unexpected’.

3.4.6 Event Actions – Archive Event

Archive Event will archive the current event resulting in it not being automatically transferred during a data offload process.

Note: No confirmation is required. The event will be archived upon selecting this action.

Archived events can be manually offloaded from the Event Archive.

Figure 41: Event Actions - Event Discarded

After archiving an event, the Event Actions menu options change to include a Delete Event. Selection of this option deletes all of the event data.

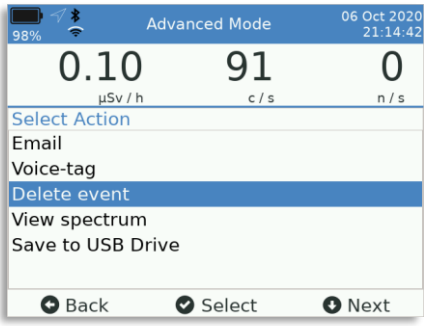

Figure 42: Event Actions - Delete Event

3.4.7 Event Actions – View Spectrum (Advanced Mode)

Displays the collected spectrum.

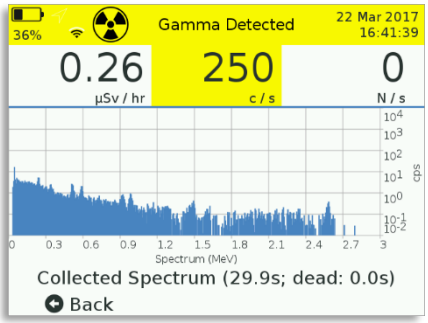

Figure 43: Event Actions - View Spectrum

3.4.8 Event Actions – Save to USB Drive

Event files can be saved to an external USB flash memory “stick”.

Notes: USB Memory drive should be formatted in FAT, VFAT, ExFAT or FAT32 format. If in doubt, test the memory drive before taking it out operationally. If applicable, ensure that the USB Memory is not set as “read-only” before proceeding. Be aware that the USB may take a few seconds to register on the device.

1. Connect the Mini-B USB to USB converter then attached a USB Memory drive.
2. Scroll down the menu to choose to save the event to a USB Memory drive.
3. PDF, N42.42 and SML files are saved into a ‘Symetrica’ folder on the drive (user configurable).

3.5 System Status

To access the System Status from the main menu (Normal and Advanced mode), scroll to the Information icon with the Down button and press the Select button.

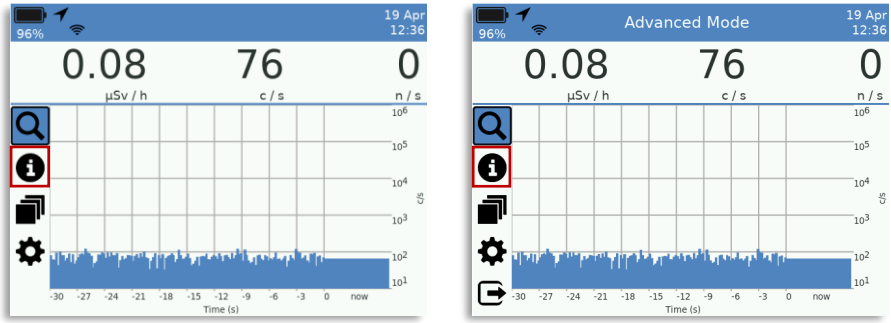

Figure 44: Main Menu - Information Icon

The System Status menu provides all necessary information on the status / health of the system.

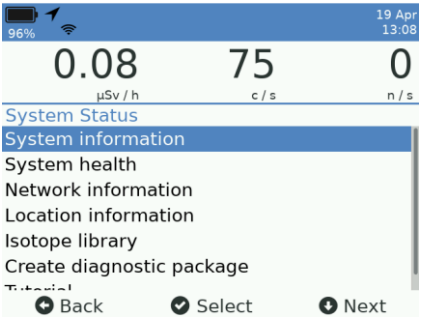

Figure 45: System Status

Within each sub-menu option, you will find specific information that can be used to understand how VeriFinder is performing. For more information refer to the following:

- System Information - page 54
- System Health - page 56
- Network Information - page 57
- Location Information - page 58
- Isotope Library – page 59
- Create Diagnostic Package – page 60

3.5.1 System Information

Selecting this option allows you to view the system information.

1. From the System Status screen, select System information. The System information screen is displayed.
2. Press the Back button to return to the System Status screen.

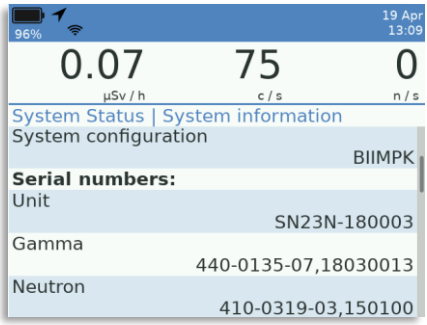

Figure 46: System Information Screen

System Information	Description
Model	VeriFinder Model name.
Gamma detector	Gamma detector type used in the VeriFinder.
Neutron detector	Neutron detector type used in the VeriFinder.
System configuration	Unique identifier for the software, firmware and operating system on the VeriFinder.
Serial number: Unit	Serial number of the VeriFinder.
Serial number: Gamma	Serial number of the gamma detector in the system.
Serial number: Neutron	Serial number of the neutron detector in the system.
Software version: Application	Application software version on the system.
Software version: Kernel	Kernel System version.
Firmware version: Gamma	Firmware version of the gamma detector in the system.
Firmware version: Neutron	Firmware version of the neutron detector in the system.

System Information	Description
Firmware version: Main board	Firmware of the main board in the system.
Calibration information: Gamma	Calibration information related to the gamma date, stabilization number of Becquerels and the born-on date.
Calibration info: Stabilization	Activity of the stabilization source at time of manufacture.
Operating Hours	Total hours of operation of System since it was last factory reset.
Storage: Free disk space	Free storage space in kilobytes.
TLS Certificate Thumbprint	TLS certificate for authenticated access to the web interface.

3.5.2 System Health

Selecting this option allows you to view the system health.

1. From the System Status screen, select System health. The System health screen is displayed.
2. Press the Back button to return to the System Status screen.

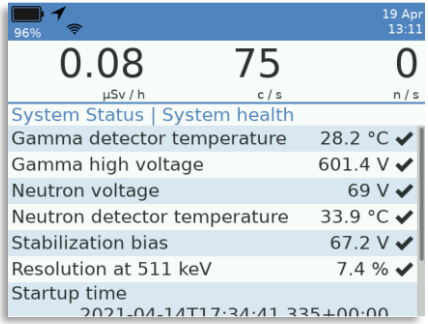

Figure 47: System Health Screen

System Information	Description
Gamma detector temperature	Normal range between -20 °C and 50 °C (-4 °F and 122 °F)
Gamma high voltage	Normal range between 500 V and 1200 V

System Information	Description
Neutron voltage	Normal range between 60 V and 80 V
Neutron detector temperature	Normal range between -20 °C and 50 °C (-4 °F and 122 °F)
Stabilization bias	Normal range between 60 V and 80 V
Resolution at 511 keV	Continuously monitors the stabilization peak FWHM. Sets off an alert if it assesses there could be an issue with the detector causing detector resolution degradation
Startup time	Date and time the device was last switched on in the format YYY-MM-DD
Gamma detections since boot	Count of the number of gamma detection events that have occurred since the device last booted
Neutron detections since boot	Count of the number of neutron detection events that have occurred since the device last booted

3.5.3 Network Information

Selecting this option allows you to view the network information.

1. From the System Status screen, select Network information.
2. Choose from the list of available connections (USB, Wi-Fi or Modem (if a SIM card is installed)).

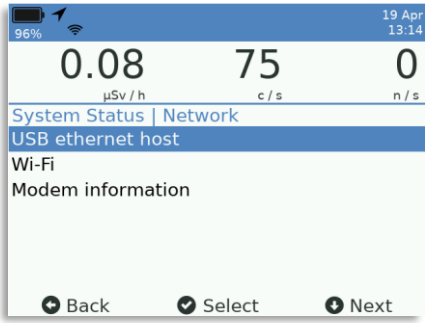

Figure 48: Network Information

3. Once you select the connection, the display indicates the following information:

- Whether the on-board Wi-Fi interface is enabled or disabled.
- The SSID of the Wi-Fi network to which the on-board Wi-Fi interface is connected.
- The signal strength (in dB) detected by the on-board Wi-Fi interface.
- The IP address of the wireless interface when connected to wireless network.
- The media access control (MAC) address of the on-board Wi-Fi interface.
- Whether the USB interface is connected to a PC.
- The IP address for the USB interface when connected via a cable to a PC

Note: If the serial interface is used the USB does not display an IP address.

If a SIM card is installed, the Modem screen displays the following information:

- The status of the cellular network.
- The readiness status of the cellular network.
- The registration status of the SIM card with the cellular network.
- The signal level of the cellular network.
- The CCID and CIMI of the installed SIM card.

4. Press the Back button to return to the System Status screen.

3.5.4 Location Information

Selecting this option allows you to view location information, which is stored in the VeriFinder data file.

1. From the System Status screen, select Location information.
2. The Location information screen appears indicating:
   - Whether the Location chip is enabled or disabled
   - If a Location fix is obtained
   - The current Location longitude and latitude co-ordinates of the VeriFinder determined by the onboard location chip.

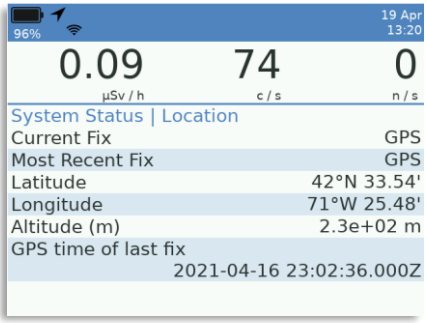

Figure 49: Location Information

3. Press the Back button to return to the System Status screen.

3.5.5 Isotope Library (Normal Mode)

Selecting this option allows you to view the Isotope Library.

1. From the System Status screen, select Isotope Library. The Isotope Library screen is displayed.
2. Press the Down button to scroll through the isotope list. Press the Back button to return to the System Status screen.

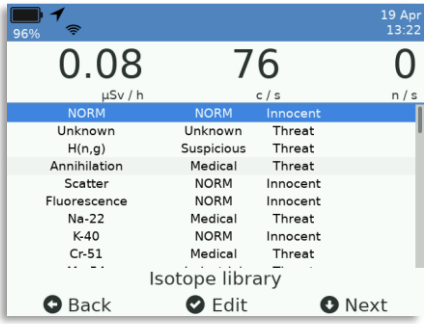

Figure 50: Isotope List

3.5.6 Isotope Library (Advanced Mode)

In Advance mode, the isotope library can be configured allowing some isotopes to be changed from Threat to Innocent, and back. Some isotopes, such as Uranium isotopes, are always a threat and cannot be changed; this is indicated by the Locked column of the web interface isotope library management screen.

To change whether an isotope alarm category is considered innocent or threat:

1. From within the Advanced settings screen, press the Down button to select the Isotope list option, then press the Select button.
2. From the list of isotopes screen that appears, press the Down button to select the isotope whose alarm category you want to change, then press the Select button.

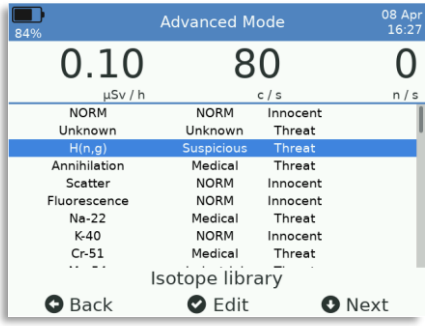

Figure 51: Isotope List (Advance Mode)

3. From the Threat Menu of the isotope you selected, press the Down button to select the alarm category you want to assign to that isotope (Threat, Suspicious or Innocent), then press the Select button.

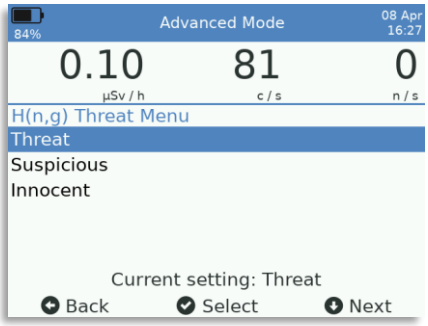

Figure 52: Alarm Category

4. To accept the new alarm category for the isotope, press the Select button.

3.5.7 Creating a Diagnostic Package

Selecting this option allows you to create a diagnostic package, which can be used for troubleshooting / support purposes. The diagnostic package is an SML file which includes:

- Last 30 seconds of recorded data.
- All health parameters.

- System log file.
- Snapshot of detector communications.

To create a diagnostic package:

1. From the System Status menu select Create Diagnostics Package.
2. Press the Select ✔ button to launch the diagnostics package building process.
3. A screen appears showing the status of the diagnostic package building process.

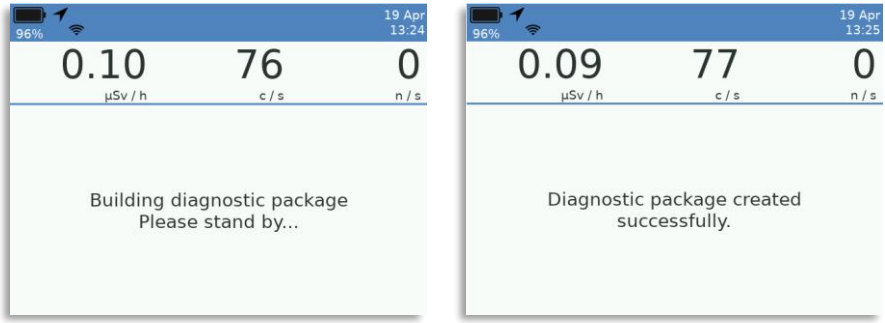

Figure 53: Creating a Diagnostic Package

4. The diagnostic package building process takes approximately five seconds to complete. Once complete, a success message appears and you are returned to the System Status menu.
5. Download using the Web Management Interface through the Advanced menu> Artifacts > Diagnostics options (refer to page 168 - Artifacts).

3.5.8 Tutorial

Selecting this option opens the VeriFinder tutorial, which displays basic help on the system.

Figure 54: Tutorial Screen

Use the Back ⬅ Select ✔ and Down ⬇ buttons to navigate through the help topics.

3.6 Event Viewer

There are two types of events:

- **Open Events** – Events that have not been offloaded from the VeriFinder nor archived by the user.
- **Event Archive** – Displays all events archived by the user.

Events can be:

- Viewed on screen.
- Emailed.
- Offloaded through a USB drive.
- Viewed using the Web Management Interface.
- Viewed using Symetrica's (optional) Discovery Fleet Management Tool.

To enter the Event Viewer:

1. From the main menu, scroll to the Events icon with the Down ⬇ button and press the Select ✔ button.

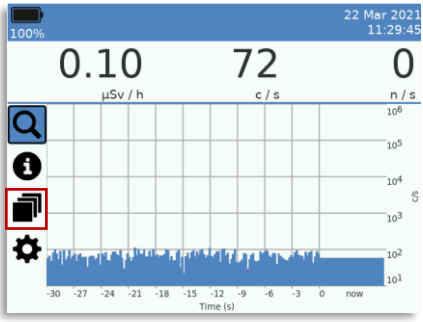

Figure 55: Main Menu

2. The Event Viewer screen is displayed.

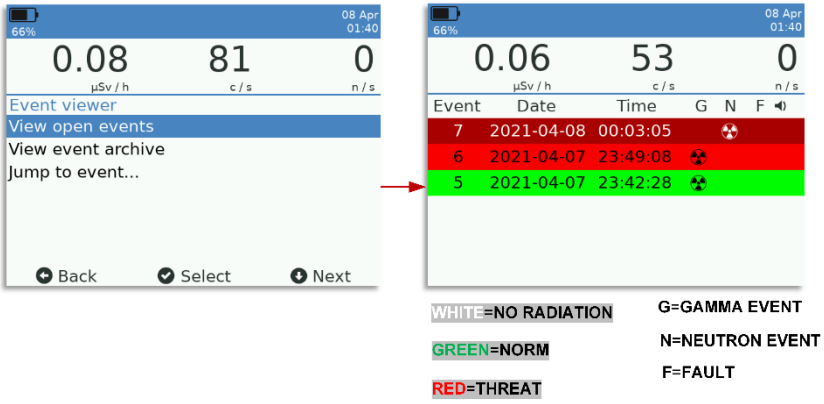

Figure 56: Event Viewer

3. Once in the Event Viewer menu, you can choose to do the following:

   a. View the full list of open events (that is, events that have not yet been offloaded) starting with the most recent.

   b. View archived events (that is, everything that has ever happened since the last factory reset) starting with the most recent.

   c. Jump to a specific event to view (that is, select a specific event to go to by entering the event number).

4. For open and archived events, a table is displayed with events listed in date time order. Scroll the list using the Down button. Press the Select button to display the event details. **Note:** On selection of an event, the color changes to a darker variant, for example a red threat event will change to dark red to indicate it is the current selection.

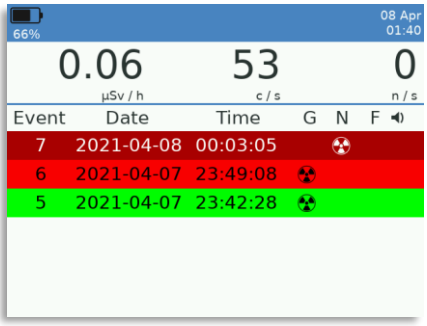

Figure 57: Event Viewer - Table of Recent Events

5. Event details presents the radionuclides identified and the threat category. Pressing the Down button scrolls through the event details. The Select button opens the Actions screen (see page 49 – Event Actions). The Back button returns you to the events list.

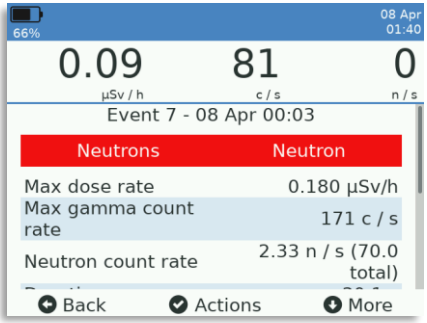

Figure 58: Event Viewer Results

3.7 Emailing Historic Events

To e-mail an historic event:

1. Navigate to the Events view and select an event.
2. Press the Select button for the action menu.
3. Select the Email option.
4. An email is sent to all recipients added for that device.

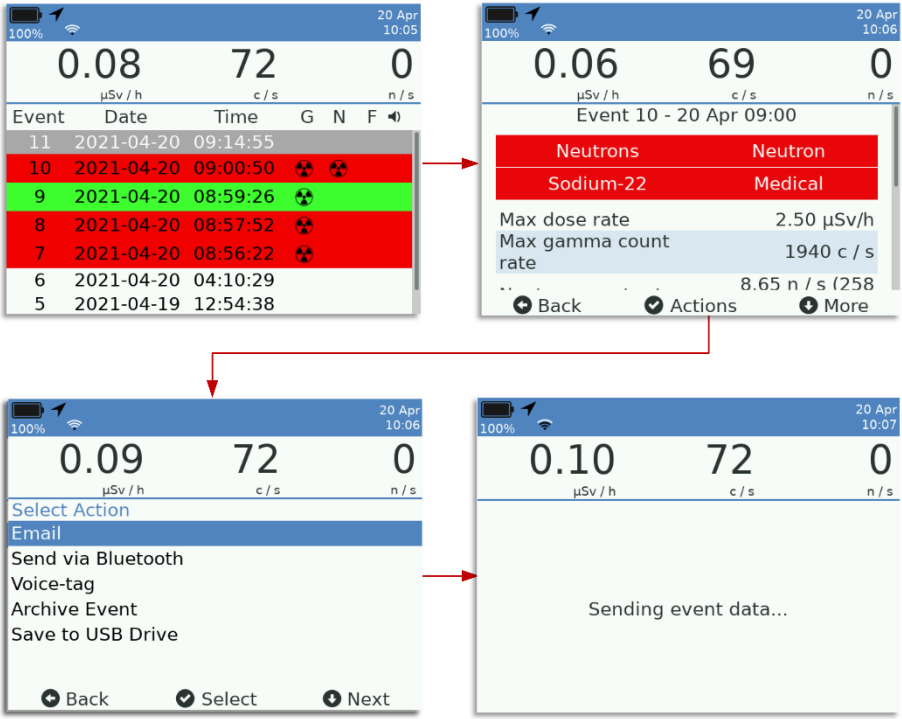

Figure 59: Emailing Historic Events

3.8 Normal Mode Settings

To access the Normal Mode settings from the main menu, scroll to the Gear icon with the Down button and press the Select button.

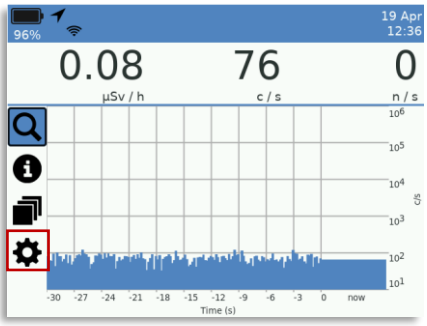

Figure 60: Main Menu - Gear Icon

The menu offers a number of setting options.

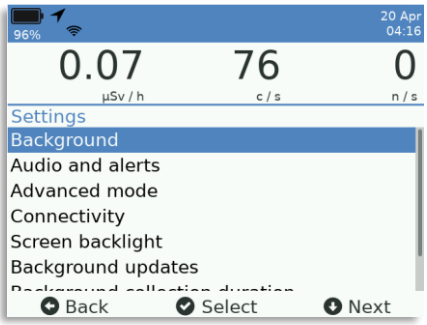

Figure 61: Normal Mode Settings Menu

Setting	Description
Background	VeriFinder updates background continuously and automatically detects when there is a change. Should you wish to capture a new background, you can do so manually using this option. For more information, see page 68 - New Background Collection.

Setting	Description
Audio and Alerts	These settings allow you to select if audible alerts are on or off and at what volume (0-100% in 10% increments), and if the system provides a click sensitivity feedback (low / med / high) based on count rate of a source. It also defines whether vibration indication is enabled. For more information, see page 74 - Audio and Alert Settings
Advanced Mode	Enters the VeriFinder in Advanced mode to provide increased access to settings and makes viewable additional information in Operating mode. **Note:** Advanced mode is password protected. For more information, see page 81 - Advanced Mode.
Connectivity	This allows you to enable/disable the various communication methods available on this VeriFinder model. For more information, see page 76 - Connectivity Status Settings.
Screen Backlight	This allows you to change the backlight brightness. For more information, see page 77 - Backlight Settings.
Background Updates	By default, the VeriFinder updates the background continuously and automatically detects when there is a change. This setting allows you to change whether backgrounds are automatically updated while the VeriFinder is being used. For more information, see page 78 - Background Mode Settings.
Background Collection Duration	This allows you to select the duration in seconds for the background collection. (Must be between 30 s and 999 s).
Shutdown	This provides a complete shutdown of the VeriFinder. Similar function to holding the Power / Select button for 5 seconds. For more information, see page 79 - System Shutdown.

3.9 Background Collection

3.9.1 Manual Background Collection

It is recommended that a manual background collection is taken prior to performing each new set of identifications and / or when you move into a new area.

The recommended duration is at least 300 s in low radiation fields (1 µSv / h). In higher fields, this can be reduced linearly for example, in 10 µSv / h, 30 s is sufficient.

You will be informed if the background has changed in two stages:

- Update background (out of date alert).
- Background Invalid.

3.9.1.1 New Background Collection

Normal mode allows for the collection of a new background from the Settings menu.

To collect a new background:

1. Press the Back button to highlight the menu bar.
2. Scroll down and select the Gear (Settings) icon.
3. Select Background from the Settings screen.

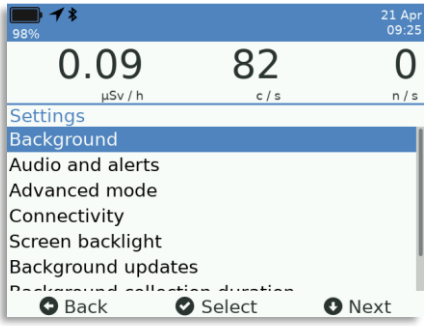

Figure 62: Settings Screen – Background Option

4. The VeriFinder displays the last background collection data.

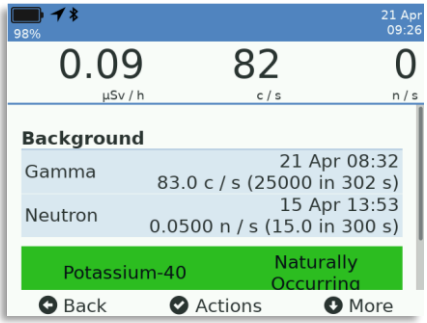

Figure 63: Last Background Collection Data

5. Press the Select button and from the displayed screen select the Collect option.

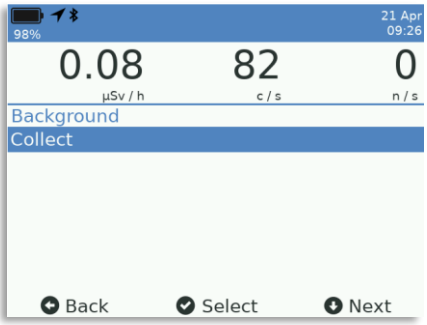

Figure 64: Collect Background Item

6. The VeriFinder starts the background collection and displays the progress.

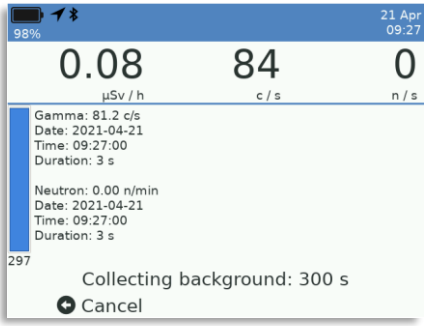

Figure 65: Background Collection Screen

7. To cancel the background collection, press the Back button. On completion of the collection, VeriFinder analyzes the background for radionuclides and displays the final results.

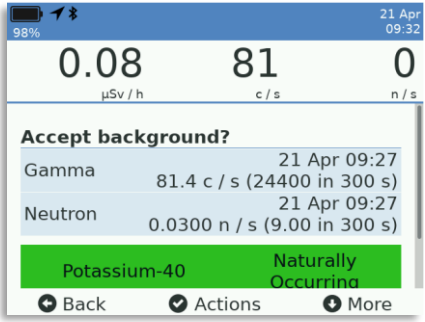

Figure 66: Background Collection Results

8. To reject the background and return to using the previously collected background, press the Back button.

9. To accept the new background, press the Select button. The Accept background screen is displayed with the Accept option highlighted. Press the Select button to accept the new background. Note that the new background can also be rejected from this screen.

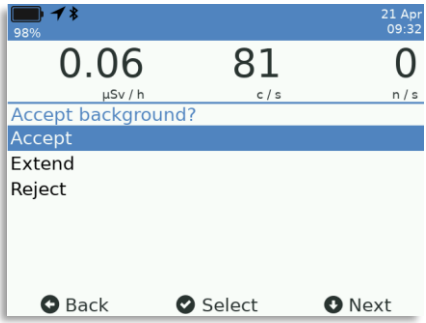

Figure 67: Accept Background Screen

10. If the background collection period requires to be extended, press the Down button to scroll down to the Extend option and press Select . The Background duration screen is displayed.

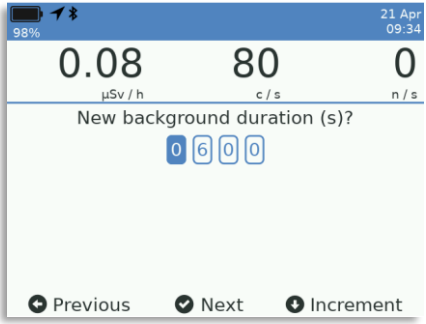

Figure 68: Background Collection Extended Selection

11. Enter the required extended duration using the Down button to increment the values and the Select button to move to the next value box. On completion, press the Select button to initiate the extended background collection. **Note:** Extended duration is any value between the existing collection duration and 7200 seconds.

Note: If Active Background collection is enabled when a manual background collection is initiated, the Active Background is temporarily suspended during the manual collection time. Once the manual background collection is complete and you choose Accept or Reject, the Active Background mode then resumes.

3.9.1.2 New Background Needed

If a background is more than five hours old a warning is displayed. This is to ensure that operator's regularly update the background and prevents it from becoming too out of date when operating in manual background mode.

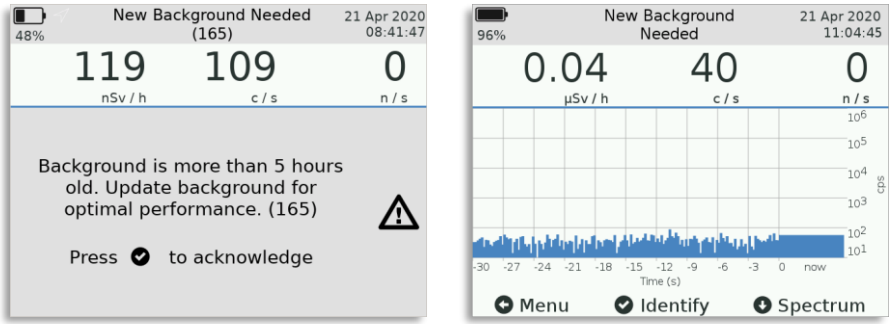

Figure 69: New Background Needed

It is operator discretion whether to take a new background however the warning will remain in the status bar until a new background is taken or Automatic background is enabled.

3.9.2 Automatic Background Collection

Automatic background should only be used when searching for threat sources as NORM sources will be absorbed into the background algorithm.

Note: Automatic updates is for gamma only.

Conditions for VeriFinder to automatically update its background are:

- The unit has been in an unchanging background for 5 minutes
- Only NORM sources identified in the new background.

To enable / disable automatic background, navigate to the Settings menu and enable / disable Background Updates.

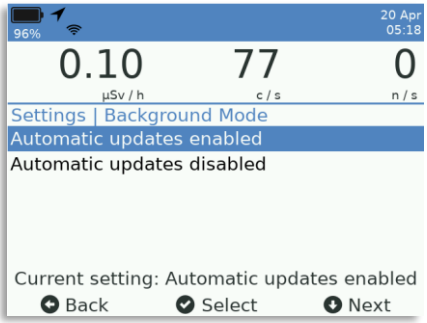

Figure 70: Enable / Disable Background Updates

When automatic updates are enabled, the system determines if a new background is needed and the operator is notified with an acknowledge message. This situation can appear at any time, similar to an alert or alarm condition.

If the operator is in the process of conducting a data collection, the background process is temporarily halted.

Note: If the background significantly decreases from the recorded one, to prevent a negative result in the analysis, a previous background will be used.

3.9.2.1 Invalid Background

An error message is displayed in the event the Automatic Background determines that the background is no longer valid.

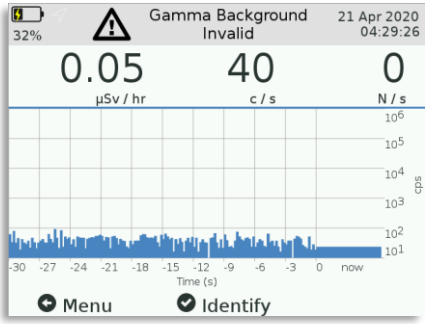

Figure 71: Invalid Background Display

Should this happen, press the Select key to acknowledge. You are advised that a new background collection is in process.

Notes: It is left to operator discretion whether to perform any identifications while the background is invalid. This situation occurs primarily when the operator moves from a background with some Naturally Occurring Radioactive Material (NORM) to a clear background.

It is possible to perform identifications with an invalid background; however, background subtraction will not be used during analysis, since there is no valid background to use.

Subsequent displays will show a notification in the message bar that the background is presently not valid. The notification will disappear once a valid background is collected and implemented.

3.10 Audio and Alert Settings

3.10.1 Adjusting the Audible Rate Indicator

VeriFinder can provide an audible click with a rate proportional to the count rate measured, negating the need to look directly at the screen when searching for the general location of a source of interest. The default setting for the audible rate indicator is OFF.

To configure the audible rate indicated:

1. Select Audio and Alerts in the Settings menu.
2. Select the Sensitivity option.
3. Press the Down button to select your desired audible rate indicator setting (Low, Medium, High or Off), then press the Select button.
4. To accept a new audible rate indicator setting, press the Select button.

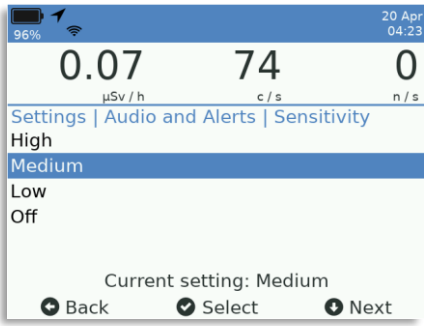

Figure 72: Settings - Audible Rate Indicator

3.10.2 Adjusting the Audible Volume

To adjust the speaker volume:

1. Select Audio and Alerts in the Settings menu.
2. Select the Speaker Volume option.
3. Press the Down button to select your desired volume setting (10% - 100%), then press the Select button.
4. To accept the new volume setting, press the Select button.

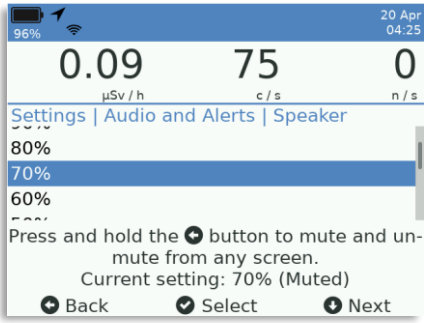

Figure 73: Settings – Audio and Alerts Speaker Volume

5. To mute the speaker volume, press the **Toggle mute** option.

To adjust the Headphone volume:

1. Select Audio and Alerts in the Settings menu.
2. Select the Headphone volume option.
3. Carry out steps 3 – 5 described in adjusting speaker volume above.

3.10.2.1 Audio Sub-System Failure

If the audio sub-system should fail for any reason, you are presented with the following screen.

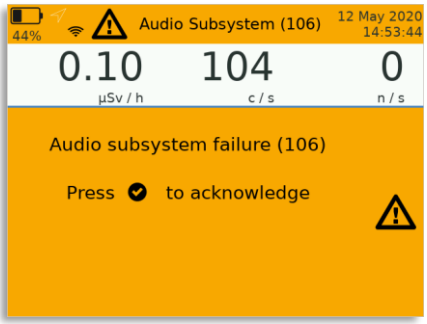

Figure 74: Audio Sub-System Failure

Press the Select button to acknowledge. Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.

3.10.3 Adjusting the Vibrator Indicator

VeriFinder can provide tactile feedback (vibration) for events via its internal vibrator. The default setting vibrator indicator is enabled.

To configure the vibrator indicator (enable or disable):

1. Select Audio and Alerts within the Settings menu.
2. Select the Vibrator option.
3. Press the Down button to select your desired (Disable or Enable) vibrator indicator setting, then press the Select button.
4. To accept a vibrator indicator setting, press the Select button.

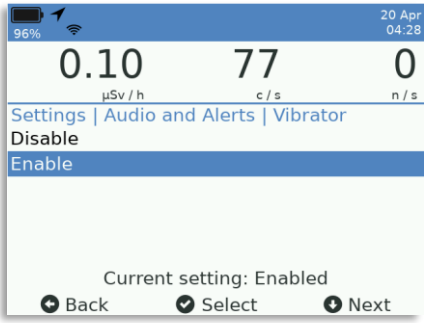

Figure 75: Settings - Vibrator Setting

3.11 Other Settings

3.11.1 Connectivity Status Settings

Note: If VeriFinder is set to operate in Alternate Mode 1 (refer to page 81 – Advanced Mode of Operation), the Connectivity settings option can be found in the Advanced Settings menu.

You can configure which connectivity modes are enabled on VeriFinder. By default, only GPS is enabled. When a connectivity mode is enabled, its corresponding icon is visible on the status bar.

The available connectivity modes are:

- Wi-Fi - Connects to the strongest authorized Wi-Fi network
- Bluetooth – Connects via Bluetooth 4.0 to a paired Android device
- Cellular – 3G enabled micro SIM card required
- Discovery Fleet – Enables Remote Access
- GPS – Turns location information On or Off (only works in outside environment).

- Pair Bluetooth
- Bluetooth Tethering
- Unpair all Bluetooth Devices

To enable/disable the available connectivity modes:

1. From the Settings menu, select Connectivity.
2. A screen appears showing the status of the connectivity modes (enabled or disabled).

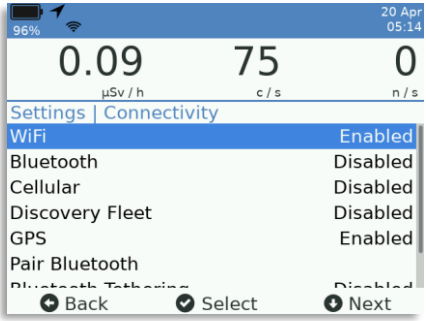

Figure 76: Connectivity Status Settings

3. For each of the connectivity modes you want to change:
   a. Press the Down button to select appropriate connectivity mode.
   b. Press the Select button to toggle its status to the opposite value.
4. The screen updates with the new setting for the connectivity methods. Icons for each mode are displayed based on the enable/disable status of that mode.
5. Press the Back button to return to the Settings screen.

3.11.2 Backlight Settings

VeriFinder screen brightness can be adjusted to suit your viewing preferences by configuring the screen backlight. The default screen backlight setting is Auto.

When the backlight setting is set to Auto, the integrated luminosity meter will detect the ambient light, and automatically adjust the screen's backlight to an appropriate setting.

To configure the screen backlight:

1. From the Settings menu select Screen backlight.
2. Press the Down button to select your desired backlight setting (Auto, 100%, 75%, 50%, 25%,15%, 5%. 1%, 0%), then press the Select button.
3. To accept a new backlight setting, press the Select button.

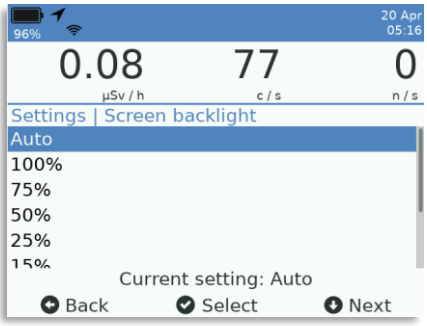

Figure 77: Settings - Screen Backlight

3.11.3 Background Updates Setting

For optimal identification performance you must manually do a background collection whenever new environmental conditions are encountered (refer to page 68 - New Background Collection).

Note: Automatic updates is for gamma only.

To enable / disable background automatic update:

1. From the Settings menu select Background updates.
2. Press the Down button to select the required background mode setting (Automatic updates enabled, or Automatic updates disabled).
3. To accept a new background mode setting, press the Select button.

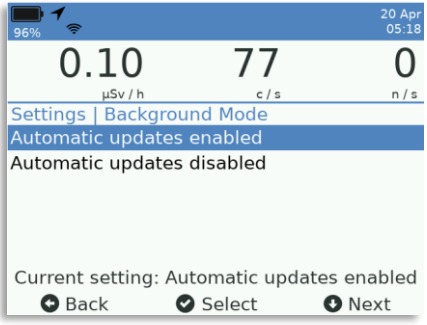

Figure 78: Settings - Background Mode

3.11.4 Background Collection Duration

You can set the duration for background collection between 30 and 999 seconds.

To set the background collection duration:

1. From the Settings menu select Background collections duration.
2. Change the duration by using the Down button to increment the integer value and the Select button to move to the next value box.

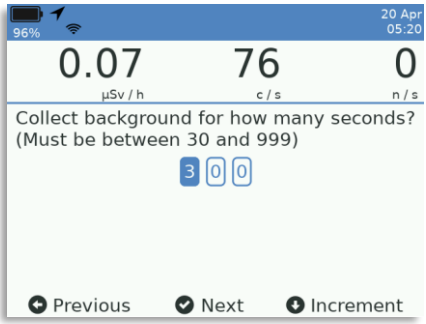

Figure 79: Background Collection Duration

3. To accept a new duration setting, press the Select button.

3.11.5 System Shutdown

To shut down VeriFinder from the Settings menu:

1. From the Settings menu select Shutdown.
2. From the screen that appears, press the Down button to select Yes, then press the Select button. After a short while VeriFinder shuts down.

Note: Pressing the Select button for 5 seconds or more will shutdown VeriFinder from any screen.

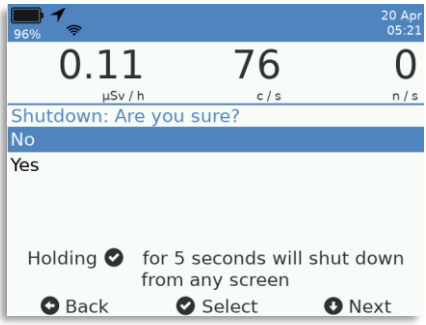

Figure 80: Settings – Shutdown

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SECTION 4 ADVANCED MODE OF OPERATION

Advanced operation of VeriFinder is available in one of two modes, **Default Mode** and **Alternate Mode 1**. Type of mode is determined from the Web Management Interface > User Interface Settings screen (refer to page 164 – User Interface Settings) after logging in as Advanced user.

The main difference is that in Alternate Mode 1, there is no requirement for the user to input a password to enter advanced mode. In addition, several of the menu options are relocated, details of which are highlighted as applicable in the sections that follow.

Advanced mode enables the following processes and procedures:

- Select desired dose units for display.
- Set Detection Alert and Alarm Threshold Levels.
- View and reset the accumulated operating hours.
- View detector calibration data.
- Set background collection parameters (thresholds, collection time, and how the background is applied).
- Check for software updates with network connection.
- Set the Advanced Mode password – (Default mode of operation only).
- Set the clock and timezone.
- Look at battery information.
- Change language settings.
- Deletion of all event data collected.
- Reset to Factory defaults (Default mode of operation only).

4.1 Advanced Mode Login – Default Mode Only

Access the Advanced settings menu:

1. Access the Settings menu, select the Gear icon in the menu bar.
2. From the Settings menu, select Advanced Mode.

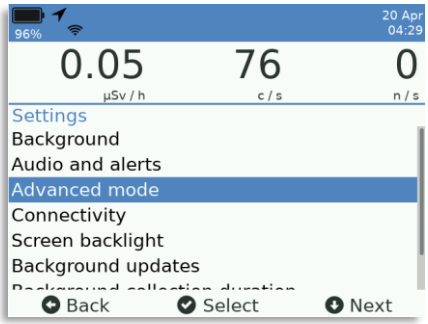

Figure 81: Advanced Mode Login

3. The Enter advanced mode password screen is displayed.

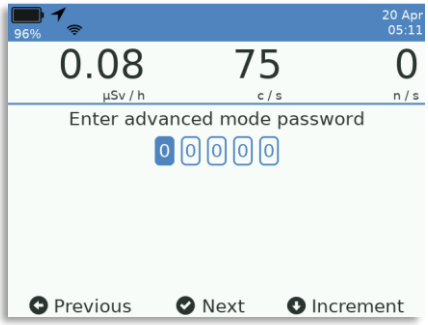

Figure 82: Advanced Mode Password

4. Enter each number of the advanced mode password by pressing the Down button to change the value, and the Select button to accept the value. Press the Select button to accept the selection and move to next integer.

5. Once the advance mode password is fully specified, press the Select button to enter Advanced Mode. When in Advanced Mode you will find that:

   - You no longer need to enter a password to review and modify Advanced Mode settings.
   - Events will display the certainty of isotope identifications.

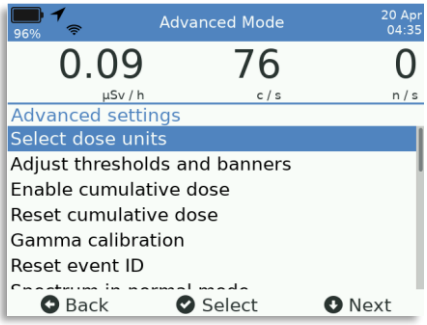

Figure 83: Advanced Settings Screen

4.2 Selecting Dose Units

VeriFinder can be configured to display either mrem/h and µSv/h dose units. The default dose unit setting is µSv/h.

To adjust which dose unit VeriFinder displays:

1. From within the Advanced settings screen, press the Down button to select the Select Dose Units option, then press the Select button.
2. From the Select dose units screen that appears, press the Down button to select your desired (mrem/h or µSv/h) dose unit setting, then press the Select button.

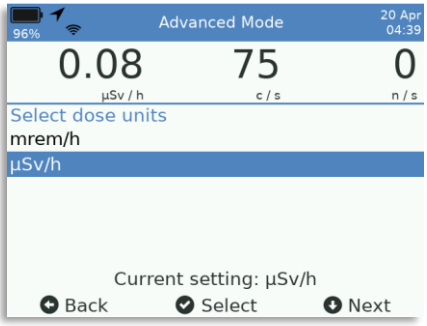

Figure 84: Selecting Dose Units

3. To accept new dose unit setting, press the Select button.

4.3 Adjust Alarm Thresholds and Banners

Note: If VeriFinder is set to operate in Alternate Mode 1, adjustment of Alarm Thresholds and Banners can be found in the Normal Settings menu.

Adjust of alarm thresholds is from the ‘Adjust thresholds and banners’ sub-menu in the Advanced Mode menu.

4.3.1 Gamma and Neutron Detection Alerts

Alert screens can be toggled to off for when VeriFinder detects an increased gamma or neutron source, and only provide the count/dose rate outside the event collection.

To toggle gamma and neutron detection alerts:

1. From within the Advanced settings screen press the Down button to select the ‘Adjust thresholds and banners’ option, then press the Select button.
2. From the Adjust Thresholds screen that appears, press the Down button to select the ‘Gamma or Neutron alerts outside events’ option, then press the Select button to toggle between Yes and No as required.

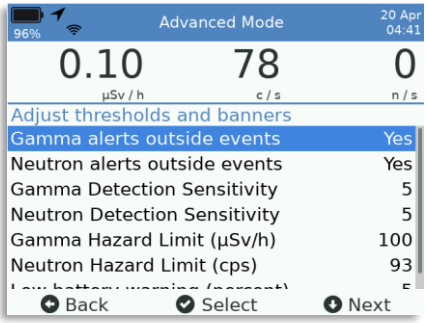

Figure 85:Gamma / Neutron Alerts Outside Events

Note: The status bar will still change color and provide detection information. Dose rate will continue to provide indications of increased radiation.

Disabling the alerts will only disable the full screen alert that requires you to acknowledge the alarm.

4.3.2 Gamma and Neutron Sensitivity

Changes can be made to the detection sensitivity for both the Gamma and Neutron detectors. The default value is set at 5, however this can be modified as required from 0 (disabled) through to 9 (very high).

To change the gamma or neutron sensitivity value:

1. From within the Advanced settings screen press the Down button to select the ‘Adjust thresholds and banners’ option, then press the Select button.
2. From the Adjust Thresholds screen that appears, press the Down button to select the Gamma or Neutron Detection Sensitivity option, then press the Select button.

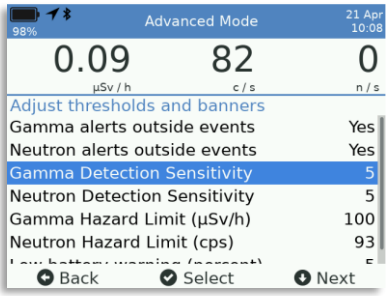

Figure 86: Gamma and Neutron Sensitivity Values

3. Change the sensitivity by using the Down button to increment the integer value to the required setting.

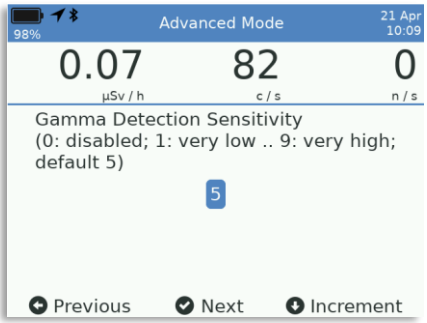

Figure 87: Changing the Sensitivity Value

4.3.3 Gamma and Neutron and Personal Hazard Limits

Changes can be made to the count threshold limits that trigger the Neutron detected alarm, Gamma detected alert and also the personal hazard limits for gamma and neutron.

To change the neutron and/or gamma count threshold values:

1. From within the Advanced settings screen press the Down button to select the 'Adjust thresholds and banners' option, then press the Select button.
2. From the Adjust Thresholds screen that appears, press the Down button to select the Gamma Hazard Limit option, then press the Select button.

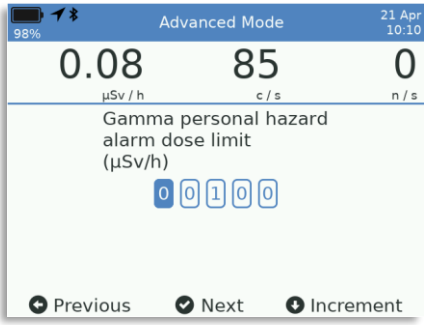

Figure 88: Gamma Personal Hazard Alarm Dose Limit

3. Enter numbers by changing the highlighted box value using the Down button. Accept the value and move to the next box by pressing the Select button.
4. Once the new Gamma Detection Limit is fully specified and you are at the last box, press the Select button to store the new Gamma Detection Limit and exit back to the previous Adjust Thresholds screen.
5. Follow similar steps to adjust the neutron personal hazard limit. From the Adjust Thresholds screen that appears, change the neutron count threshold values by pressing the Down button to select the Neutron Hazard Limit option, then press the Select button.
6. Enter numbers by changing the highlighted box value using the Down button. Accept the value and move to the next box by pressing the Select button.

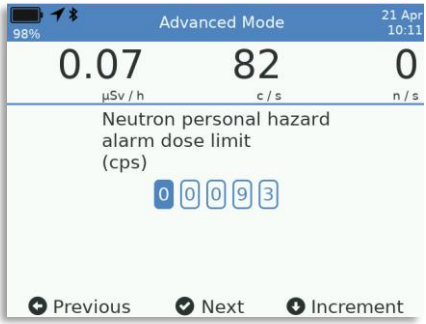

Figure 89: Neutron Personal Hazard Alarm Dose Limit

7. Once the new Neutron Detection Limit is fully specified and you are at the last box, press the Select button to store the new Gamma Detection Limit and exit back to the previous Adjust Thresholds screen.

4.3.4 Low Battery Warning Threshold

Important: The Low Battery Warning Threshold is set at factory and should not be changed without first consulting Symetrica support.

The percentage threshold limit that causes VeriFinder to trigger the System Fault Low Battery warning can be configured from the default percentage threshold limit of 5%, which equates to approximately a 25 minute warning under standard battery test conditions.

To change the percentage threshold limit that triggers the System Fault Low Battery warning:

1. From within the Advanced settings screen press the Down button to select the 'Adjust thresholds and banners' option, then press the Select button.
2. From the Adjust Thresholds screen that appears, press the Down button to select the Low battery warning (percent) and then push the Select button.
3. Enter numbers by changing the highlighted box value using the Down button. Accept the value and move to the next box by pressing the Select button.

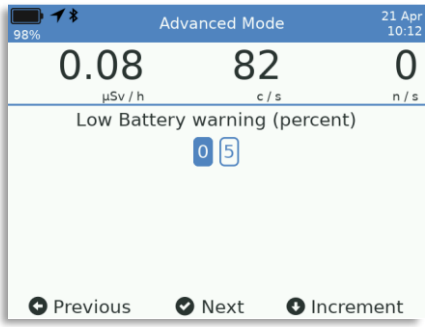

Figure 90: Low Battery Warning Threshold

4. Once the new percentage threshold limit is fully specified and you are at the last box, press the Select button to store the new percentage threshold limit and exit back to the previous Adjust Thresholds screen.

4.4 Enable / Disable Cumulative Dose

Cumulative dose displays a summary value of the dose rate that an operator is exposed to over a period of time. When enabled, it is displayed on the Dose screen (if selected) for the detection of radionuclides (refer to page 45 – Detection of Radionuclide Sources).

To enable / disable cumulative dose:

1. From within the Advanced settings screen, press the Down button to select the 'Enable cumulative dose' option, then press the Select button.
2. The setting changes to 'Disable cumulative dose'. Press the Select button to disable.

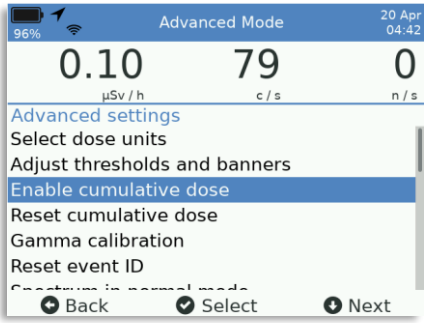

Figure 91: Enable / Disable Cumulative Dose

4.5 Reset Cumulative Dose

Reset cumulative dose resets the start of integer value for cumulative dose displayed on the Dose screen.

To reset cumulative dose:

1. From within the Advanced settings screen, press the Down button to select the 'Reset cumulative dose' option, then press the Select button.
2. Cumulative dose reset is displayed.

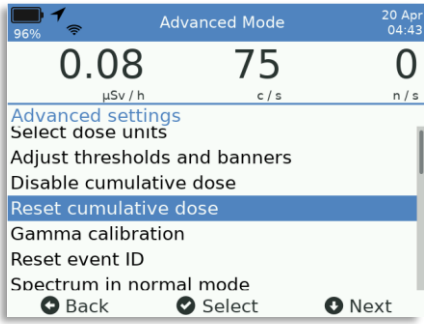

Figure 92: Reset Cumulative Dose

4.6 Gamma Calibration

Caution: Gamma calibration of VeriFinder should only ever be performed by Symetrica personnel. Performing a gamma calibration by non-Symetrica personnel voids the warranty.

To view the existing gamma calibration on VeriFinder:

1. From the Advanced settings screen, press the Down button to select the Gamma Calibration option, then press the Select button.
2. A Gamma Calibration screen appears showing a calibration spectrum and date that the previous calibration was undertaken.

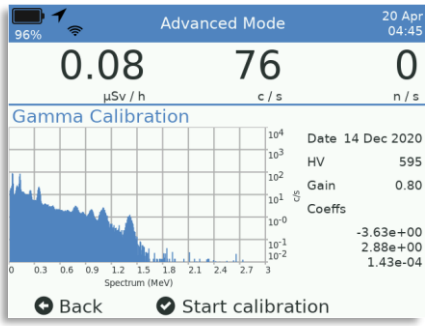

Figure 93: Gamma Calibration

3. Once you have finished reviewing the gamma calibration information, press the Back button to return to the Advanced settings screen.

4.7 Reset Event ID

This option restarts the event counter, with the next event starting at event number 1.

To reset the event ID:

1. From within the Advanced settings screen, press the Down button to select the Reset Event ID option, then press the Select button.
2. From the Reset Event ID: are you sure? screen, select Yes and press the Select button.

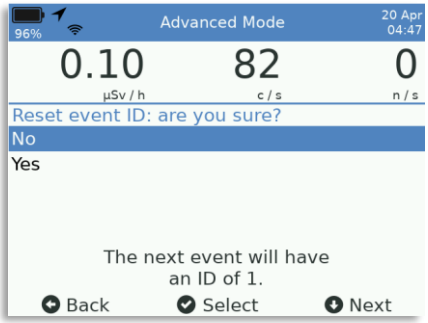

Figure 94: Reset Event ID

4.8 Spectrum in Normal Mode

VeriFinder can be configured to display the spectrum in normal mode when in operational use. The default setting is disabled (no spectrum in normal mode).

To configure the spectrum to display in Normal mode:

1. From the Advanced settings screen, press the Down button to select the Spectrum in Normal Mode option, then press the Select button.
2. From the 'Spectrum visible to normal user' screen that appears, press the Down button to select the desired setting (Disable or Enable), then press the Select button.

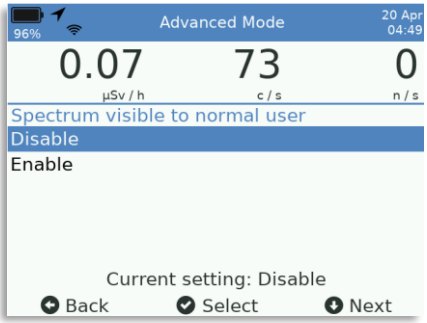

Figure 95: Spectrum Visible to Normal User

3. To accept the new setting, press the Select button.

4.9 Isotope Confidence Display Range

The isotope confidence range is selected from the Advanced settings and provides the operator with a visual level of confidence for a detected radionuclide isotope, by either a percentage or integer range.

To select the isotope confidence display range:

1. From the Advanced settings screen press the Down button to select the Isotope confidence display range option, then press the Select button.
2. From the screen that appears, press the Down button to select the desired display range (1 – 100 (%) or 1 - 10), then press the Select button.

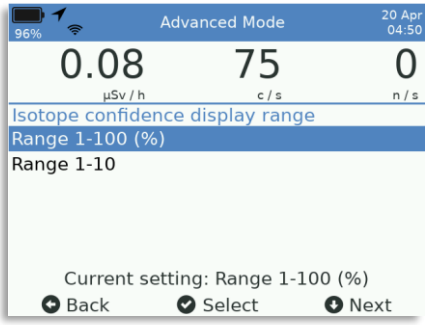

Figure 96: Isotope Confidence Display Range

3. To accept the setting, press the Select button.

4.10 Default Collection Duration

Note: If VeriFinder is set to operate in Alternate Mode 1, the Default Collection Duration option can be found in the Normal Settings menu.

Default Collection Duration determines the extent of data collection when the operator selects the identify function to detect and identify radionuclide sources.

VeriFinder can be configured to a collection duration of 30 seconds, 60 seconds, 2 minutes, 5 minutes, 10 minutes, or 15 minutes. The default collection duration is 30 seconds.

To adjust the default collection duration:

1. From the Advanced settings screen, press the Down button to select the Default Collection Duration option, then press the Select button.
2. From the Select collection duration screen that appears, press the Down button to select the desired default collection duration then press the Select button.

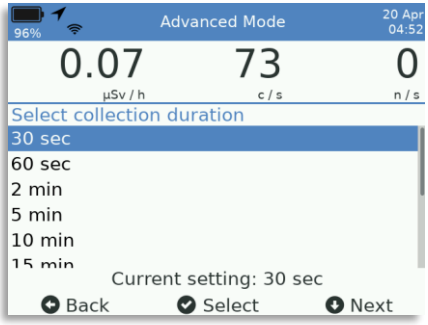

Figure 97: Start Collection Duration

3. To accept the new collection duration setting, press the Select button.

4.11 Gamma / Neutron Count Rate Units

The rate unit used to display gamma count rates can be configured as either:

- Counts per second (c/s).
- Counts per minute (c/min).

Similarly, the neutron count rate can be configured as either:

- Neutrons per second (n/s).
- Neutrons per minute (n/min).

Note: The units will auto scale as the count rate increases.

To change the Gamma or Neutron Count Rate units:

1. Navigate to Advanced Settings.
2. Press the Down button and select either the gamma or neutron count rate units as required.
3. The relevant select count rate units screen is displayed.
4. Choose either c/s or c/min (gamma) or n/s or n/min (neutron) and press the Select button.
5. The new count rate setting is applied.

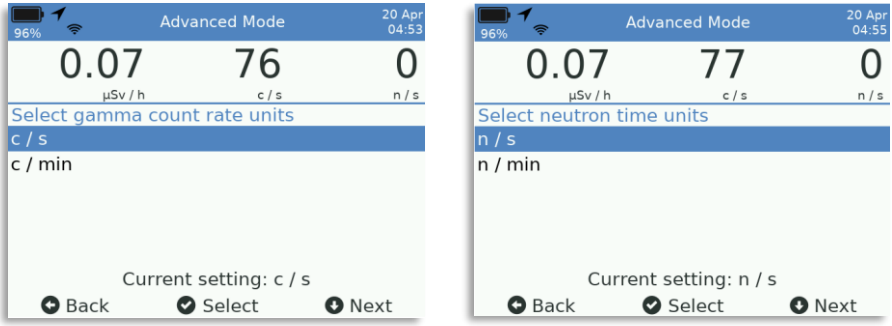

Figure 98: Count Rate Settings

4.12 System Log

The system log is written by the system at start-up. It contains a record of the current software running on VeriFinder along with all system messages, any alerts or alarms and configuration changes.

To view the system log:

1. From the Advanced Settings screen, select System log.
2. The System log screen appears.

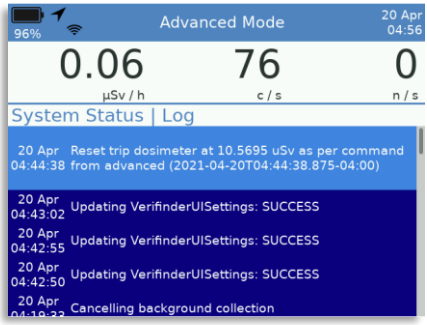

Figure 99: System Log

3. If necessary, scroll through the logs by pressing the Down button and Select button.
4. Press the Back button to return to the Advanced Settings screen.

4.13 Check for Software Updates

Important: Prior to updating software, ensure the system is reliably connected to the network. If possible, connect the power cord to a mains power supply. Software updates can also be conducted through the Web UI (refer to page 178 – Update Software).

Software releases are created to add new functionality or features, improve performance / stability or correct any issues discovered.

To check for Software Updates:

1. From within the Advanced Settings press the Down button to select the Check for Software Updates option, then press the Select button.
2. From the ‘Settings | Software update’ screen that is displayed, press the Select button to initiate a check.

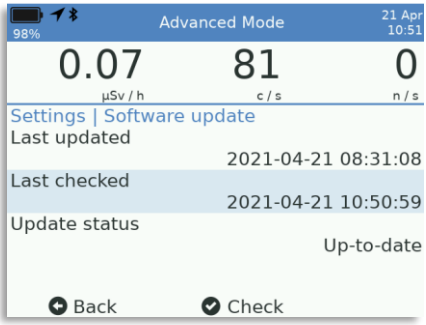

Figure 100: Settings / Software Update Screen

3. The System commences a check for any software updates. If new updates are available, 'Software updates are ready to be installed' is displayed. Press the Select ✔ button to acknowledge.

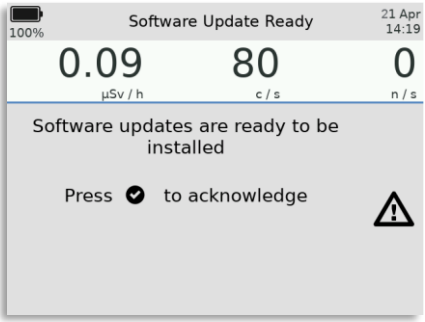

Figure 101: Acknowledge Software Updates Available

4. When the Update status changes to 'Updates ready' press the Down ⬇ button to install.

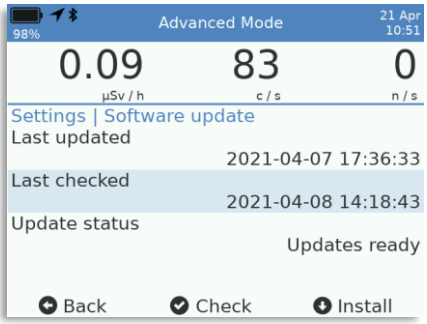

Figure 102: Updates Ready to be Installed

5. The system updates with the latest software. On completion, the status changes to 'Up-to-date'.

4.14 Self Test

Self test facilitates a series of tests that are run on the VeriFinder to confirm its functional status. After a test is completed, the operator confirms the results by selecting either Pass or Fail before proceeding to the next test. Results of all tests are recorded in the Log file (Log.xml), which can be viewed from the Artifacts screen on the Web Management Interface (refer to page - 168 Artifacts).

A self test can be stopped at any time by selecting the Cancel button.

To conduct a self test:

1. From the Advanced Settings press the Down button to select the 'Self test' option, then press the Select button.
2. The 'Self test of device' screen is displayed with 'Start self test' highlighted. Press the Select button to continue.

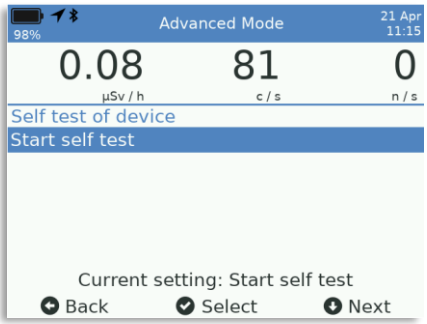

Figure 103: Self Test of Device Screen

3. From the ‘Self test: Are you sure?’ screen, press the Down button to select ‘Yes’ then press the Select button to continue.

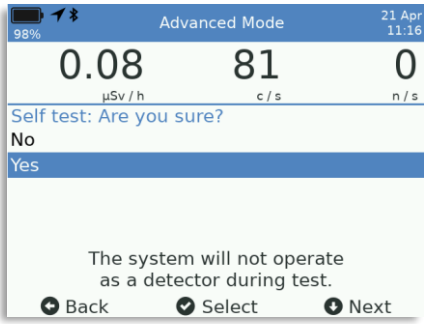

Figure 104: Confirm Start Self Test Screen

4. The self test sequence will start with a check on functionality of the VeriFinder buttons (Left, Middle and Right). Press each button when requested.

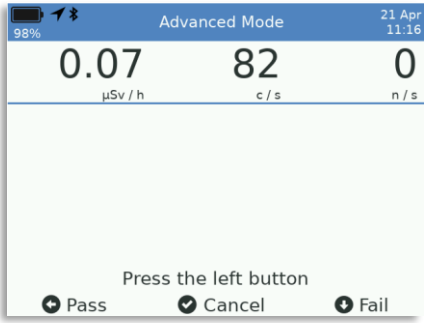

Figure 105: VeriFinder Buttons Test (Example)

5. For each test displayed thereafter, select either Pass or Fail as appropriate. Test results will be recorded in the Log file.

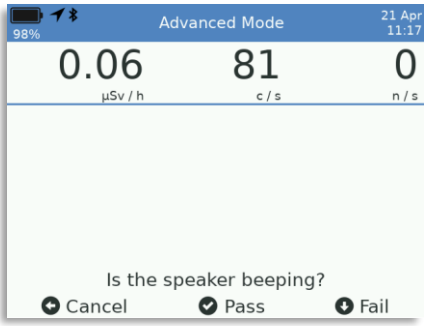

Figure 106: Example Test Screen

Self tests conducted are as follows:

- VeriFinder buttons (Left, Middle, Right)
- Is the speaker beeping?
- Is the buzzer buzzing?
- Are the lights flashing red?
- Are the lights flashing green?
- Are the lights flashing blue?
- Testing system display (a series of screen color tests are conducted)

On completion, select the Back arrow to return to the self test screen.

4.15 Change Advanced Mode Password – Default Mode Only

The Advance Mode Password is required to access the Advanced settings menu.

To change the Advance Mode Password:

1. From the Advanced settings menu, select Change Advanced Mode Password.

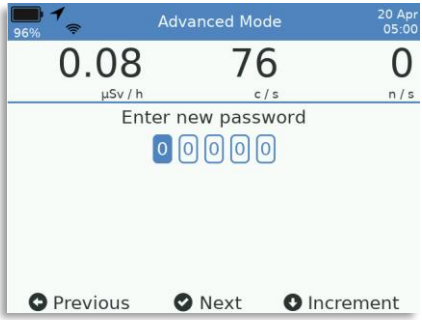

Figure 107: Enter New Password

2. From the Enter advanced mode password screen that appears, change the Advanced Mode Password, as follows:

   a. Enter numbers by changing the highlighted box value using the Down button. Accept the value and move to the next box by pressing the Select button.

   b. Once the new Advanced Mode Password is fully specified and you are at the last box, press the Select button to store the new Advanced Mode Password and return to the previous menu.

4.16 Configuring the Clock Settings

The VeriFinder internal clock can be configured as required. To configure the internal clock:

1. From within the Advanced settings press the Down arrow button to select the Set clock option, then press the Select button.
2. From the 'Select clock value to change' screen that is displayed, press the Down arrow button to select the clock setting you want to change (Year, Month, Day of month, Hour, Minute or Second), then press the Select button.

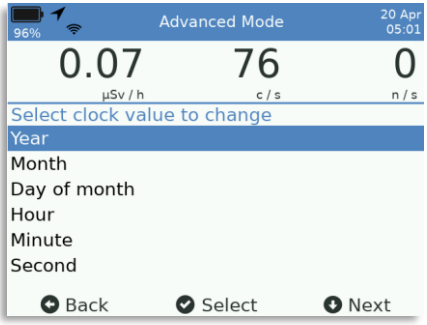

Figure 108: Select Clock Value to Change

3. From the numerical value screen that is displayed, change the highlighted box value using the Down arrow button, accept the value and move to the next box by pressing the Select button
4. Once the new value is fully specified and you are at the last box, press the Select button to store the new value and exit back to the previous page.
5. Repeat steps 2 and 3 for each clock value that you want to change.
6. Once you are happy with the updated clock values, press the Select button.

4.17 Configuring the Time Zone

The time zone used by the VeriFinder internal clock can be configured as required. Each time zone accounts for daylight savings differently, so it is important to set the time zone correctly in order for the internal clock to match that of local time.

To configure the time zone:

1. From the Settings menu select Set time zone.
2. From the Select time zone screen that appears, press the Down button to select the appropriate time zone appears and is selected, then press the Select button.

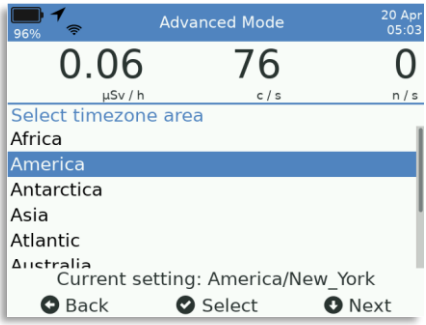

Figure 109: Select Time Zone

3. To accept the new time zone, press the Select button.

4.18 Battery Information

It is important for both operators and maintenance personnel to monitor the life of the batteries. The battery health screen provides this information.

1. From the Advanced Settings screen, select Battery information.
2. The Battery Information screen appears displaying the battery information.
3. Use the Down arrow button to scroll through the battery information.
4. Press the Back arrow button to return to the Advanced Settings screen.

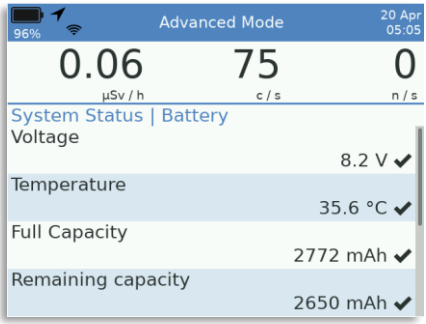

Figure 110: Battery Information

Battery Information:

Displayed Data	Description
Voltage	Actual battery voltage
Temperature	Temperature of battery in degrees Celsius
Full Capacity	Total battery capacity in mAh
Remaining Capacity	Remaining battery capacity in mAh
Time to empty	Remaining time before the battery is empty in minutes
Percent Charge	Percent remaining on the charge

4.19 Language Settings

The VeriFinder user interface supports various languages. The default language setting is English.

To configure the user interface language:

1. From the Advanced Settings menu select Language.
2. Press the Down button to select your desired language, then press the Select button.
3. To accept a new language setting, press the Select button.

Figure 111: Advanced Settings – Language

4.20 Delete All Event Data

This option permanently removes all events from the device.

To delete all event data:

1. From within the Advanced settings screen, press the Down button to select the Delete all event data option, then press the Select button.
2. From the Delete all events: Are you sure? screen, select Yes and press the Select button.

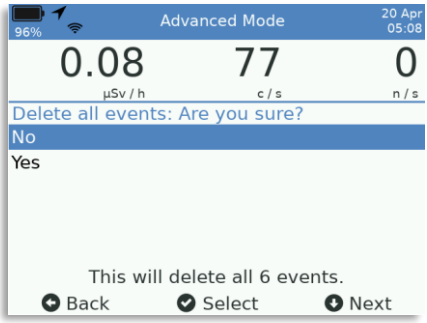

Figure 112: Delete All Event Data

4.21 Factory Reset – Default Mode Only

Performing a factory reset will reset all parameters of VeriFinder back to their factory settings, including the advance mode password and clears all events (refer to page 192 - Appendix 2 Default Settings).

To perform a factory reset:

1. From the Advanced settings screen, press the Down button to select the Factory reset option, then press the Select button.
2. From the Factory Reset: Are you sure? screen that appears, press the Down button to select Yes, then press the Select button. VeriFinder takes approximately 30 seconds to reboot.

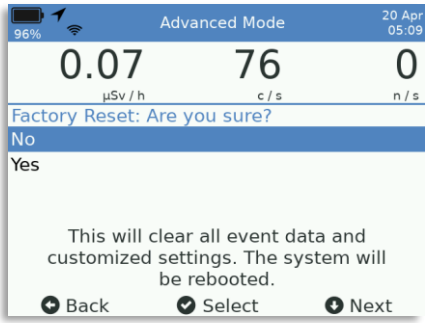

Figure 113: Factory Reset

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SECTION 5 DETECTION - ALERTS AND ALARMS

5.1 Alert and Alarm Indicators

All alert and alarm conditions must be acknowledged to turn off the audio and tactile alarm functions. VeriFinder notifies you depending on the alert/alarm condition.

Once the alert/ alarm has been acknowledged, the alert/alarm condition continues to display in the message field of the window until the condition is no longer present.

Alert and Alarm Conditions:

Condition Type	Condition	Resolution Actions
Alert	Gamma Detected	Refer to page 104 - Gamma Detected Alert. Refer to page 112 - Identification of Low- Level Gamma Signals.
Alert	Threat Radionuclide Identification	Refer to page 105 – Identifying Isotopes.
Alarm	High Gamma Dose Rate	Refer to page 107 - High Gamma Dose Rate Alarm.
Alarm	High Dose Mode	Refer to page 108 - High Dose Mode.
Alarm	Neutron Detected	Refer to page 109 - Neutron Detection Alarm.
Alarm	High Neutron Count (Saturation)	Refer to page 110- Neutron Saturation.
Alarm	Innocent Radionuclide Identification	Refer to page 112 - Innocent Radioisotope Identification Alarm.
Alarm	System issues	Refer to page 112 - System Alarms.

5.2 Detection Alerts

5.2.1 Detection Screen Modes

VeriFinder will detect a radionuclide source instantaneously and identify the type within 60 seconds, assuming a 30 second collection period. The identification process can be initiated from either the **Locate**, **Spectrum** or **Dose** screens (refer to page 45 – Detection of Radionuclide Sources).

- **Locate** – Displays real-time and historical count rate with gamma and neutron detections highlighted on the trace.
- **Spectrum** – Displays spectrum.
- **Dose** - Displays the live gamma dose rate, neutron count rate and cumulative dose (if enabled).

5.2.2 Gamma Detected Alert

VeriFinder displays a Gamma detected alert when gamma radiation is above the threshold. This alert occurs whenever the gamma radiation exceeds the Advanced Mode configurable threshold value and can occur at any point of operation. For more information about configuring the threshold value, refer to page 83 - Adjust Alarm Thresholds.

VeriFinder vibrates during the initial detection.

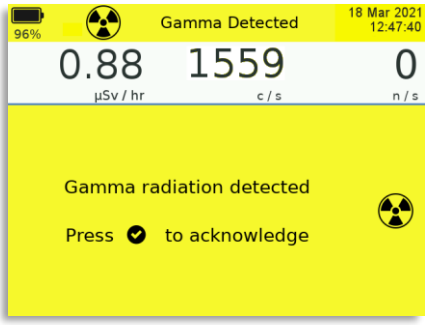


Figure 114: Gamma Detection Alert

VeriFinder displays the alert until it is acknowledged by pressing the Select button. On acknowledgment the view returns to the locate screen.

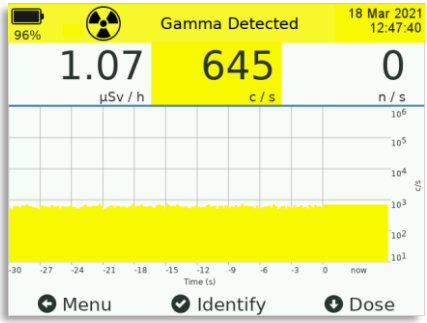


Figure 115: Search Screen

Gamma detection is indicated by the yellow trace.

The Gamma detected banner in the status bar remains as long as the gamma signal remains above the threshold, and for 30 seconds thereafter. This 30-second hysteresis value is user-adjustable and helps prevent nuisance alarms when the gross count is near the threshold value.

To create an event and identify the isotope press the Select ✔ button.

5.2.3 Identifying Isotopes

The default collection period is 30 seconds.

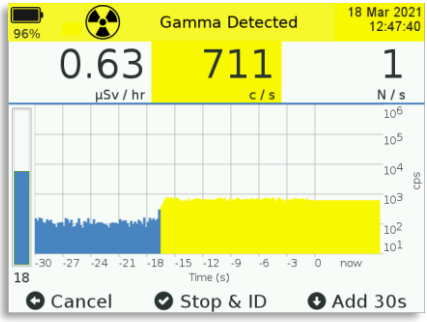


Figure 116: Default Collection Period

The identifying process can be stopped or cancelled at any time during the collection period. The system analyses any data already collected if stopped, but data is discarded if the process is cancelled.

Additional time can be added during or after the collection period.

When the identification is complete, the VeriFinder vibrates and the isotope is displayed.

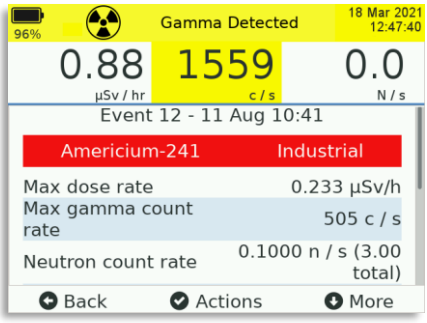


Figure 117: Threat Isotope Identification

The event summary must always be acknowledged.

To scroll through the Event report, use the Down arrow button.

For each nuclide identified, the following information is shown:

- Nuclide name
- Category
- Certainty (Advanced Mode only)
- Atomic symbol and mass number (Advanced Mode only)

5.2.4 Identification of Low-Level Gamma Signals

When analyzing for identification, VeriFinder will evaluate the gamma spectrum for relative strength over the current background. If VeriFinder determines that the signal strength could be marginal for performing identification, a notification is displayed.

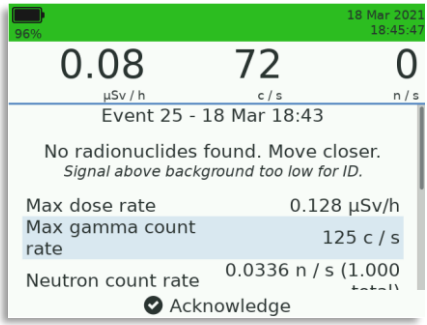


Figure 118: No Radionuclides Found

This can occur in three situations:

- No radiation is visible above background levels.
- The source is strong enough to be detected but below the limit for reliable identification.
- You have an out-of-date / invalid background.

This notification may occur along with the results of one or more identified radionuclides or with just the message, '**No radionuclides found**'. In either case, you may want to get closer to the signal source to obtain a stronger spectrum for analysis.

Note: If radiation is detected whilst the event is being reviewed the banner will change color.

5.2.5 High Gamma Dose Rate Alarm

The High Gamma Dose Rate alarm is a personal hazard alarm, which triggers when the gamma dose rate detected by VeriFinder exceeds the Advanced Mode configurable threshold value. For more information about configuring the threshold value, refer to page 83 - Adjust Alarm Thresholds.

Features of a High Gamma Dose Rate alarm are:

- Default is 100 µSv/h
- User settable
- Audible alarm and tactile alert will activate
- Banner remains whilst the dose is at a hazardous level
- Must be acknowledged

Figure 119:High Gamma Dose Rate Alarm

When a high gamma dose rate alarm occurs, press the Select button to acknowledge the alarm.

At this point VeriFinder displays the alarm status message on the locate screen. The message remains on the screen for as long as the gamma gross count stays above the threshold value. Regardless of user preferred settings, the audible alarm and tactile alert will be activated.

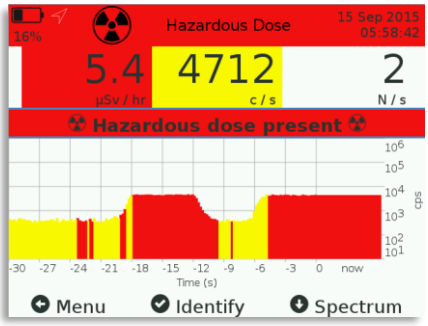


Figure 120: Search Screen - Alarm Status Message

If the gamma dose rate reaches or exceeds the detector saturation level, VeriFinder shuts off the gamma detector and enters High Dose mode (see next).

5.2.6 High Dose Mode

At a dose of approximately 1 mSv/h from Cs-137, VeriFinder will enter high dose mode.

In high dose mode, the gamma detector is turned off to preserve the life of the detector and the High Dose Mode alarm appears. At the same time the gamma count rate reading changes to dashes (**----)**, and the dose rate is provided by a secondary smaller detector.

High dose mode allows VeriFinder to be used in exceptionally high dose rate environments to locate large gamma sources.

VeriFinder will automatically recover when the dose returns to a normal rate, at which time it reverts to a stabilizing state to enable normal operation to continue (less than one minute).

Figure 121: High Dose Mode Alarm

If a high dose mode alarm occurs, press the Select button to acknowledge the alarm.

5.2.7 Neutron Detection Alarm

When the neutron count detected by VeriFinder exceeds the threshold value, an alarm is triggered and a pop-up will appear. VeriFinder vibrates on the initial detection.

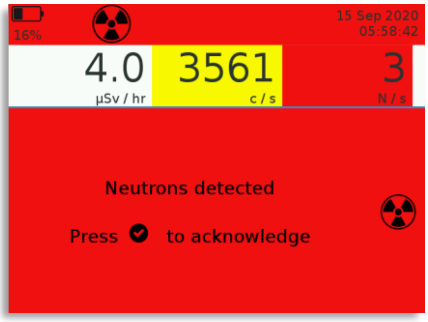


Figure 122: Neutron Detected Alarm

Press the Select button to acknowledge the alarm. VeriFinder switches to the detection mode screen.

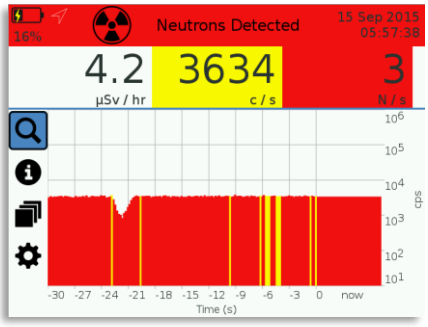


Figure 123: Neutron Detected in Detection Mode

Neutron detection is indicated by a red trace.

The banner in the status bar remains for 30 seconds (default) after the last neutron event is detected.

Press the Select button to record spectra of any gamma radiation associated with the neutron event.

5.2.8 Identifying Neutron Events

The VeriFinder vibrates when identification is complete and the neutron event is displayed.

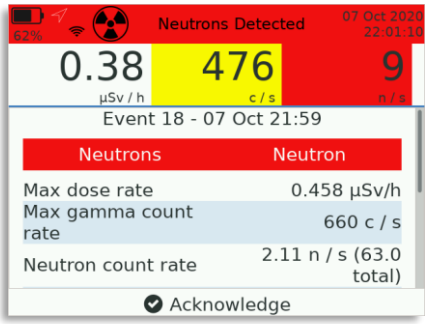


Figure 124: Identifying Neutron Events

The event summary must always be acknowledged. To scroll through the isotope list, use the Down arrow button.

For each nuclide identified, the following information is shown:

- Nuclide name.
- Category.

5.2.9 Neutron Saturation

Under exceptionally high gamma fluxes (2 mSv/h) the neutron detector will saturate.

At this point the detector system will shut down the detector to prevent damage to VeriFinder. When the detector becomes saturated an alarm is displayed.

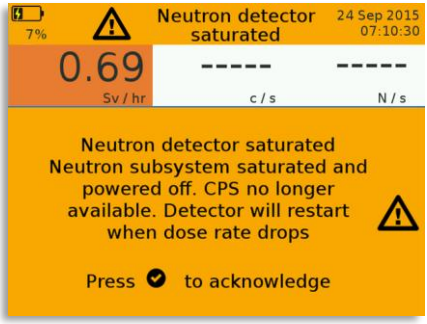


Figure 125: Neutron Detector Saturated Alarm

If a neutron saturation alarm occurs, press the Select button to acknowledge the alarm and move the VeriFinder to a lower gamma dose environment.

When the dose rate drops below the saturation threshold the neutron detector will automatically restart and normal operation will resume.

5.2.10 Simultaneous Alarms

If multiple alarms occur simultaneously, each alarm must be acknowledged separately by the operator. The highest threat alarm is acknowledged first, followed by the others as follows:

Alert/Alarm Condition	Type	Priority Level
High Neutron Count (Saturation)	Alarm	1
High Gamma Dose Rate	Alarm	2
Instrument Failure	Alarm	3
System Fault	Alarm	4
Neutron Detection*	Alarm	5
Gamma Detection*	Alert	6
Radionuclide Identification	Alert	7
General Alert	Alert	8
Battery Low Warning	Alert	9

***** This alert/alarm has zero priority after first initiation unless no gamma/neutrons have been detected for at least 30 s. After 30 seconds, if gamma / neutrons are detected the alert / alarm will re-initiate at the above stated priority level.

Note: If the gamma and neutron detection alarms have been disabled in Advanced Mode, they will have zero priority and not appear.

Subsequent threat level alarms are acknowledged in order. If multiple alarms of the same priority occur, they are acknowledged in the order in which they are detected by the software.

5.3 Radioisotope Identification Alerts

There are two types of radioisotope identification alert: innocent or threat.

Identification of a radioisotope, either innocent or threat, generates an alarm. The radioisotopes are displayed in order of alarm level.

Threats show as red and innocents as green; the isotopes identified in the event report are listed in priority order, with threats always prioritised over innocents.

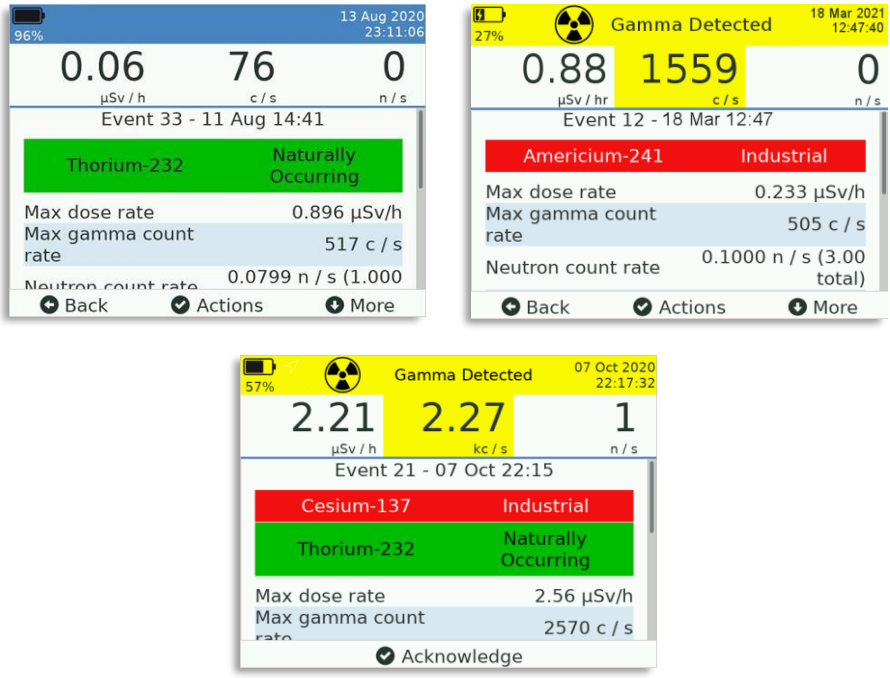


Figure 126: Radioisotope Identification Alerts

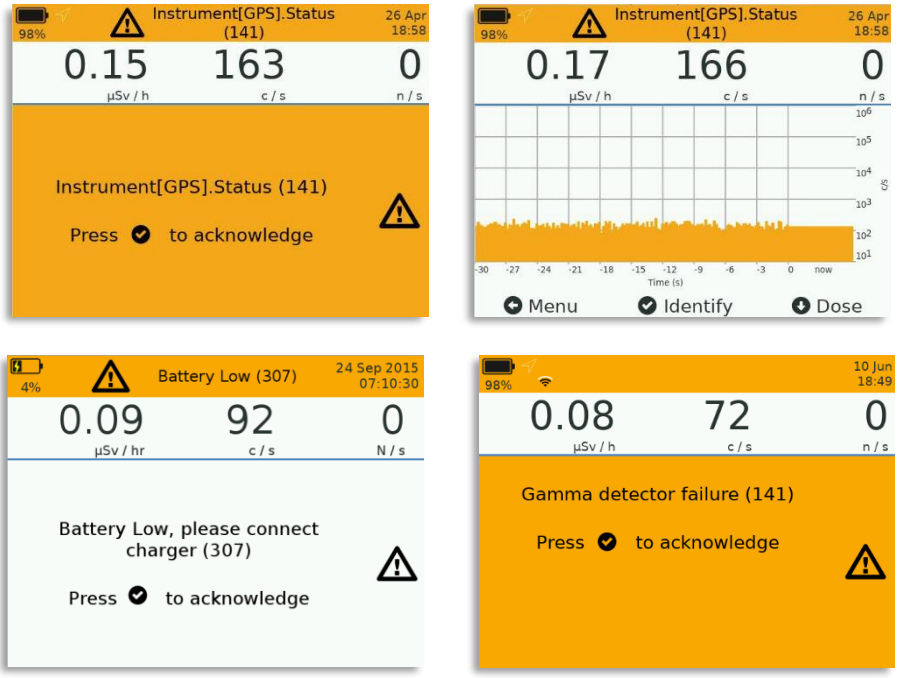
An advanced user can use the VeriFinder web interface (refer to page 123 - The VeriFinder Web Interface) to move radioisotopes between categories to align with their concept of operations (refer to page 59 - Appendix 1 Isotope Library).

5.4 System Alarms

System alarms are generated whenever a fault or error condition exists within VeriFinder and are indicated by the status bar and / or screen turning orange.

Possible system alarms are:

- GPS fault
- Low battery
- Detector failure



…

Figure 127: Possible System Alarms

Warnings must be acknowledged. Press the Select button to acknowledge the alarm, and then take appropriate action to resolve.

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SECTION 6 CONNECTING VERIFINDER TO A PC

Symetrica's Offload Tool enables:

- Download all events from VeriFinder for further review, including detailed spectra and creation of N42.42 data for reach-back purposes.
- Operate VeriFinder remotely in cases where radiation may require you to remain at a safe distance.
- Manage the VeriFinder isotope library.

6.1 Initial VeriFinder Setup on a PC

The first time you connect VeriFinder to a PC it will be recognized only as a mass storage device, and its RNDIS driver will not yet be installed. VeriFinder comes with a small amount of mass storage, which contains this Operator Manual, the Offload Tool and the RNDIS driver.

For the software to connect with VeriFinder, the RNDIS driver must first be installed on the PC.

Although this is a standard operation, Administrator rights are generally required to install the driver. This is a one-time install per PC.

6.1.1 Installing the VeriFinder RNDIS Driver

To install the RNDIS driver:

1. Open the protective boot cover on the rear of VeriFinder and use the supplied USB cable to connect to a USB port on the PC.

Figure 128: Connecting VeriFinder to a USB Port on the PC

2. VeriFinder is recognized as a mass storage device with a new drive letter. The AutoPlay dialog box is displayed.

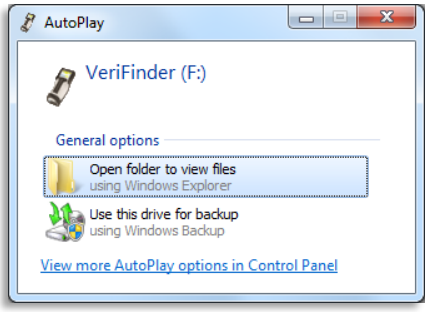

Figure 129: AutoPlay Dialog

Note: If the AutoPlay dialog box does not appear, then the AutoPlay feature has been disabled in your Windows operating system. In this case, use Windows Explorer to navigate to the new drive letter assigned to VeriFinder.

3. From the AutoPlay dialog box, click Open folder to view the files. Alternatively, use Windows Explorer to navigate to the new drive letter assigned to VeriFinder.

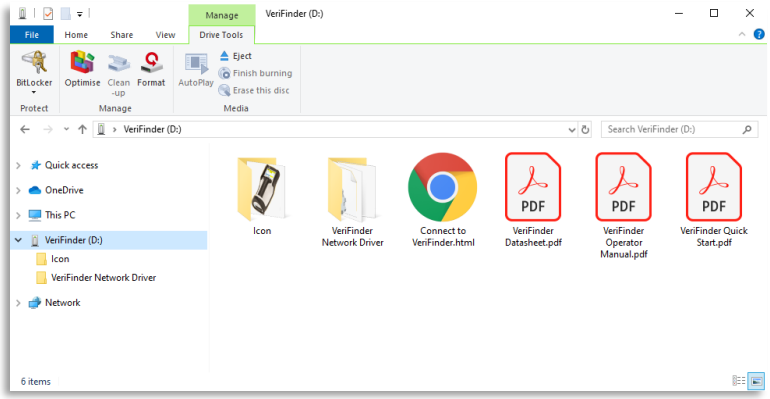

Figure 130: Windows Explorer

4. For the PC and the Deep Discovery to be able to connect to VeriFinder, the network drivers need to be installed. If the PC has never had the VeriFinder network drivers, an installation popup appears in the Windows tray.

Figure 131: Installing Device Driver

5. In the Windows Explorer window, double-click the 'Connect to VeriFinder.html' link. The VeriFinder will now guide you through the RNDIS driver install procedure.

Note: If you have trouble during Step 5, you may use Steps 6 and 7 below to perform the task manually.

6. Double-click the status pop-up to display the status. A 'Driver Software Installation' dialog box appears.

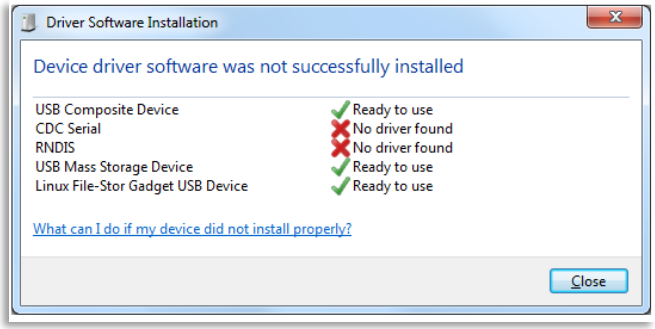

Figure 132: Driver Software Installation

Notes: It is normal that Windows cannot find all the necessary drivers for VeriFinder because it only searches the Microsoft database of drivers.

The CDC Serial driver is not used by VeriFinder and does not need to be installed.

7. Launch the Windows Device Manager (Start > Control Panel > Device Manager).

8. From the Device Manager window that appears, expand the Other devices node to reveal the RNDIS device.

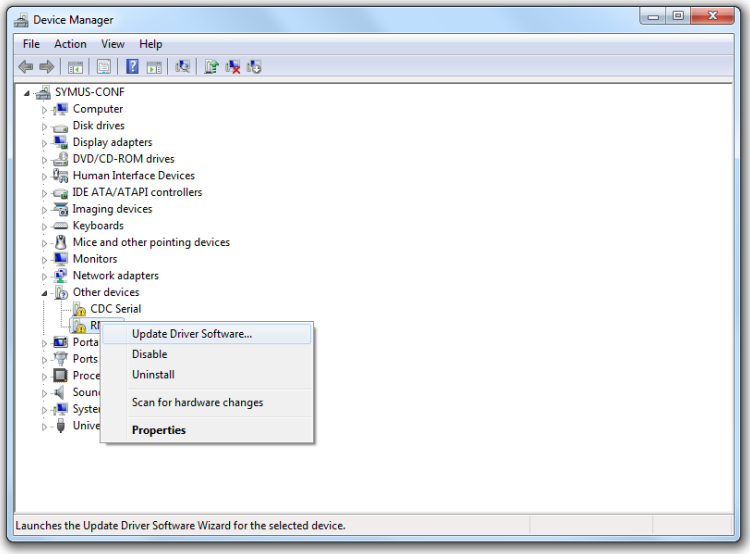

Figure 133: Device Manager

9. Right-click on the RNDIS device and select Update Driver Software from the pop-up menu that appears.

10. From the Update Driver Software - RNDS dialog box that appears, select Browse my computer for driver software.

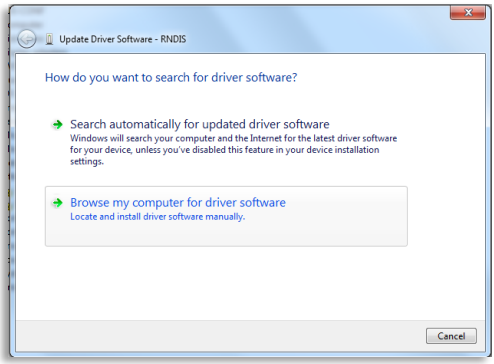

Figure 134: RNDIS Dialog

11. Click the Browse button and navigate to the drive letter assigned to VeriFinder, choose the VeriFinder Network Driver folder, and click Next.

12. Click Install. Windows will install the RNDIS device driver. Once the RNDIS device driver is complete, close the Device Manager window.

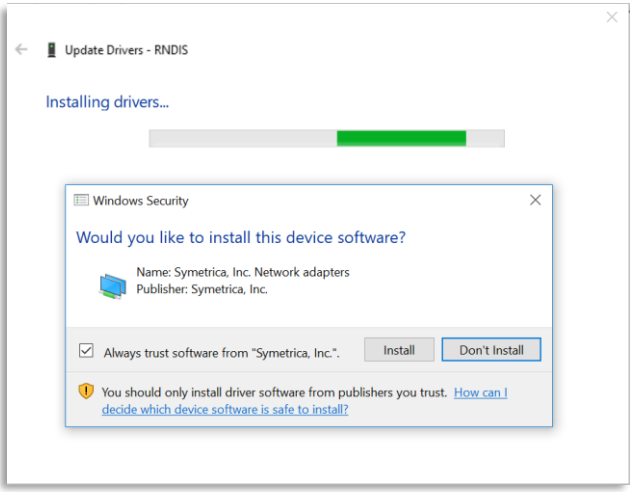

Figure 135: Installing Drivers

6.2 Offloading Events to the PC

To offload events from VeriFinder to the PC:

1. Ensure that either the external power is connected to VeriFinder or that the battery is not fully depleted.
2. Open the protective boot cover on the rear of VeriFinder and use the supplied USB cable to connect to a USB port on the PC.
3. Click the Start menu and run Deep Discovery or double-click the Deep Discovery tray icon.
4. In the Symetrica Application Discovery window, select the detected VeriFinder unit and click the Connect button.

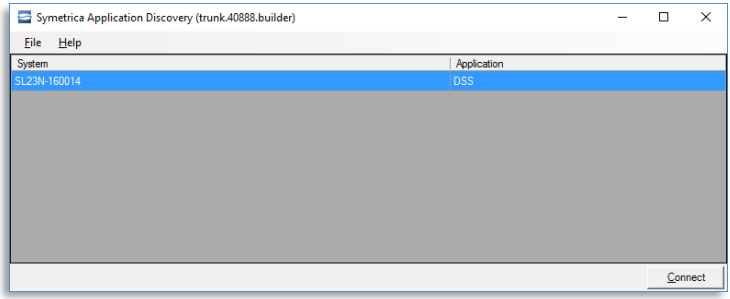

Figure 136: Symetrica Application Discovery

5. If this is the first connection, a Confirm Remote Identify dialog may appear. Click Accept to accept the certificate.

Note: If the required VeriFinder is not on the list, navigate to the File menu and click the Connect option. From the Connect dialog, enter the IP address of the VeriFinder and click OK.

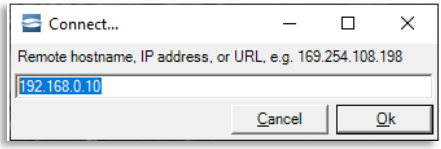

Figure 137: VeriFinder Connect Dialog

6. When asked to Log in, enter ‘operator’ in the Username field. In the Password field, enter the current password; the default is ‘symetrica’.

7. On successful connection the ‘Offload data…’ dialog appears with options to export only new events or export all events.

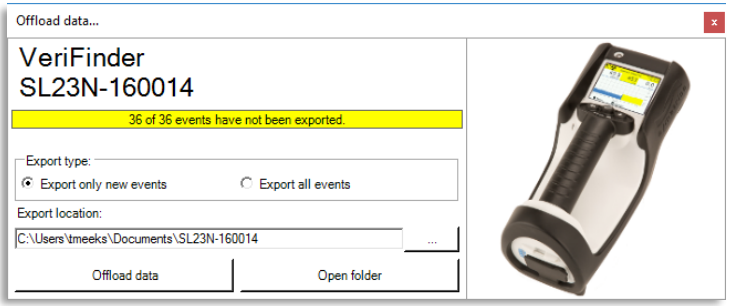

Figure 138: Offload Data Dialog

8. Enter an export location and click the ‘Offload data’ button. The progress bar populates with the offload status indicating number of event files offloaded.

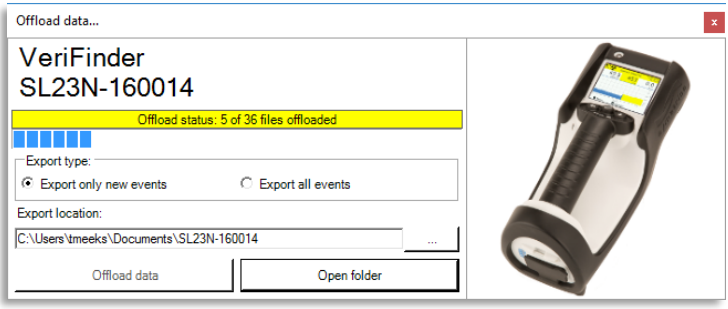

Figure 139: Progress Bar - Events Files Offloaded

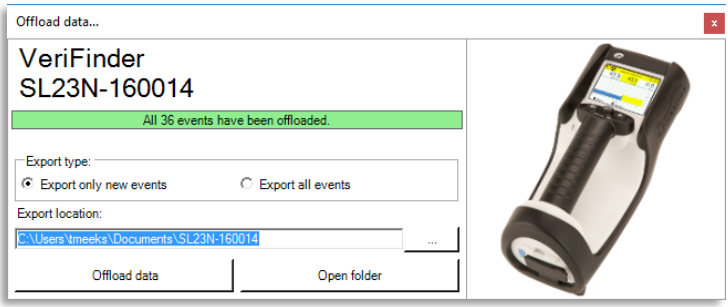

Figure 140: Progress Bar – All Events Offloaded

9. Click the Open folder button to view the offloaded files.

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SECTION 7 CONNECTING TO THE WEB MANAGEMENT INTERFACE

VeriFinder contains a built-in web server, which hosts a set of Web Management Interface (WMI) screens that can be accessed using a Web Browser and / or Android device. The WMI offers you an alternative mechanism to manage the VeriFinder.

7.1 Connecting to the VeriFinder WMI

There are three ways in which you can connect to the VeriFinder WMI:

- Through a USB Cable Connection on a PC.
- Through a Wi-Fi network (if VeriFinder is already connected to the same Wi-Fi network as your PC).
- Via a Bluetooth connection to a compatible device.

Note: When connecting VeriFinder to a Wi-Fi network for the first time, it is recommended that you configure the Wi-Fi SSID network password using a USB cable connection and the WMI screen associated with managing Wi-Fi networks.

7.1.1 Connecting to VeriFinder WMI via a USB Cable Connection

It is recommended to use the Chrome web browser when using the WMI.

1. Open the protective boot cover on the rear of VeriFinder and use the supplied USB cable to connect to a USB port on the PC.

Figure 141: Connecting VeriFinder to a USB Port on the PC

2. VeriFinder is recognized as a mass storage device with a new drive letter. The AutoPlay dialog box is displayed.

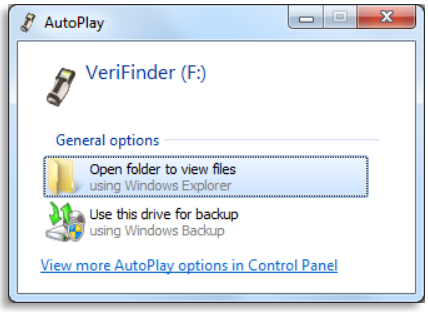

Figure 142: AutoPlay Dialog

Note: If the AutoPlay dialog box does not appear, then the AutoPlay feature has been disabled in your Windows operating system. In this case, use Windows Explorer to navigate to the new drive letter taken by VeriFinder.

3. From the AutoPlay dialog box, click Open folder to view the files. Alternatively, use Windows Explorer to navigate to the new drive letter assigned to VeriFinder.

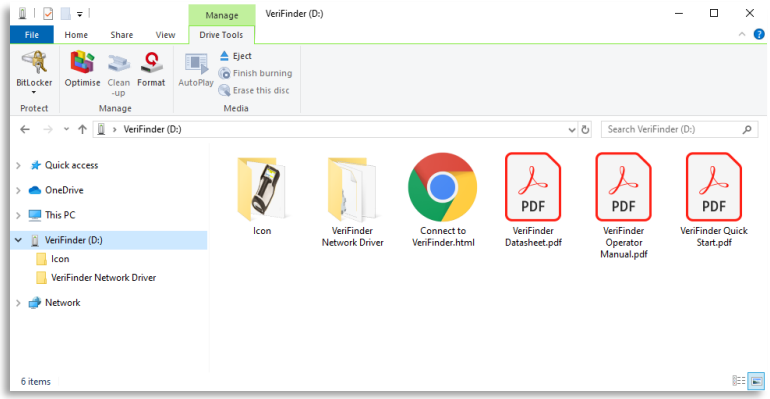

Figure 143: Windows Explorer

4. Double-click the ‘Connect to VeriFinder.html’ icon. A login screen will appear in your default Web Browser.

5. Refer to page 129 - Logging into the VeriFinder WMI.

7.1.2 Connecting to the VeriFinder WMI via a Wi-Fi Network

Note: VeriFinder will only connect to authorized networks, that is, networks with a saved security key.

The following steps assume that VeriFinder is already connected to the same Wi-Fi network as your PC.

1. From the System Status screen on VeriFinder, select Network information.

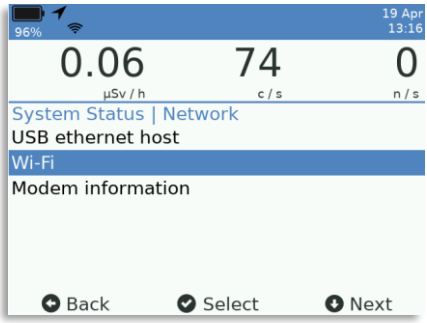

Figure 144: System Status - Network

2. Press the Down button to choose the Wi-Fi menu option and Select button.
3. A Wi-Fi status screen appears showing the IPv4 address, for example 192.168.16.202.

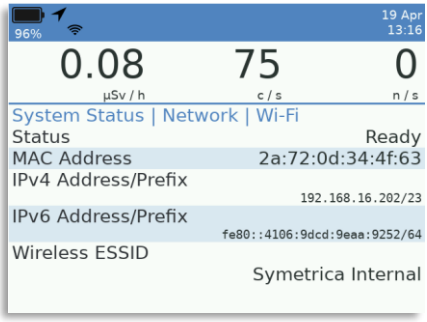

Figure 145: System Status – Network and Wi-Fi

4. Note down the IP address.
5. Press the Back button to return to the System Status screen.
6. On your PC, open a Web Browser and enter the following URL: http://IP_ADDRESS, where IP_ADDRESS is the VeriFinder IP address you noted down in Step 4, for example http://192.168.6.72.
7. A login screen will appear in your preferred Web Browser.
8. Refer to page 129 - Logging into the VeriFinder WMI.

7.1.3 Connecting to the VeriFinder WMI via Bluetooth

VeriFinder has Bluetooth 4.0 capability, which enables pairing of an Android device.

To Enable Bluetooth Pairing on VeriFinder:

1. On the VeriFinder screen, select Menu > Settings > Connectivity.
2. Select Bluetooth and select Enabled.
3. Select Pair Bluetooth.
4. You will see the message: VeriFinder is now discoverable as <device name>.
5. Make a note of the device name. (SN23N-180003 in this example).

Figure 146: Configure VeriFinder and Android for Bluetooth Pairing

To Enable Bluetooth Pairing on an Android Device:

Follow the manufacturer's instructions for pairing Bluetooth devices for your specific version of Android.

Note: Make sure Bluetooth Tethering is enabled on the Android device. Symetrica has validated Bluetooth capability with Android versions 7.0.0 and newer. If you encounter difficulties with older versions of Android, please contact Symetrica.

On VeriFinder:

1. Confirm the pairing on VeriFinder.
2. Make sure Bluetooth icon is solid background with a blue icon.
3. Select Menu > System Status > Network Information > Bluetooth.
4. Make a note of the IPv4 Address/Prefix (192.168.44.151 in this example).

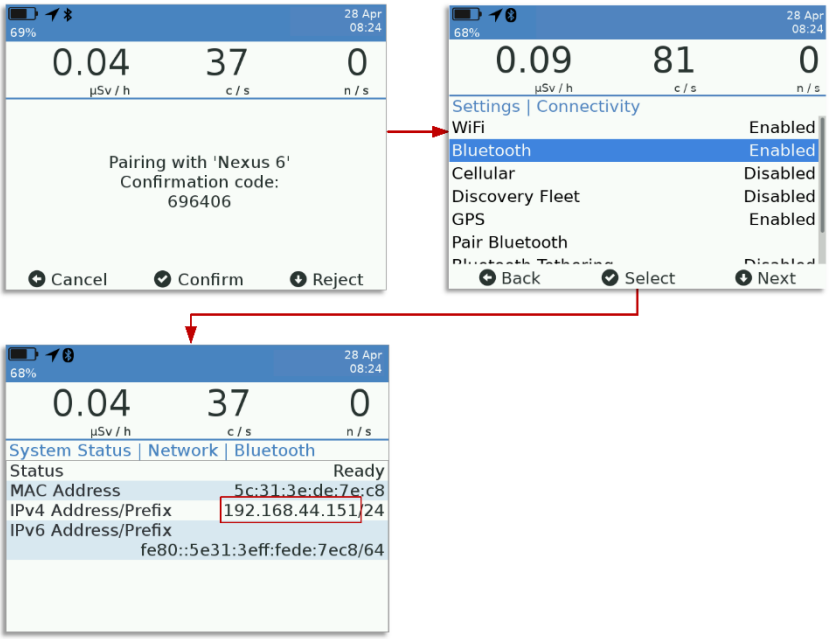

Figure 147: Confirm Pairing on VeriFinder

On the Android Device:

1. Open an Internet Browser on your Android device.
2. Enter the IPv4 address you noted above.
3. The VeriFinder WMI is displayed.

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SECTION 8 USING THE WEB MANAGEMENT INTERFACE

8.1 Logging in to the VeriFinder Web Management Interface

Once connected to the VeriFinder Web Management Interface (WMI), the Login dialog is displayed.

Figure 148: VeriFinder Login Dialog

In the Username/Password field, type a valid username and password. The default is ‘operator’ and ‘symetrica’ or ‘advanced’ and ‘symetricas’, however these can be changed as required.

Click the Log in button. The VeriFinder WMI is displayed with the device **System Information** details.

Figure 149: VeriFinder Web Management Interface

8.2 VeriFinder WMI Overview

8.2.1 Home Screen

The **Home** screen display is determined by the default landing screen set by the user (refer to page 147 – User Preferences).

The screen consists of a **Menu Bar**, **Status Bar**, **Detection Rate** (Dose, Gamma and Neutron) and **Display Area**. The Menu Bar, Status Bar and Detection Rate are permanently available on all views.

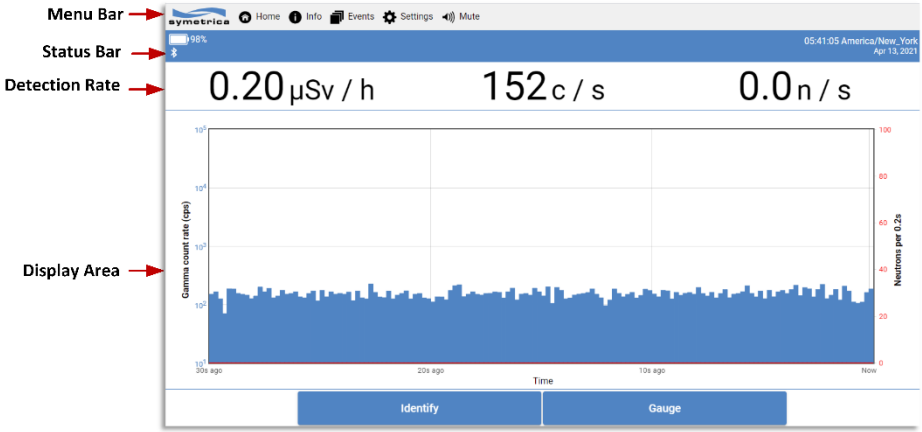

Figure 150: Home Screen

The display can be changed as required by clicking the available display button (**Locate**, **Gauge**, **Dose Rate** and for the advanced user, **Spectrum**).

Figure 151: Home Screen Displays

Selection of the **Identify** button starts the process of identifying and reporting on a detected source. The system starts collecting acquisition data, which is detailed in the progress bar. On completion, details of the acquisition are summarised in the **Status Bar**.

Figure 152: Identify Source

The process can be stopped at any time by clicking the **Stop and ID** button. This action will finalise the process and summarise the results in the **Status Bar**.

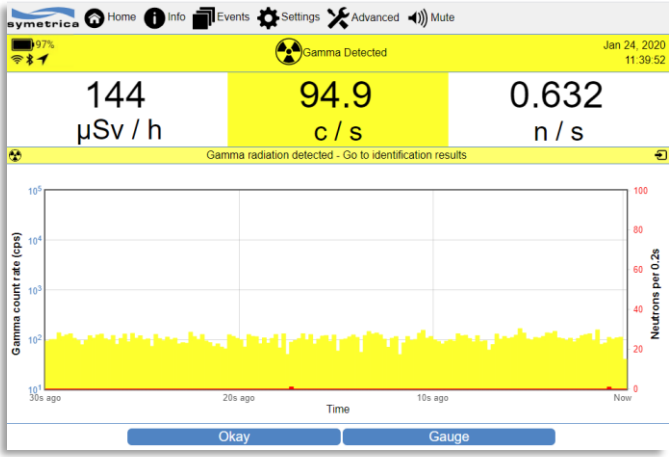

Figure 153: Detection Results

Select **Okay** to acknowledge and load the **Identification Results** screen (refer to page 140 – View Open Events).

8.2.2 Menu Bar

The VeriFinder WMI has several menu options available to the operator / advanced operator.

Menu Options:

Menu	Menu Options	Reference Page
Info	System Info	Refer to page 54
	System Health	Refer to page 56
	Network Info	Refer to page 57
	Location Info	Refer to page 58
	Battery Info	Refer to page 136
	Isotope Library	Refer to page 137
	Tutorial	Refer to page 139
	Manuals	Refer to page 139
	Contact Support	Refer to page 140

Menu	Menu Options	Reference Page
Events	View Open Events	Refer to page 140
	View Event Archive	Refer to page 143
Settings	Background	Refer to page 144
	Audio and Alerts	Refer to page 145
	User Preferences	Refer to page 147
	Create Diagnostic Package	Refer to page 148
	Connectivity	Refer to page 149
	Configure Email	Refer to page 160
	Remote Control	Refer to page 162
	Log Out (<User Type>)	Refer to page 162
	Reboot	Refer to page 163
	Shutdown	Refer to page 163
Advanced	User-Interface Settings	Refer to page 164
	Adjust Thresholds and Banners	Refer to page 165
	Gamma Calibration	Refer to page 166
	Reset Event ID	Refer to page 167
	System Log	Refer to page 167
	Artifacts	Refer to page 168
	Set Clock and Time Zone	Refer to page 170
	Factory Reset	Refer to page 172
	Change Password	Refer to page 175
	Manage Users	Refer to page 175
	TLS Certificate	Refer to page 176
	Update Software	Refer to page 178

Button	Action
Home	Returns the user to the Home screen (refer to page 130).

Menu	Menu Options	Reference Page
Mute	Mutes the alarm. To unmute, press the button	

8.3 Information (Info) Menu Options

8.3.1 System Information

System Information is the opening screen after initial login to the system. This screen is also displayed from the **Info > System info** menu option.

The screen contains full data details on the VeriFinder, including:

- Overall system information.
- Serial numbers of the VeriFinder unit, Gamma and Neutron detectors.
- Software and firmware versioning.
- Calibration information.
- Storage information.
- Time information.

Figure 154: System Information Screen

8.3.2 System Health

System Health is displayed from the **Info > System health** menu option.

The screen provides a live overview of the health status for the system. If the system parameters are operating correctly, they are annotated with a tick ✔. If system parameters are out of specification, they are annotated with a cross ✘.

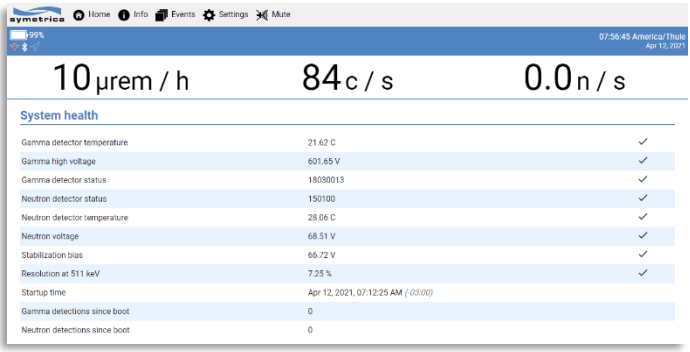

Figure 155: System Health Screen

8.3.3 Network Information

Network Information is displayed from the **Info > Network info** menu option.

The screen provides an overview of the network connectivity, including:

- Ethernet information.
- USB ethernet host information.
- Wi-Fi information.
- Modem information.
- Network connections.

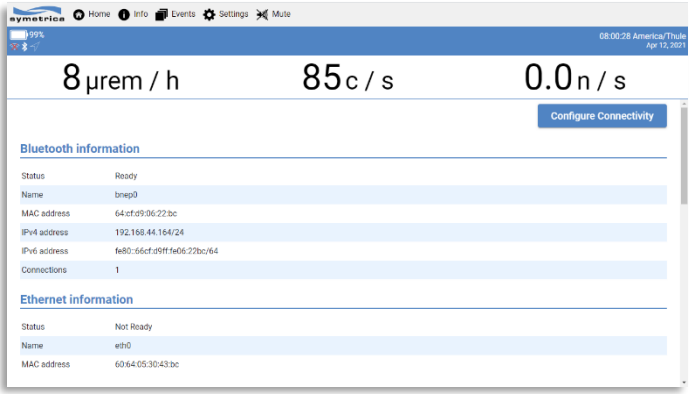

Figure 156: Network Information Screen

This screen also offers the option to make changes to the network connectivity. Clicking the **Configure connectivity** button opens the **Connectivity Settings** screen from where configuration of the network parameters can be made (refer to page 149 – Connectivity Settings).

8.3.4 Location Information

Location Information is displayed from the **Info > Location info** menu option.

The screen provides fixation data for the VeriFinder unit, including:

- Whether the location chip is enabled or disabled.
- If a location fix is obtained.
- The current longitude and latitude co-ordinates of the unit determined by the onboard location chip.

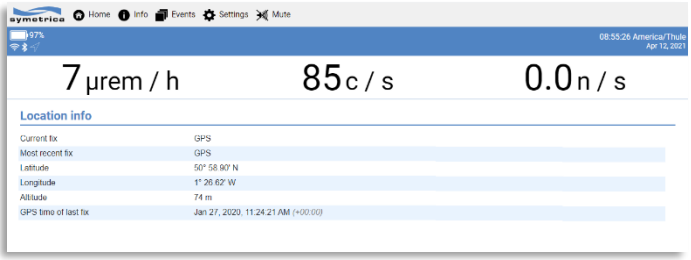

Figure 157: Location Information Screen

8.3.5 Battery Information

Battery Information is displayed from the **Info > Battery info** menu option.

The screen provides an overview of the current status of the battery, including:

Current charge state (including estimated time left)

- Battery voltage.
- Battery temperature in °C.
- Remaining battery capacity in mAh.
- Charge current in mA.

If the battery parameters are operating correctly, they are annotated with a tick ✔ If battery parameters are in error or out of specification, they are annotated with a cross ✘.

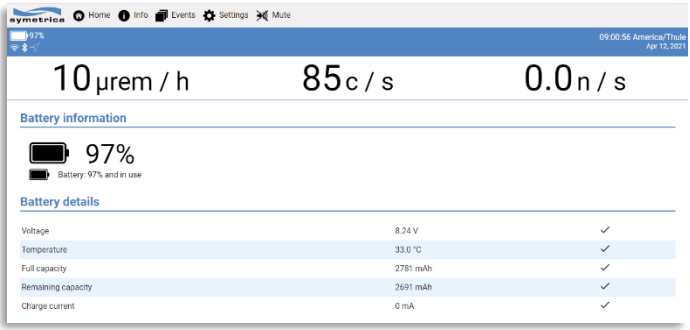

Figure 158: Battery Information Screen

8.3.6 Isotope Library

Isotope Library is displayed from the **Info > Isotope library** menu option.

The screen provides a list of all isotopes that VeriFinder is configured to detect, with the option for an **Advanced** user to locally edit isotope parameters. Where an isotope cannot be edited, for example Uranium, it will be annotated with a lock icon 🔒.

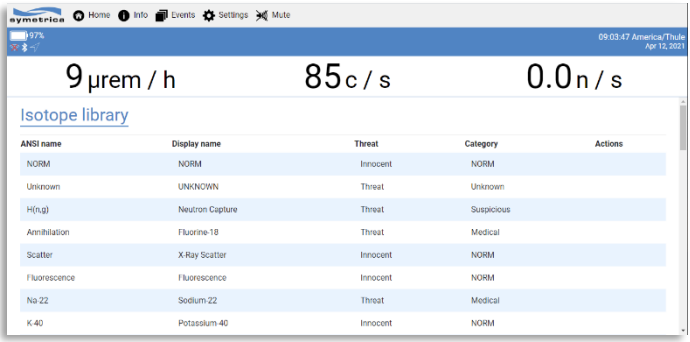

Figure 159: Isotope Library Screen

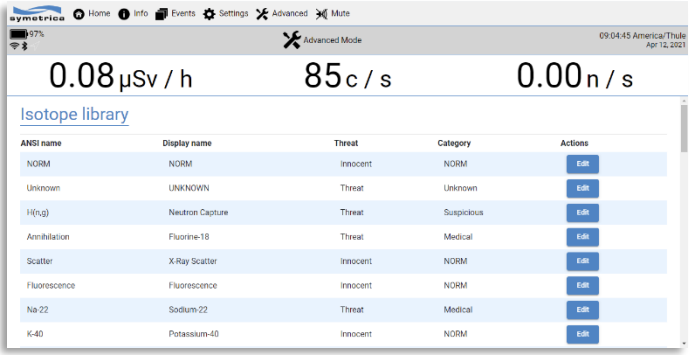

Figure 160: Isotope Library Screen (Advanced)

To change the parameters of an isotope as an **Advanced** user, click the **Edit** button. The **Edit nuclide** screen is displayed.

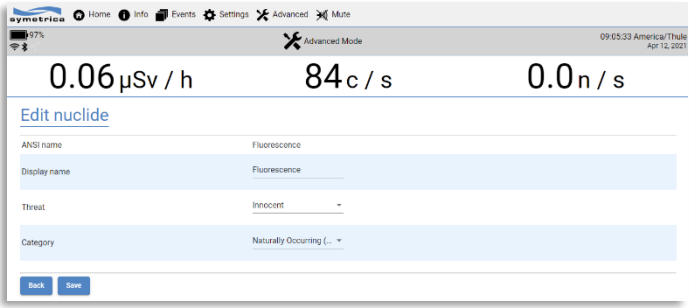

Figure 161: Edit Nuclide Screen

Changes can be made to the Display name, Threat type and Category of the isotope.

Threat:

- Threat.
- Suspicious.
- Innocent.

Category:

- Naturally Occurring (NORM).
- Unknown.
- Suspicious.

- Medical.
- Industrial.
- Special Nuclear Material.

On completion of editing, click the **Save** button to confirm and effect the changes.

8.3.7 Tutorial

Tutorial is available from the **Info** > **Tutorial** menu option.

The screen displays basic help on the system. Use the **Next** button to navigate through the help topics.

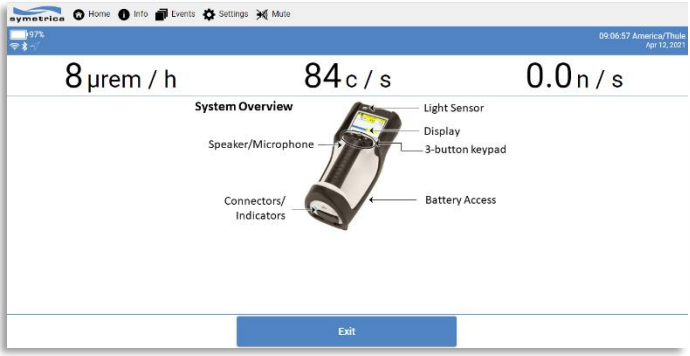

Figure 162: Tutorial Screen

8.3.8 Manuals

Manuals are available from the **Info** > **Manuals** menu option.

The screen displays hyperlinks to the **VeriFinder Quick Start Guide** and the **VeriFinder Operator Manual.** Click the required hyperlink to open and display the manual.

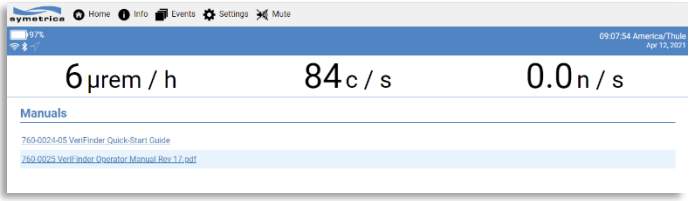

Figure 163: Manuals Screen

8.3.9 Contact Support

Contact Support is available from the **Info** > **Contact support** menu option.

The screen displays Symetrica support contact details for both the UK and USA.

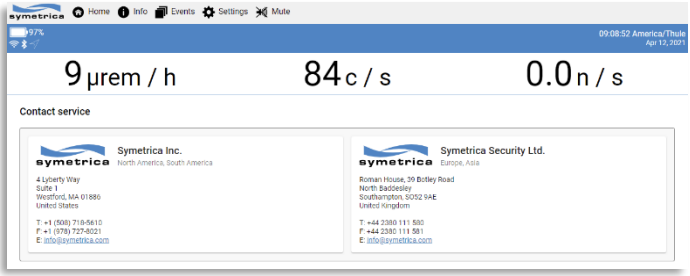

Figure 164: Contact Service Screen

8.4 Events Menu Options

8.4.1 View Open Events

View Open Events is available from the **Events** > **View open events** menu option.

The screen displays all events (up to 500) from the current phase of operations.

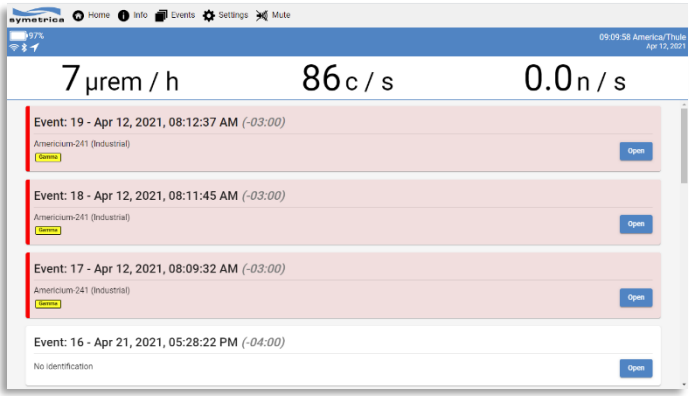

Figure 165: View Open Events Screen

Click the **Open** button for an event to view the identification results. Identification results display threat details on the nuclide detected including category type and detection confidence level.

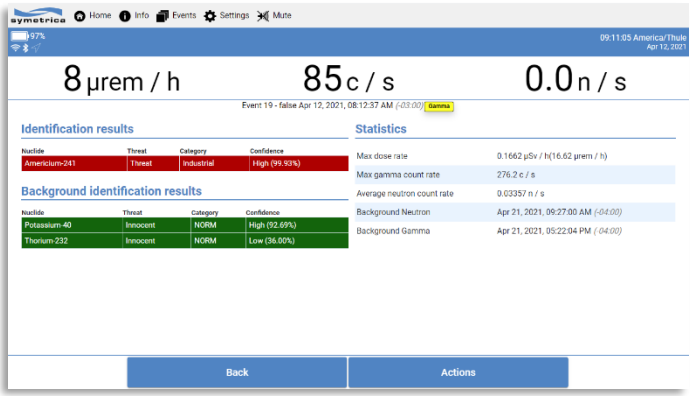

Figure 166: Identification Results Screen

In addition, the screen displays any background identification results that may have been obtained and supporting statistics.

In the case of a Gamma threat, the associated Gamma spectrum is also made available for further analysis when logged in as **Advanced** user.

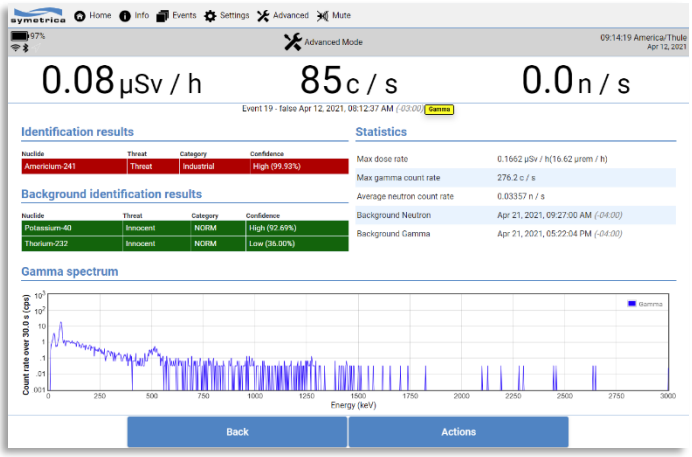

Figure 167: Gamma Spectrum

Click the **Actions** button to view available actions open the user.

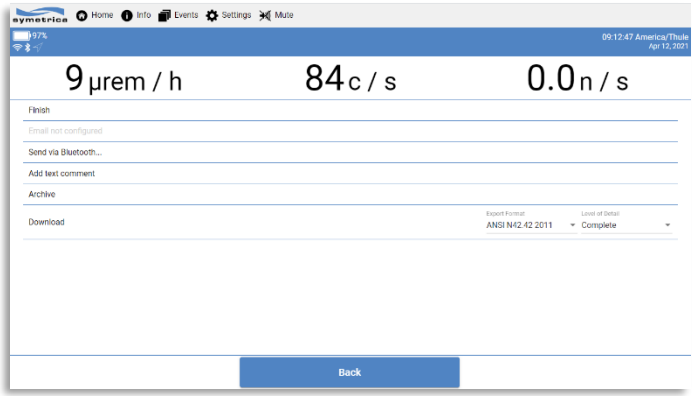

Figure 168: Actions Screen

Options available are:

- **Finish** – Click this option to return to the **View Open Events** screen.
- **Email** – Click this option to email the event to pre-configured e-mail addresses (see Configure Email – page 160).
- **Send via Bluetooth** – Click this option to send the event via Bluetooth to a connected device. **Note:** If Bluetooth has not been configured this option will be greyed out.
- **Add Text Comment** – Click this option to enable comments to be added to the Event.
- **Archive** - Click this option to archive the event from the Events list.
- **Download - ANSI N42.42** – Click this option to generate a **ANSI N42.42** file. Select the type of file required from the **Level of Detail** drop down menu (Complete or Summary). On download, click the file object located bottom left of the screen. Alternatively, to view all files click the **Show all** button and select the required file from the displayed screen
- **Download** – **Printable Report (HTML)** – Click this option to generate a report in HTML format. On download, click the file object located bottom left of the screen. Alternatively, to view all files click the **Show all** button and select the required file from the displayed screen. To print, right click on the HTML screen and select **Print** from the context menu.
- **Download** – **Printable Report (PDF)** – Click this option to generate a report in PDF format. On download, click the file object located bottom left of the screen. Alternatively, to view all files click the **Show all** button and select the required file from the displayed screen. Print or download the file to a folder of your choice from the icons located top right of the PDF report.
- **Download - SML** – Click this option to generate an **SML** file. Select the type of file required from the **Level of Detail** drop down menu (Complete or Summary). On download, click the file object located bottom left of the screen. Alternatively, to view all files click the **Show all** button and select the required file from the displayed screen.

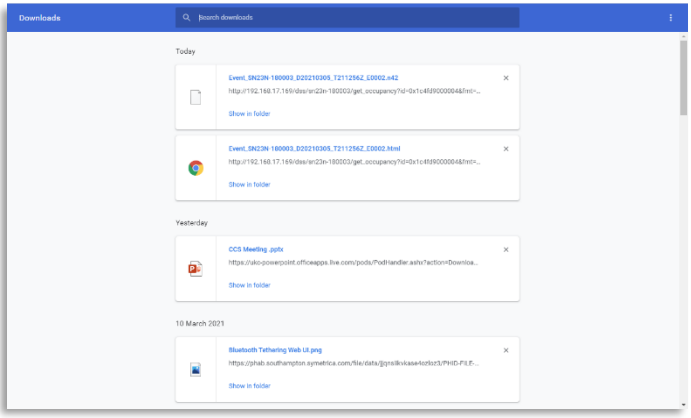

Figure 169: Actions - Show All Files Screen

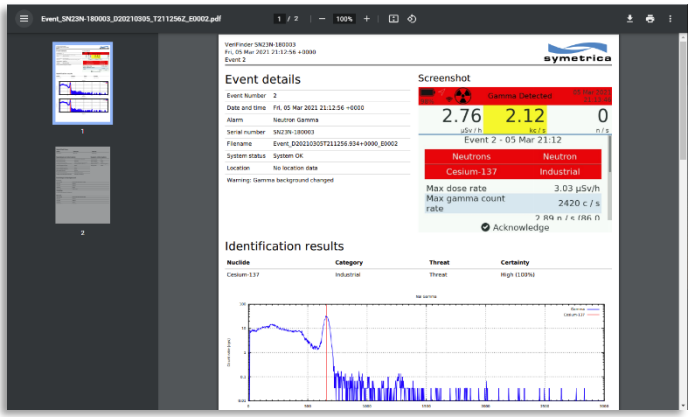

Figure 170: Actions – PDF File of Events

8.4.2 View Event Archive

View Event Archive is available from the **Events** > **View event archive** menu option.

Although similar to the View Open Events, this screen displays all events from previous operations that have been offloaded or discarded from the current operation.

8.5 Settings Menu Options

8.5.1 Background

Management of the background collection settings is available from the **Settings** > **Background** menu option.

The screen displays time stamped statistics and any Gamma radionuclides that have been identified in the background.

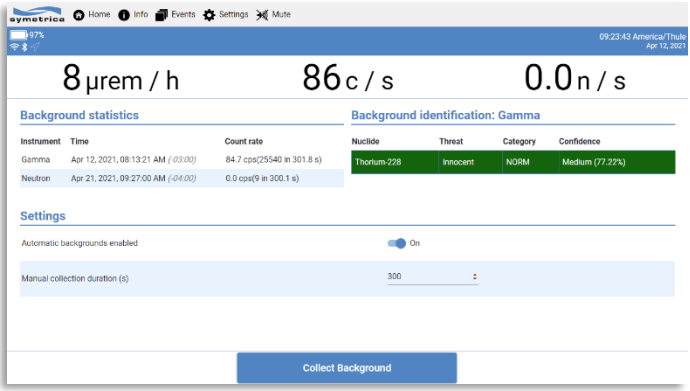

Figure 171: Background Screen

The **Settings** field enables manual collection of a background.

It is recommended that a background collection is taken when each new set of measurements are taken and / or when moving into a new area.

The recommended duration is at least 300 s in low radiation fields (1 µSv / h). In higher fields; this can be reduced linearly for example, in 10 µSv / h, 30 s is sufficient.

Automatic background collection can be enabled by toggling the **Automatic backgrounds enabled** switch. **Note:** Automatic updates is for gamma only.

Automatic background should only be used when searching for threat sources as NORM sources will be absorbed into the background algorithm. Conditions for automatic background are:

- The unit has been in an unchanging background for 5 minutes
- Only NORM sources identified in the new background.

To start a background collection, click the **Collect Background** button. The process starts and the progress bar populates indicating the background collection as a completion percentage.

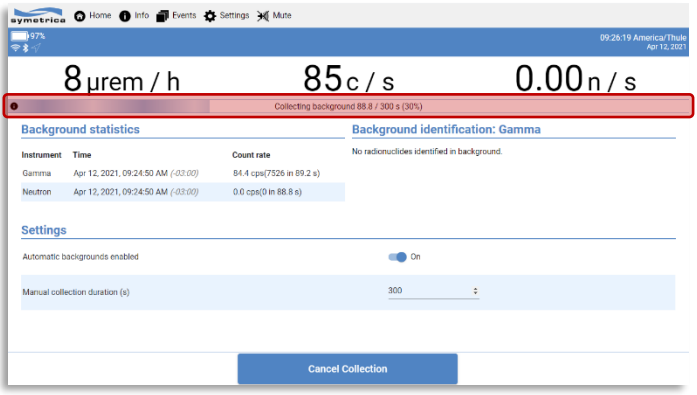

Figure 172: Background Collection Progress

Once the background collection has completed, click the **Accept Background** button to complete the process. Alternatively, click the **Reject Background** button to discard the process.

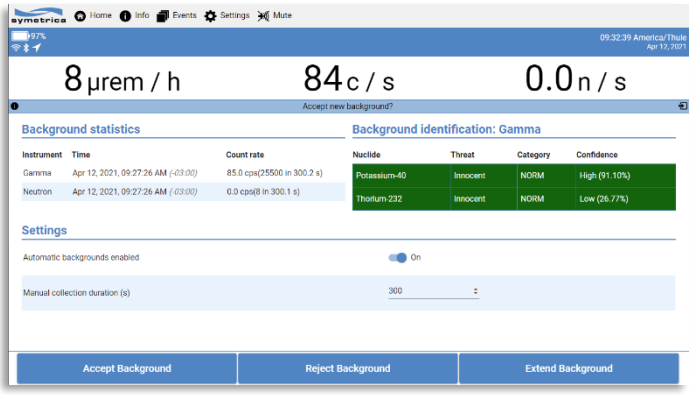

Figure 173: Accept or Reject Background Collection

If working on another screen, the status bar will display with ‘Accept new background?’. Click the notification bar to return to the Background screen and then click the **Accept Background** button.

8.5.2 Audio and Alerts

Management of audio and alert settings is available from the **Settings** > **Audio and Alerts** menu option.

The screen enables a range of options for the management of audio and alert outputs.

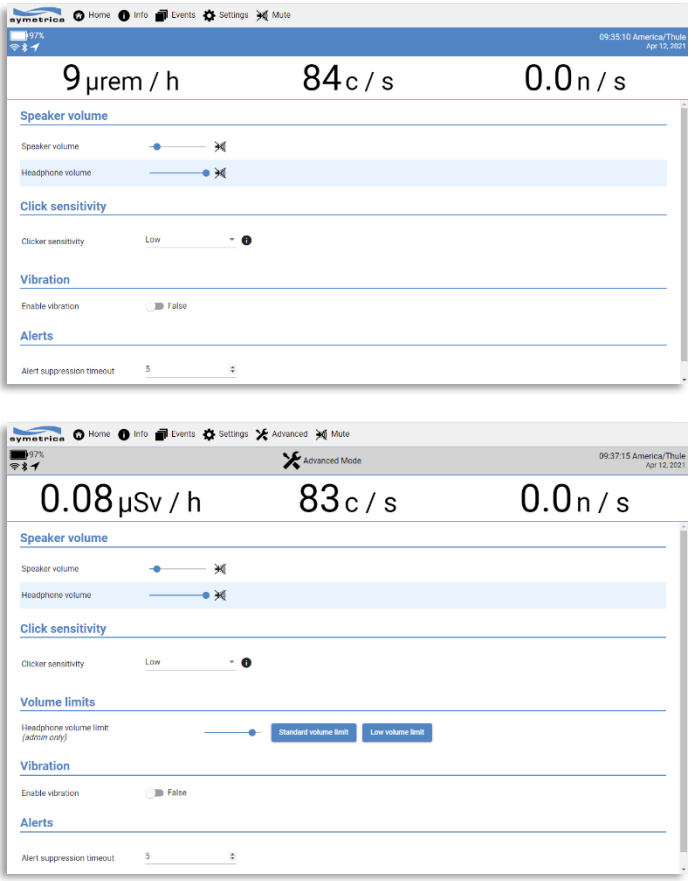

Figure 174: Audio and Alert Screen (Normal and Advanced for Volume Limits)

Options available are:

- **Speaker and Headphone Volume** – Select the required volume using the slider bar. Mute or un-mute the speaker / headphone by clicking / pressing the speaker icon. Mute is indicated by the speaker icon being crossed out.
- **Click Sensitivity** – This feature enables notification of a detected source through gamma click frequency rather than visual indication on screen. The control determines the frequency of gamma clicks produced at a given level of radiation.

  Select the required sensitivity from the drop down menu. Options available are High, Medium, Low and Off.

- **Volume Limits** – **Advanced user only** - Allows the administrator to reduce the volume scale so as to prevent hearing loss if using headphones. The 'Low volume limit' gives 50dB at 1cm using a XDU Pathfinder Single Noise Isolating Earbud.
- **Vibration** – Toggle switch to enable or disable vibration of the unit. If using an Android device, ensure the vibration capability is enabled.
- **Alerts** – Increase or decrease the alert suppression timeout (hysteresis) period. This determines the amount of time that an alarm/alert condition must be below its corresponding threshold before a subsequent alarm/alert of that type can be raised again.

  For example, with a hysteresis of 30 seconds, once a gamma detection alert occurs the system must see 30 seconds of continuous data below the alert threshold before it will recognize another gamma detection alert condition.

On completion, the notification bar displays **Settings updated**. Click anywhere on the bar to clear it.

8.5.3 User Preferences

Management of operator preferences is available from the **Settings** > **User preferences** menu option.

The screen enables a range of options for setting the system to operate in a preferred way.

Figure 175: User Preferences Screen

Options available are:

- **Preferred Dose Rate Units** – Select the required unit from the drop-down menu. Options available are Sieverts / hour or rem / hour.
- **Select Gamma Count Rate Units** – Select the required unit from the drop-down menu. Options available are cps or cpm.

- **Select Neutron Count Rate Units** – Select the required unit from the drop down menu. Options available are nps or npm.
- **Default Landing Page** – Changes the **Home** screen based on user selection. Select the required option from the drop down menu. Options available are **Dose rate mode**, **Locate mode** or **Gauge mode**.

  Note: This can also be changed from the **Home** screen (refer to page 130 – Home Screen).
- **Gauge Mode: Lower Alert Boundary Value** - Changes the **Gauge** mode lower boundary level based on user selection. Select the required value from the drop down menu. Options available are 2 mrem/h, 10 mrem/h or 20 mrem/h.
- **Gauge Mode: Upper Alert Boundary Level** - Changes the **Gauge** mode upper boundary level based on user selection. Select the required value from the drop down menu. Options available are 100 mrem/h, 200 mrem/h or 500 mrem/h.
- **Locate Mode: Graph Mode** – Changes the graph display (Gamma count rate displayed value) based on user selection. Select the required option from the drop down menu. Options available are log or linear.

On completion, the notification bar displays **Account settings updated**. Click anywhere on the bar to clear it.

Note: These user settings affect the VeriFinder WMI only. To change the VeriFinder device settings navigate to **Advanced** > **User-Interface Settings**.

8.5.4 Create Diagnostic Package

This option is only available to an **Advanced** User.

Creation of a diagnostics package to capture problems with the system is available from the **Settings** > **Create diagnostics package** menu option.

The screen enables a diagnostics file to be created for onwards transmission to Symetrica for reach back support.

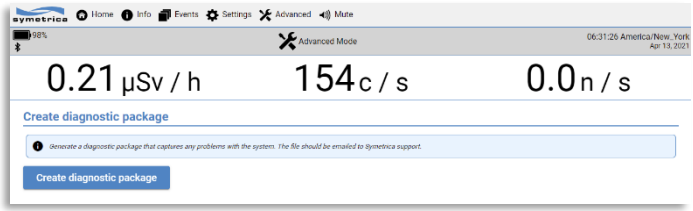

Figure 176: Create Diagnostics Package Screen

To start the process, click the **Create diagnostics package** button. Once complete, a message bar appears and the **Diagnostic Package** file (.tgz) is shown in the system tray.

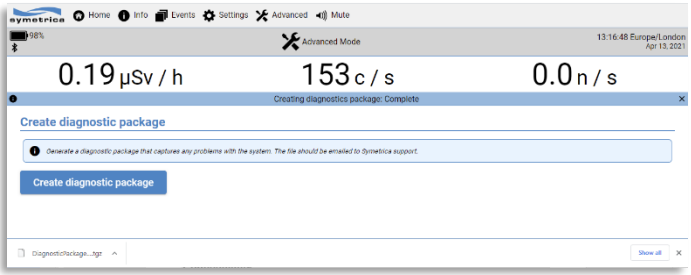

Figure 177: Diagnostics Package Complete

The package can then be downloaded from the **Artifacts** screen (see Artifacts – Page 168).

8.5.5 Connectivity

Connectivity settings are available from the **Settings** > **Connectivity** menu option.

This screen enables configuration of:

- Bluetooth.
- Cellular.
- Ethernet.
- GPS + GLONASS.
- Wi-Fi.
- Discovery Services.

8.5.5.1 Bluetooth

To configure Bluetooth on VeriFinder:

1. Connect to the VeriFinder using either a USB cable, and login to the WMI.
2. From the WMI menu bar, select **Settings > Connectivity**.
3. The **Connectivity Settings** screen is displayed. Toggle the Bluetooth switch to **On** to enable the **Configure** button.

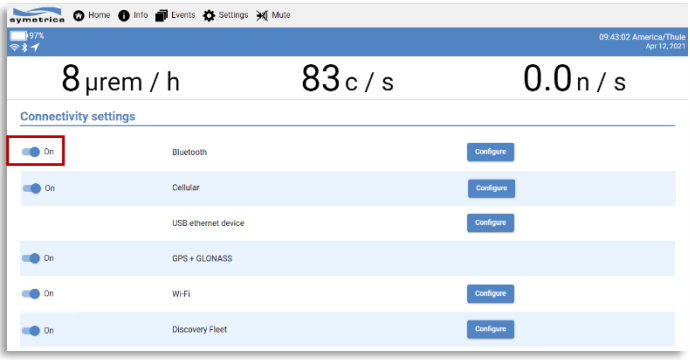

Figure 178: Connectivity Settings Screen

4. Click the Bluetooth **Configure** button. The **Configure Bluetooth** screen is displayed.

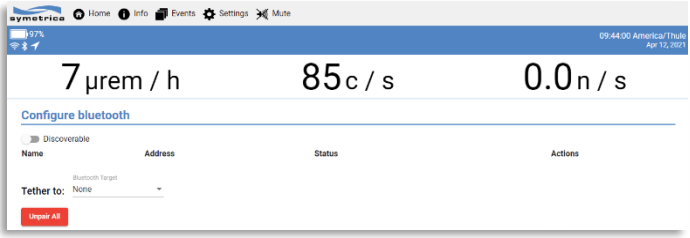

Figure 179: Bluetooth Configuration Screen

5. Toggle the configuration switch to **Discoverable** to enable Bluetooth connectivity screen.
6. An information banner is displayed to indicate that the VeriFinder is now discoverable with the Bluetooth devices that are available for pairing.

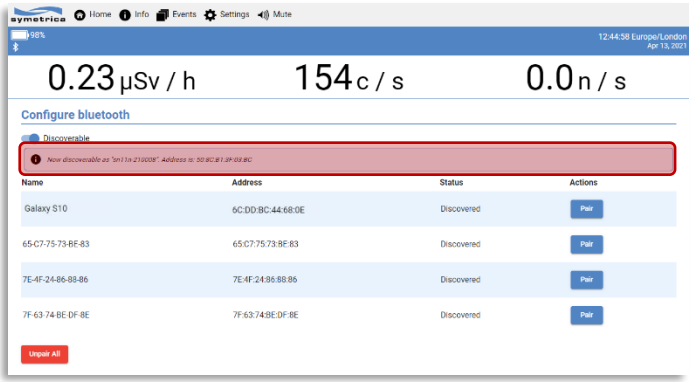

Figure 180: Available Bluetooth Devices

7. Identify the Bluetooth device to pair with and click the **Pair** button. A status window is displayed with a request to confirm the pairing pin number.

Note: At this stage, the Android device that is being connected too needs to be setup for pairing. Follow the manufacturer's instructions for pairing Bluetooth devices for your specific version of Android ensuring that **Bluetooth** is enabled.

8. Click the **Pair** button to continue.

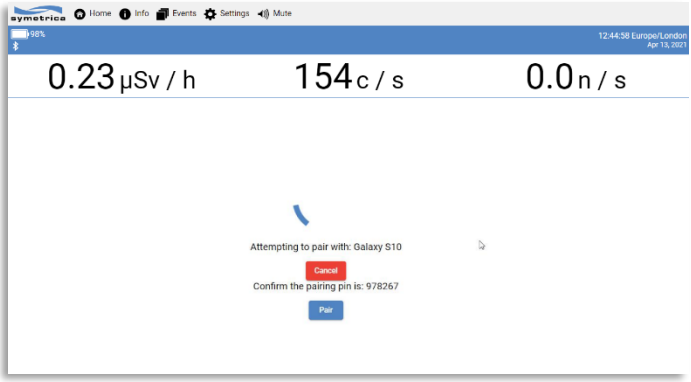

Figure 181: Confirm Pairing PIN

9. On successful pairing the status for the Android device changes from **Discovered** to **Paired**. You should now be able to view the VeriFinder on your Android device.

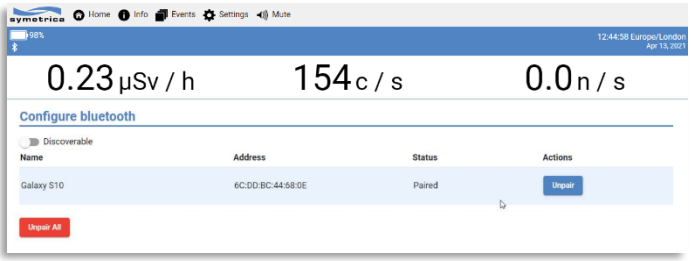

Figure 182: Android Status – Connected

10. To disconnect from the Android device, click the **Unpair** button.

8.5.5.2 Cellular

To configure Cellular on VeriFinder:

1. Toggle the **Cellular** option to enable the **Configure**… button.

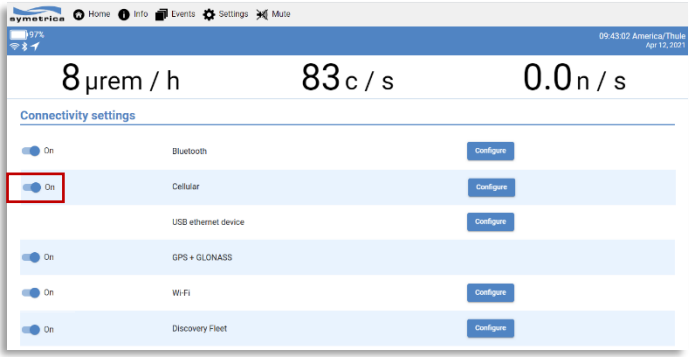

Figure 183: Enabling Cellular Configuration

2. Click the Configure… button to display the Modem settings screen.

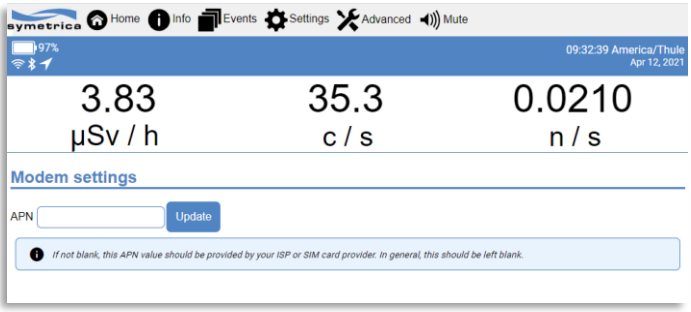

Figure 184: Cellular (Modem) Settings Screen

3. Enter the APN of your cellular provider and click the **Update** button.

Note: The Access Point Name (APN) is required to setup a connection to your provider's cellular network. The APN can be obtained from your cellular provider, for example: mobile.o2.co.uk is the APN for o2. If you do not intend to use cellular communications, this can be left blank.

8.5.5.3 Ethernet

To configure the Ethernet on VeriFinder:

1. Click the Ethernet **Configure**… button to display the configuration screen.

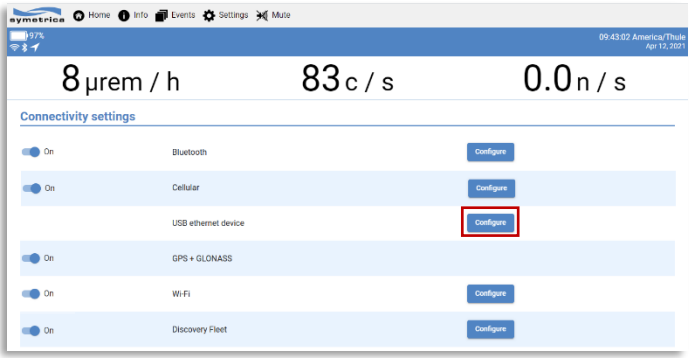

Figure 185: Ethernet Configure Button

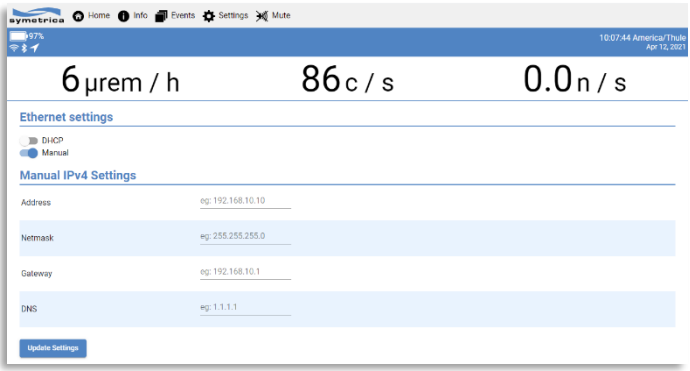

Figure 186: Ethernet Configuration Screen

Note: By default, Ethernet is set to Dynamic Host Configuration Protocol (DHCP) to dynamically assign the IP address and other network configuration parameters.

2. To manually configure, toggle the **Manual** switch to enable and configure the IPv4 settings as required.

3. Once done, click the **Update Settings** button for the changes to take effect.

8.5.5.4 GPS + GLONASS

To enable GPS + GLONASS on VeriFinder, Toggle the switch to enable.

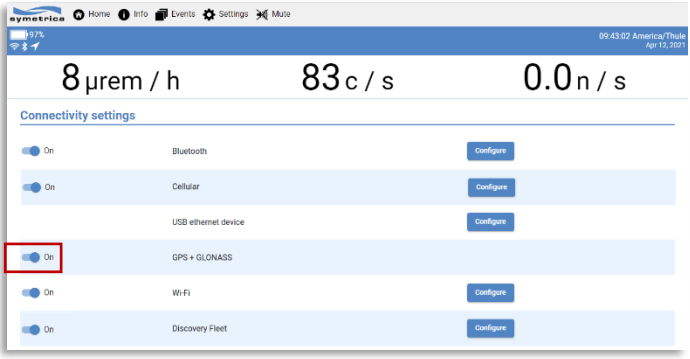

Figure 187: Enabling GPS + GLONASS

8.5.5.5 Wi-Fi

To add a new Wi-Fi network on VeriFinder and allow remote access via a Wi-Fi network:

1. Connect to the VeriFinder using either a USB cable or an existing Wi-Fi network and login to the WMI.

Note: If no existing Wi-Fi networks have ever been added to VeriFinder, you must use a USB cable connection.

2. From the WMI menu bar, select **Settings > Connectivity**.
3. The **Connectivity Settings** screen is displayed. Toggle the Wi-Fi option to enable the **Configure…** button.

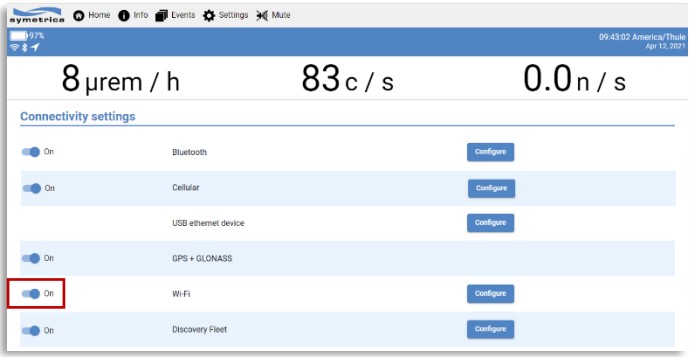

Figure 188: Connectivity Settings Screen

4. Click the Wi-Fi **Configure…** button. The Wi-Fi Configuration screen is displayed.

Figure 189: Wi-Fi Configuration Screen

5. From the Wi-Fi Configuration screen, identify the Wi-Fi network that you want the VeriFinder to connect too and click the **Join** button.

6. Type the Wi-Fi password used by the selected Wi-Fi network, and click **Join**.

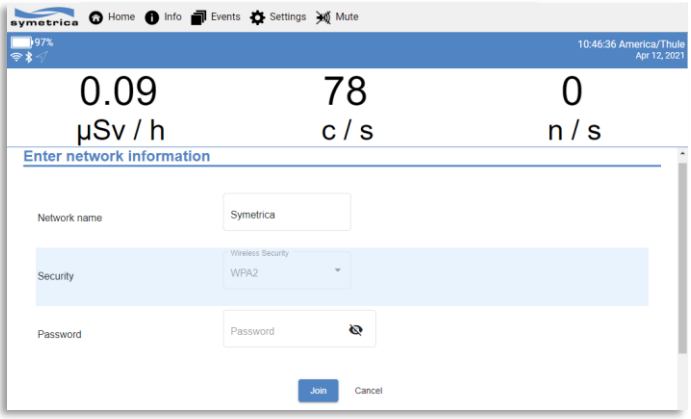

Figure 190: Network Information and Password Screen

7. The Wi-Fi connection is established and the Wi-Fi configuration updates.

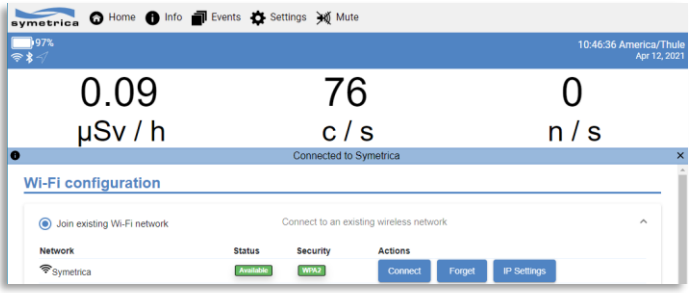

Figure 191: Wi-Fi Configuration Update Succeeded

8. Click the **IP Settings** button to display the IP configuration settings screen.

Note: By default, the IP setting is set to DHCP to dynamically assign the IP address and other network configuration parameters.

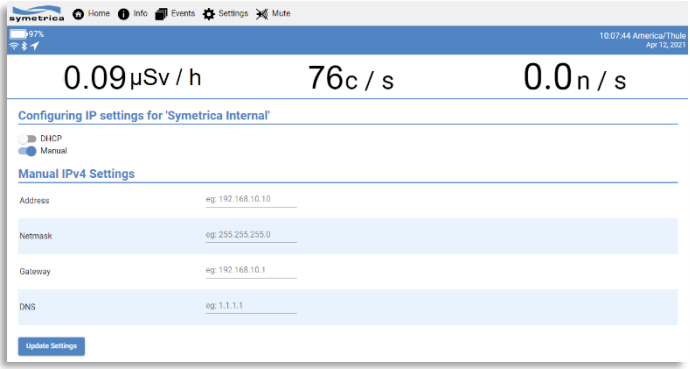

Figure 192: IP Configuration Screen

9. To manually configure, toggle the **Manual** switch to enable and configure the IPv4 settings as required.

10. Once done, click the **Update Settings** button for the changes to take effect.

11. To create a Wi-Fi hotspot so that other Android devices can connect to VeriFinder (for example, an Android mobile phone), select the **Create Wi-Fi hotspot** radio button.

12. The Wi-Fi settings are changed and the **Accesspoint name** (e.g. SN23N-160021) is made available to the Android device wishing to connect.

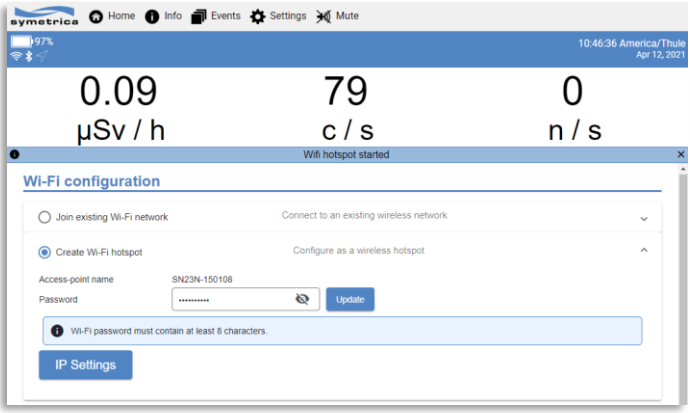

Figure 193: Create Wi-Fi- Hotspot

13. To change the auto-generated password, click the **Show** button, change the password and click the **Update** button. Note that the password must contain at least 8 characters.

14. To manually configure the IP settings for the Wi-Fi hotspot, click the **IP Settings** button.
15. Enter the IP Address, Netmask and Gateway and click the **Update Settings** button to effect the change. Default settings are available at any time by clicking the **Reset to Default** button.

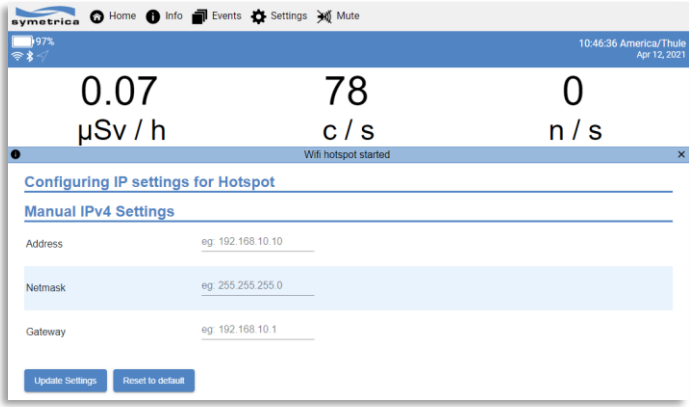

Figure 194: Manually Change IP Settings for Wi-Fi Hotspot

16. To disconnect from a Wi-Fi network, click the **Forget** button.

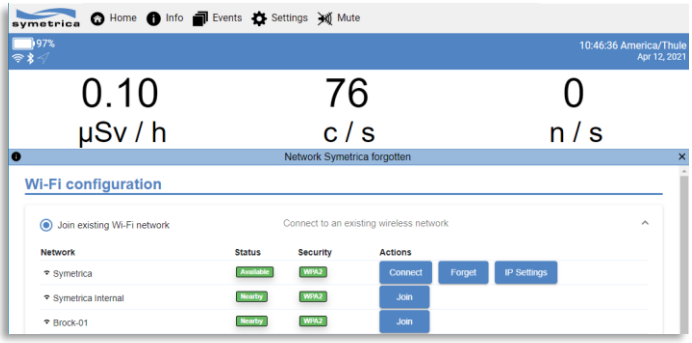

Figure 195: Disconnect from Wi-Fi Network

On disconnection, the notification bar displays **Network <name> Forgotten**. Click anywhere on the bar to clear it.

8.5.5.6 Discovery Services

Discovery Services is an optional Symetrica licensed service that enables management of a fleet of VeriFinder devices from a central server.

To configure Discovery Services:

1. Toggle the **Discovery Services** option to enable the **Configure…** button.

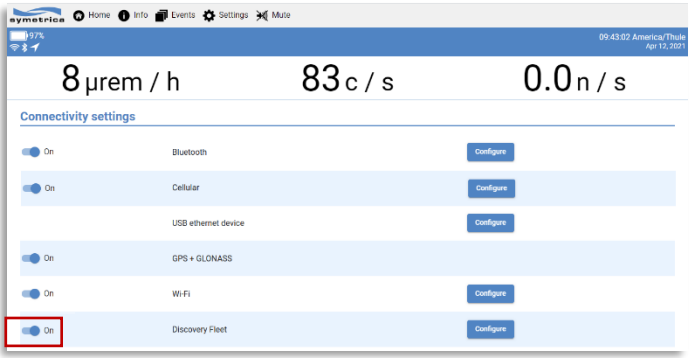

Figure 196: Enabling Discovery Services Configuration

2. Click the **Configure…** button to display the settings screen.

Figure 197: Discovery Services Settings Screen

3. Enter the provided connection string in the text box and click the **Update** button. The system scans for the Discovery Services host keys.

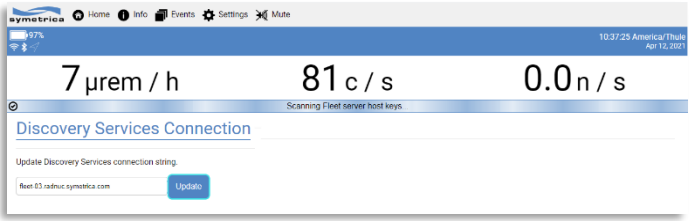

Figure 198: Entering the Connection String

4. Follow the procedures displayed for pairing with the Discovery Services server.

8.6 Configure Email

Management of email recipients is available from the **Settings** > **Email configuration** menu option.

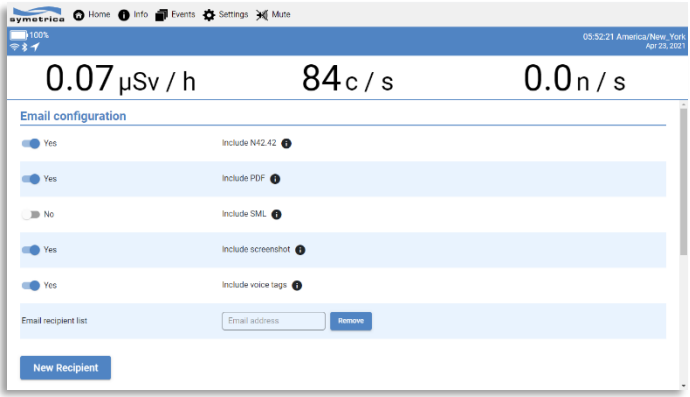

Figure 199: Email Configuration Screen

The screen enables creation of a recipient list for reach back purposes with options on what files to include as attachments. The screen also enables configuration of the email server (SMTP, Username and Password).

Note: Emails cannot be sent until the relevant email server has been configured.

To set up an email list:

1. Enter the recipient's details in email address field.
2. Click the **Add new recipient** button to add the email address to the list. **Note:** To remove a recipient, click the **Remove** button.
3. Use the toggle switches to include / exclude file types that are required as an attachment to the email.

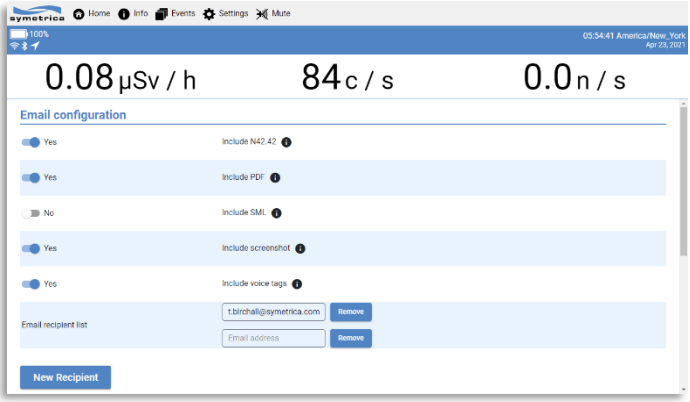

Figure 200: Add Email Address

4. In the Email server configuration field, enter or update details as follows:

   - **From** – Sender's address. Normally includes the model and serial number of the unit and domain of the sender, for example, '*s456n-160014@symetrica.com*'.
   - **SMTP Server** – URL of the SMTP server, for example, smtp.symetrica.com.
   - **Server Port** – Default setting of 587.
   - **Username** – Sender username.
   - **Password** – Sender password.

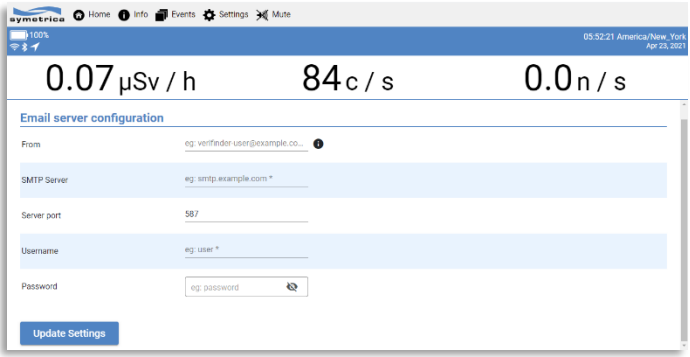

Figure 201: Email Server Configuration

5. On completion, click the **Update server settings** button.

Note: There is no visible confirmation that the update has been successful. Refresh the screen to confirm settings have been applied.

8.7 Remote Control

This option is only available to an **Advanced** User.

Remote viewing of VeriFinder is available from the **Settings** > **Remote control** menu option.

The screen mirrors what is currently on the device screen.

The buttons, **Back**, **Select** and **Down** can be used to control the remote system, however there is a delay in response time due to the slow update frequency.

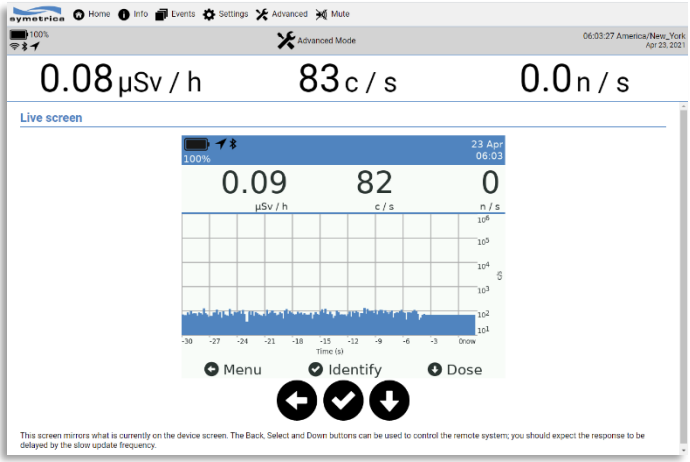

Figure 202: Remote Control Screen

8.8 Log Out (User Type)

Logout of VeriFinder is available from the **Settings** > **Log out** menu option.

Selection of this option successfully logs the user out of the system and returns to the Login screen.

Figure 203: Login Screen Displayed After Successful Logout

8.9 Reboot

Reboot of VeriFinder is available from the **Settings** > **Reboot** menu option.

On selection of this option the user is presented with a caution query. Click the **Reboot** button to continue. The system will shut down and then restart. On completion the Login screen is displayed.

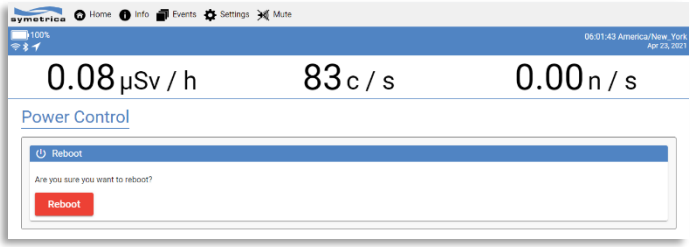

Figure 204: Reboot Screen

8.10 Shutdown

Shutdown of VeriFinder is available from the **Settings** > **Shutdown** menu option.

On selection of this option the user is presented with a caution query. Click the **Shutdown** button to continue. The system will shut down.

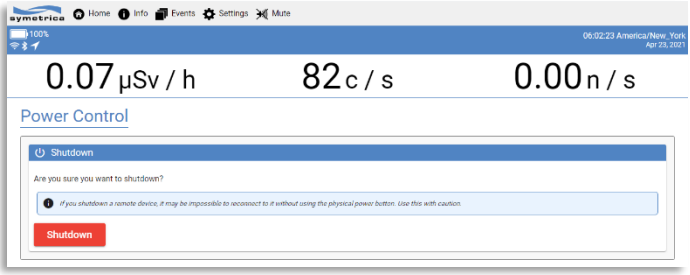

Figure 205: Shutdown Screen

8.11 Advanced Menu Options

The advanced menu options are only accessible when logging in as advanced user.

8.11.1 User Interface Settings

Management of the VeriFinder device UI is available from the **Advanced** > **User-interface settings** menu option.

The screen enables a range of options available for displaying data on the UI.

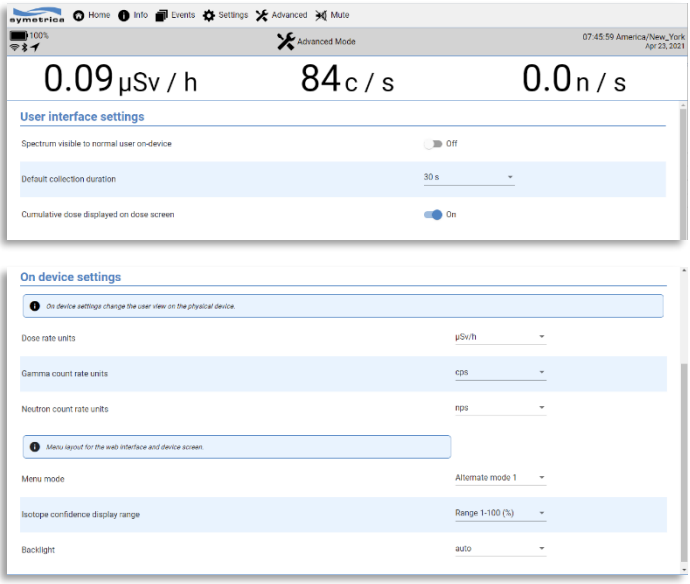

Figure 206: User Interface Settings Screen

Options available are:

- **User Interface - Spectrum Visible to Normal User On-Device** – Toggle the switch to enable or disable this option.
- **User Interface - Default Collection Duration** – Select the required unit from the drop down menu. Options available range from 30 secs through to 120 mins.
- **User Interface** – **Cumulative Dose Displayed onscreen** - Displays a summary value of the dose rate that an operator is exposed too over a period of time. When enabled, it is displayed on the **Dose** screen.
- **On-Device - Dose Rate Units** – Select the required unit from the drop-down menu. Options available are mrem/h or µSv/h.
- **On-Device - Gamma Count Rate Units** – Select the required unit from the drop-down menu. Options available are cps or cpm.
- **On-Device - Neutron Count Rate Units** – Select the required unit from the drop-down menu. Options available are nps or npm.
- **On Device** – **Menu Mode** – Select the required menu option from the drop-down menu. Options available are **Default** or **Alternate mode 1**.
- **On-Device - Backlight** - Select the required value from the drop-down menu. Options available are auto, 0%, 1%, 5%, 15%, 25%, 50%, 75%, 100%.

New settings are automatically updated on the VeriFinder device.

8.11.2 Adjust Thresholds and Banners

Detection thresholds and banners adjustment is available from the **Advanced** > **Adjust threshold and banners** menu option. The screen enables a range of operational thresholds to be changed.

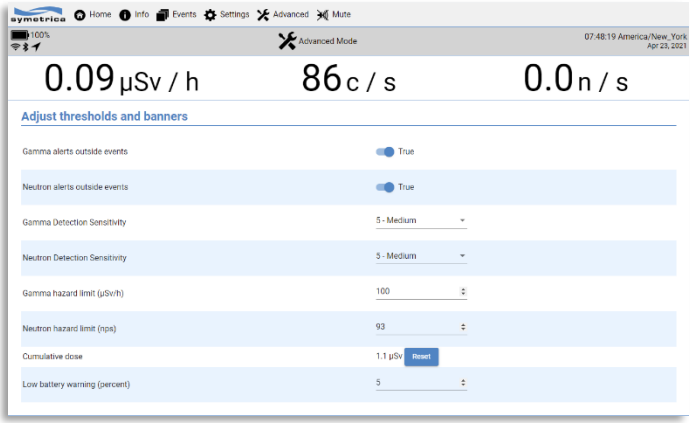

Figure 207: Adjust Thresholds and Banners Screen

Options available are:

- **Gamma Alerts Outside Events** – Turns off the Gamma alert screen, providing just the count / dose rate outside the event collection. Typically used when VeriFinder detects an increased Gamma source. Toggle the switch to enable / disable this feature.
- **Neutron Alerts Outside Events** – Turns off the Neutron alert screen, providing just the count / dose rate outside the event collection. Typically used when VeriFinder detects an increased Neutron source. Toggle the switch to enable / disable this feature.
- **Gamma Detection Sensitivity** – Sets the sensitivity for gamma detection (0 – Disabled, 1 – Lowest through to 9 – Highest with a default setting of 5 - Medium).
- **Neutron Detection Sensitivity** – Sets the sensitivity for neutron detection (0 – Disabled, 1 – Lowest through to 9 – Highest with a default setting of 5 - Medium).
- **Gamma Hazard Limit** – Adjusts the sensitivity for triggering detection of Gamma hazards. Enter a limit value for the count threshold (µSv/h).
- **Neutron Hazard Limit** – Adjusts the sensitivity for triggering detection of Neutron hazards. Enter a limit value for the count threshold (nps).
- **Cumulative Dose** – On selection of the **Reset** button, resets the start of integer value for cumulative dose displayed on the Dose screen.
- **Low Battery Warning** – Adjusts the percentage threshold limit that triggers the System Fault Low Battery warning. Enter a percentage value for when the warning is to be triggered. It is recommended that this value is not altered.

New settings are updated automatically.

8.11.3 Gamma Calibration

Gamma calibration information is available for ‘viewing only’ from the **Advanced** > **Gamma calibration** menu option.

The screen provides calibration spectrum and status information with details of calibrations conducted.

Caution: Gamma calibration of VeriFinder should only ever be performed by Symetrica personnel. Performing a gamma calibration by non-Symetrica personnel voids the warranty.

Figure 208: Gamma Calibration Screen

8.11.4 System Log

System Log is available from the **Advanced** > **System log** menu option.

The screen provides a record of the current software running on VeriFinder along with all system messages, any alerts or alarms and configuration changes.

The log is written by the system at start-up.

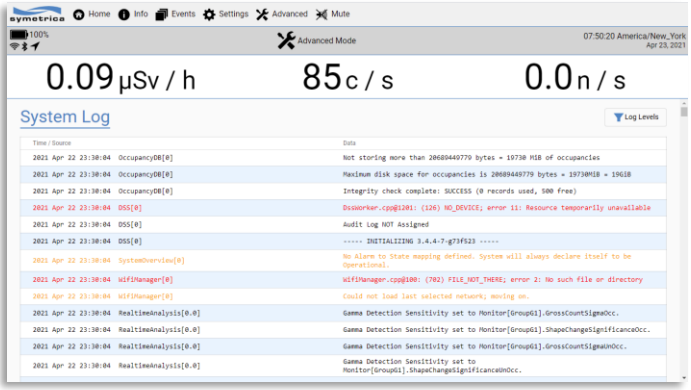

Figure 209: System Log Screen

The log level for a particular element / entity can be changed to just show information based on the level selected, for example, **Critical** information may be required for reach back analysis purposes.

8.11.4.1 Change Log Levels

Important: Do not use except under strict guidance of Symetrica personnel.

To change the log levels, click the **Log Levels** button. From the docked window displayed, identify the entity that requires the level to be changed and from the drop down-menu, select the level of information required.

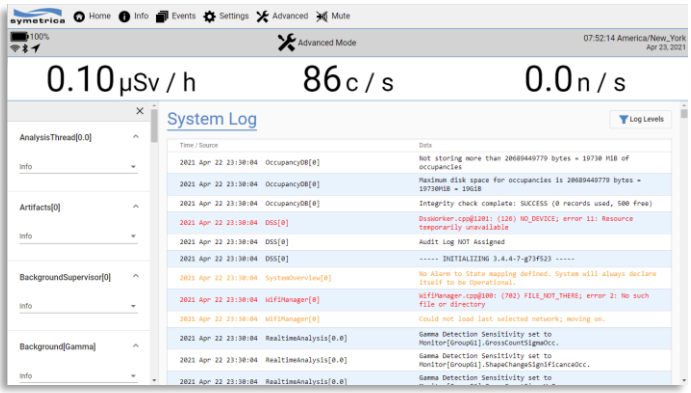

Figure 210: Change Log Level Screen

Once done, click the **Close Filters (X)** button to return to the system log screen.

8.11.5 Artifacts

Important: Do not use except under guidance of Symetrica personnel.

Artifacts is available from the **Advanced** > **Artifacts** menu option.

The screen provides an archive library of incidents / actions that have happened on the system, including downloaded diagnostic packages and Self Test results (Logs/VeriFinder-Builtin Test).

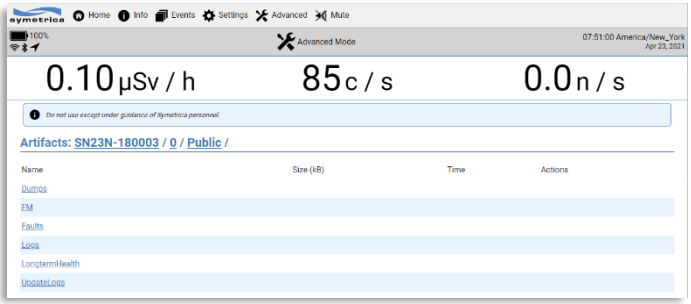

Figure 211: Artifacts Screen

To access details on an artifact, click the required hyperlink to open the contents screen.

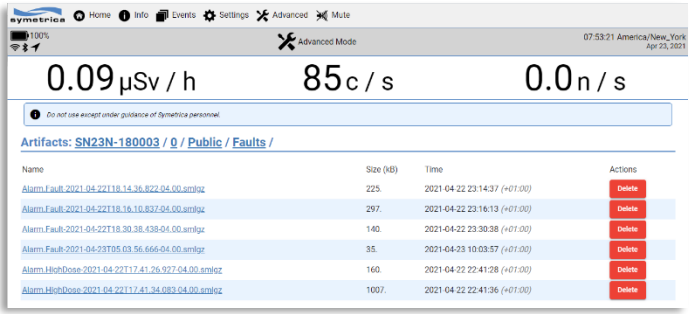

Figure 212: Artifact Contents Screen

From the contents screen, click the required hyperlink to download the file or click the **Delete** button to remove the file from the system.

On download, click the artifact file object located bottom left of the screen. Alternatively, to view all artifacts click the **Show all** button and select the required file from the displayed screen.

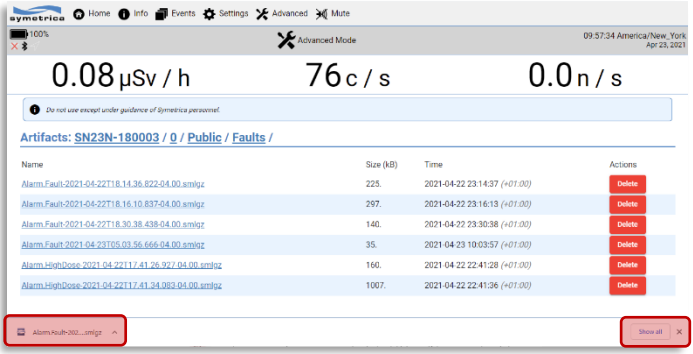

Figure 213: View File / Show All Options

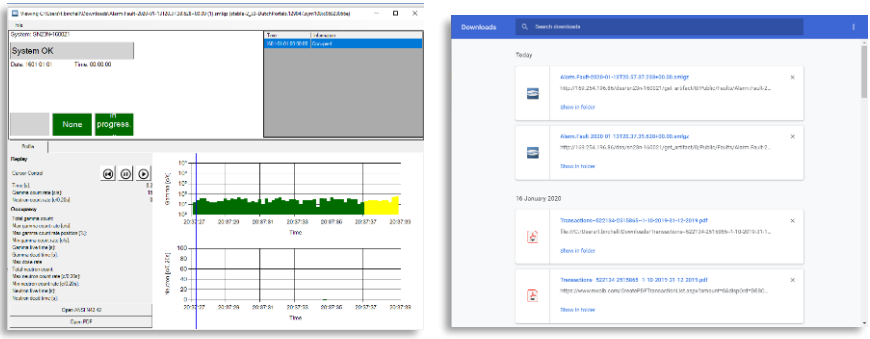

Figure 214: Single File View and All Files View

8.11.6 Set Clock and Time Zone

Set Clock and Time Zone is available from the **Advanced** > **Set clock and timezone** menu option.

The screen provides a number of options for setting the system clock and time zone for the device.

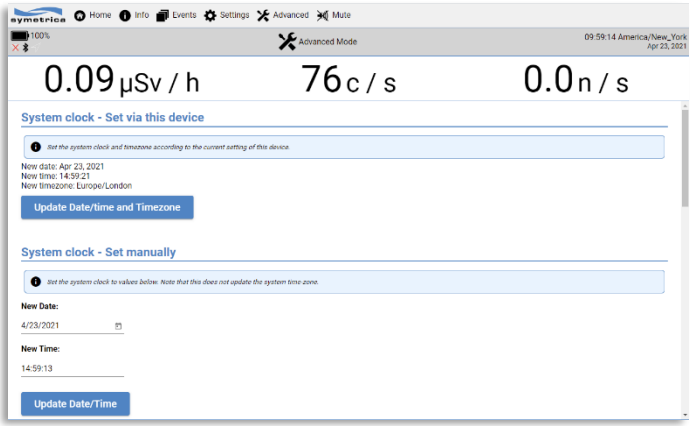

Figure 215: Set Clock and Time Zone Screen

Options available are:

- **System Clock – Set via this Device** – Click the 'Update Date/time and Timezone' button to set the system clock and time zone according to the current setting on the device.

- **System Clock – Set Manually** – Manually enter the required date and time in the New date: and New time: fields. Alternatively, click the calendar icon to select the date. Once done, click the 'Update date/time' button to effect the change.
- **System Clock – Set via GPS** – Click the 'Update via GPS' button to set the system clock according to the next GPS reading. **Note:** a notification is displayed if GPS time is not currently available, in which case, use one of the other methods until GPS time comes online.
- **Select Time Zone** – Manually select the required time zone by either using the 'Timezone:' drop-down menu or clicking on the required time zone location indicated on the map. **Note:** This feature is only viewable on a PC; not on mobile devices are android phones.

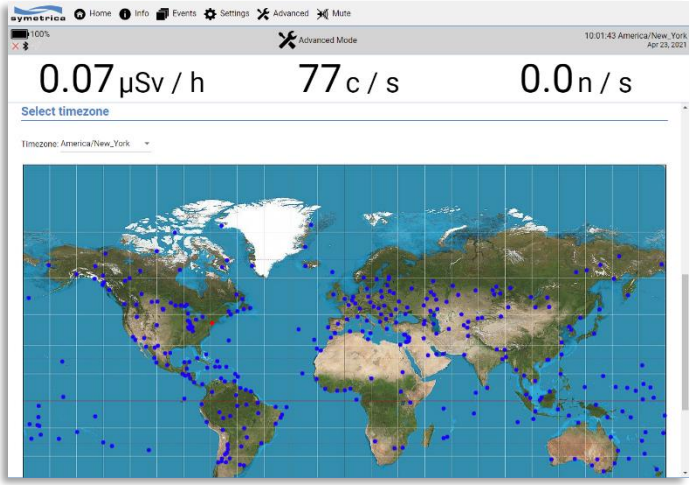

Figure 216: Select Time Zone Map Screen

8.11.7 Maintenance

Maintenance is available from the **Advanced** > **Maintenance** menu option. The screen provides a number of options for upkeep of the device.

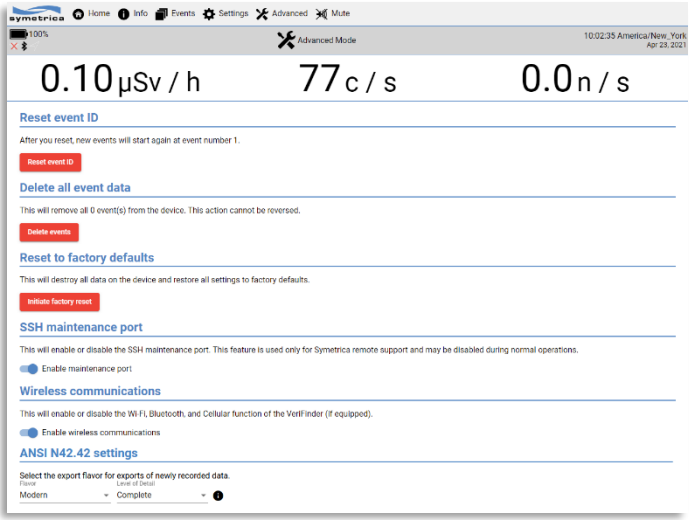

Figure 217: Maintenance Screen

8.11.7.1 Reset Event ID

This option enables the event ID number to be reset, effectively setting the counter to restart at 1.

On selection of **Reset Event ID** button, the user is presented with a caution query. Click the **Yes** button to continue or **No** to cancel.

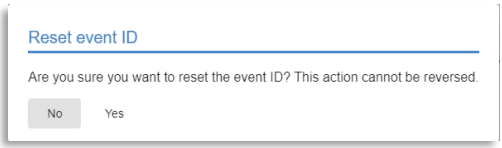

Figure 218: Reset Event ID Caution

8.11.7.2 Delete Event Data

This option permanently removes all events from the device.

On selection of **Delete Events** button, the user is presented with a caution query. Click the **Yes** button to continue or **No** to cancel.

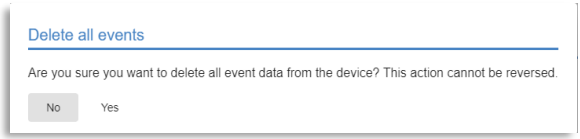

Figure 219: Delete All Events Caution

8.11.7.3 Reset to Factory Defaults

This option deletes all data on the device and restores it back to its original factory settings.

Caution: This screen should only ever be used by authorized personnel. Selecting the **Initiate Factory Reset** button will destroy all data on the device. Wi-Fi connection will also be reset, which will result in the device connectivity being lost.

On selection the **Initiate Factory Reset** button, the user is presented with a caution query. Click the **Yes** button to continue or **No** to cancel.

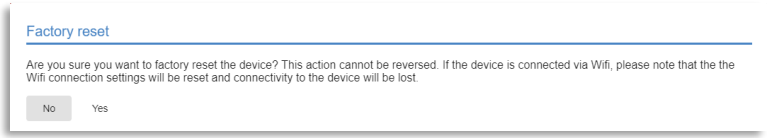

Figure 220: Factory Reset Caution

8.11.7.4 SSH Maintenance Port (Toggle)

A toggle switch that enables or disables the SSH Maintenance port. This option is only ever used for remote Symetrica maintenance support and may be disabled during normal operations.

8.11.7.5 Wireless Communications (Toggle)

A toggle switch that enables or disables the Wi-Fi, Bluetooth and Cellular function of the VeriFinder.

8.11.7.6 ANSI N42.42 Settings

This option enables the selection of a required N42.42 file variation (known as a flavor) and the level of detail required when exporting. Options are selected from the drop down menus, which are described below.

Flavor	Description	Level of Detail
Modern	**N42.42 (2011 Variant)** Optimized for presentation in third party tools, specifically targeting **PeakEasy** and **Interspec**.	**Complete:** larger files containing per-tick data. **Summary:** Smaller files containing ID results and aggregate spectra only.
2006	**N42.42 (2006 Variant)** This format is considered to be obsolete and has limited support.	
Anise	**N42.42 (2011 Variant)** This is a variant of the Basil flavor, with the spectrum ***ForegoundSum*** being in ***DerivedData*** rather than ***RadMeasurement***	
Basil	**N42.42 (2011 Variant)** This is a legacy format (pre-T12316 / symcore 3.4.6), with data from separate instruments being divided into individual ***RadMeasurements***.	
Cardamom	**N42.42 (2011 Variant)** Each tick is arranged into a single ***RadMeasurement***. ***ForegroundSum*** is a ***DerivedData***. Neutron ticks abstain from the standard ***GrossCounts*** for a custom ***sym:NeutronCounts***.	

Flavor	Description	Level of Detail
Dill	**N42.42 (2011 Variant)** This is a variant of the Basil flavor, with additional post-processing to remove sections of the Basil flavor where detection alert statuses are stored. ***RadMeasurements*** are removed and serial numbers are manipulated to comply with third party applications.	

8.11.8 Change Password

Change Password is available from the **Advanced** > **Change password** menu option. The screen enables the changing of a user password for the Web UI and should only be done by authorized personnel.

Enter the change in the **New password** field and again in the **Confirm password** field. Click the **Change password** button to effect the change.

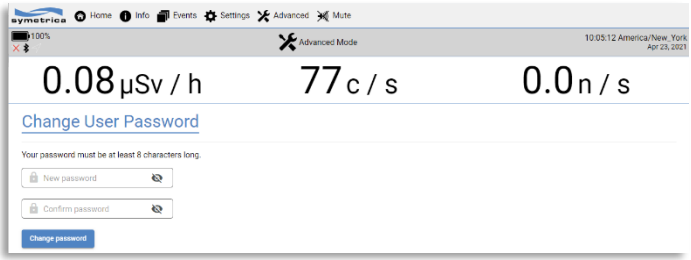

Figure 221: Change Password Screen

8.11.9 Manage Users

Manage Users is available from the **Advanced** > **Manage users** menu option.

The screen enables management of users and user groups, allowing for editing user details, resetting user passwords, deleting users, adding to groups, and allocating user privileges within a group.

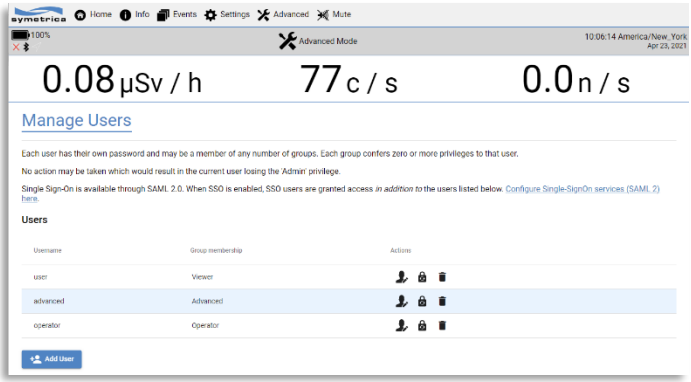

Figure 222: Manager Users Screen

Options available are:

- **Add User** – Select the **Add User** button. From the **Create new user** dialog, enter a username and select the group(s) that the new user is to be a member off. Select the **Create user** button to add the user.
- **Edit User** – Select the **Edit user** icon from the **Actions** field. From the **Edit user** dialog, edit the parameters for group membership as required. Select the **Update user** button to add update the changes.
- **Reset password** – Select the **Reset password** icon for the target user from the **Actions** field. The reset password dialog is displayed. Enter the new password for the target user and select the **Change password** button. **Note:** If the password criteria are not meet, the Passwords must match button will be displayed.
- **Delete User** – Select the **Delete user** icon for the target user from the **Actions** field. A warning dialog is displayed. Select **OK** to continue.

8.11.10 TLS Certificate

TLS Certificate is available from the **Advanced** > **TLS certificate** menu option.

The screen enables the user to replace the TLS certificate.

Three modes are available. Users should select a mode of operation applicable to their certificate management policy.

Caution: This screen should only ever be used by authorized personnel, who have a firm understanding of TLS certificates and their use.

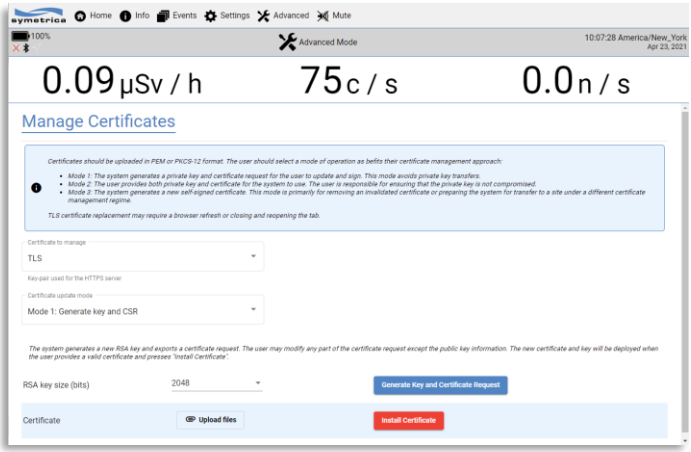

Figure 223: TLS Certificate Screen

Options available are:

Certificate Update Mode 1 – Generates a new RSA key and certificate request for the user to modify (if needed) and sign.

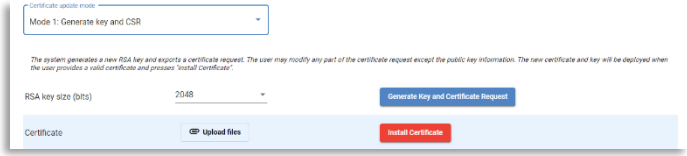

Figure 224: TLS Certificate Update Mode 1

1. Select the required **RSA Key size** (2048 or 4096) and click the **Generate Key and Certificate Request** button.
2. Acknowledge the warning dialog and click **OK** to continue. The certificate is generated and displayed on the lower left side of the system tray.
3. Right click the certificate file to either **Open** (for modification) or **Show** in the download folder.
4. Navigate to the file from the **Certificate** field and select it.
5. Click **Install Certificate** to replace the previous version.
6. Acknowledge the warning dialog and click **OK** to continue.

Certificate Update Mode 2 – Provides both a private key and certificate for the system to use.

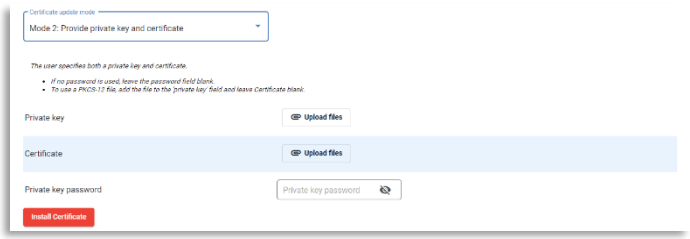

Figure 225: TLS Certificate Update Mode 2

1. From the **Private Key** field, click the **Upload files** button, navigate to the key file and select it.
2. From the **Certificate** field, click the **Upload files** button, navigate to the certificate file and select it.
3. If available, enter the password in the **Private Key Password** field, else leave the field blank.
4. Click **Install Certificate** to replace the previous version.
5. Acknowledge the warning dialog and click **OK** to continue.

Certificate Update Mode 3 - The system generates a new RSA key with a self-signed certificate

Figure 226: TLS Certificate Update Mode 3

1. Click the **Generate New Self-Signed Certificate** button.
2. Acknowledge the warning dialog and click **OK** to continue.
3. The system generates and installs the new certificate.

8.11.11 Update Software

Important: Prior to updating software, ensure the system is reliably connected to the network. If possible, connect the power cord to a mains power supply.

Update Software is available from the **Advanced** > **Update software** menu option.

Software releases are created to add new functionality or features, improve performance / stability or correct any issues discovered.

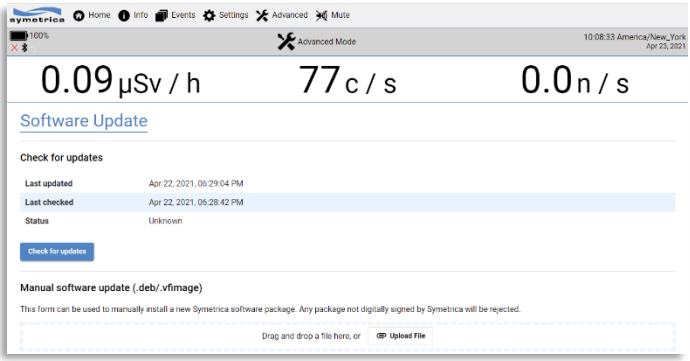

Figure 227: Update Software Screen

Options available are:

- **Check for Updates** – Click the **Check for updates** button to start the process. Once complete, the notification bar indicates if any updates have been found and are ready to be installed.

  Click the **Install updates** button to update the software. During install, the Update status field changes to '**New packages are being installed**' followed by '**The system is up-to-date**'. An automatic reboot will be performed after install.

- **Manual Software Update** – This option offers a manual install of new software packages with a drag and drop functionality, or if preferred, navigation and selection of the updated file.

  On selection of **Upload**, the system will first check the file for integrity (that is, to ensure it is an update and is not corrupt in any way). The system will then update the internal software of the various components as required. Reboot after the install.

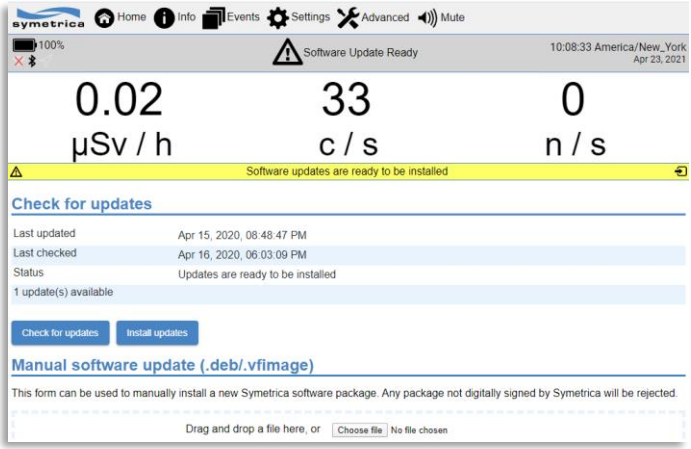

Figure 228: Software Updates Ready to be Installed

SECTION 9 TROUBLESHOOTING

9.1 Troubleshooting Guide

Issue	Action
The VeriFinder device will not power on.	Check that the battery has been correctly loaded / situated in the battery compartment. Connect to the AC mains supply and check for power (power icon on status bar). If necessary, remove the battery and recharge for 2.5 hours. If immediate use is required, remove the battery, and insert a new battery or an AA battery caddy (4 x AA battery cells). If the problem persists, contact Symetrica support.
No Audio output on the device.	Check that the mute/disabled icon is not displayed in the status bar. If necessary, enable Speaker from the Audio and Alerts /Settings menu. If the problem persists, contact Symetrica support.
No Audible click on the device.	By default, the audible rate indicator is set to Off. If necessary, enable Sensitivity from the Audio and Alerts / Settings menu. If the problem persists, contact Symetrica support.
No Vibration on the device.	Check that the mute/disabled icon is not displayed in the status bar. If necessary, enable Vibrator from the Audio and Alerts / Settings menu. If the problem persists, contact Symetrica support.
Audio Subsystem Failure is displayed.	Acknowledge the status. Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.

Issue	Action
Cannot connect to Wi-Fi.	Check that Wi-Fi is not set to Disabled. If necessary, enable Wi-Fi from the Settings / Connectivity menu. If the problem persists, contact Symetrica support.
Cannot connect Bluetooth to a paired device.	Check that Bluetooth is not set to Disabled. If necessary, enable Bluetooth from the Settings / Connectivity menu. If the problem persists, contact Symetrica support.
Cannot connect to a Cellular device.	Check that a micro SIM card is installed on the device. Check that Cellular is not set to Disabled. If necessary, enable Cellular from the Settings / Connectivity menu. If the problem persists, contact Symetrica support.
Cannot connect to GPS.	Check that GPS is not set to Disabled. If necessary, enable GPS from the Settings / Connectivity menu. If the problem persists, contact Symetrica support.
There is no Alert Screen displayed on detection of a Gamma / Neutron source.	Check that 'Gamma / Neutron Alerts outside events' option is not set to 'No'. If necessary, set to 'Yes' from Advanced Mode / Adjust Thresholds and Banners menu. If the problem persists, contact Symetrica support.
Cumulative Dose is not displayed on the Dose screen.	Check that Cumulative Dose is not set to 'Disable'. If necessary, set to 'Enable' from the Advanced Settings menu. If the problem persists, contact Symetrica support.

Issue	Action
GPS Fault is displayed.	Acknowledge the status. Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.
Modem Fault is displayed.	Acknowledge the status. Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.
Gamma / Neutron Detector Failure is displayed.	Acknowledge the status. Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.
The display is not functioning.	Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.
The navigation buttons are not functioning.	Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.
The system will not power on.	Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.
The system will not bootup.	Power off of the VeriFinder, leave for 10mins and power back on again. If the problem persists, contact Symetrica support.

Issue	Action
The system will not stabilize.	Power off of the VeriFinder, leave for 10mins and power back on again. Wait at least 10mins for stabilization to complete. If the problem persists, contact Symetrica support.
The case is cracked.	Contact Symetrica support and arrange return of the unit.

SECTION 10 MAINTENANCE

10.1 Preventive Maintenance

Preventive maintenance includes all scheduled maintenance actions required to keep the VeriFinder in good operational condition. Preventive maintenance actions include:

- Periodic inspections.
- Condition monitoring.
- Servicing (for example, cleaning).

10.1.1 Scheduled Maintenance Tasks

Recommended Schedule	Task
Monthly Actions.	▪ Inspect the unit for damage and functionality (see **Note:** below). ▪ Clean the unit monthly or as necessary, for example if the system has been used in harsh or contaminated environments.
Seven Year Actions.	▪ Replace the Stabilization source. The system is labeled with the source installation/ initiation date. This date is also accessible through the user interface on the device. ▪ Replace the real time clock battery. **Note:** Arrange return of the unit to Symetrica support for these tasks.

10.1.2 Cleaning Materials

Recommended cleaning materials for the VeriFinder:

- Alcohol Wipes (or equivalent).
- Mild Detergent (or equivalent).
- Kim Wipes (or equivalent).

10.1.3 Cleaning VeriFinder

Clean the unit whenever possible or necessary, especially if it has been used in harsh or contaminated environments.

To clean VeriFinder:

1. Remove the boot (refer to page 187 – Remove and Replace the VeriFinder Boot) and wipe down the VeriFinder with mild detergent solution applied to a soft cloth on the case and handle.
2. Clean the LED display with an alcohol wipe.
3. Ensure that no dirt remains in any recessed areas such as the microphone, connectors and screws.
4. Wipe down or hose the boot depending on the level of contamination.
5. Leave the detector and boot to air dry.
6. If the detector or boot is placed in the case the lid should be left open while drying.
7. When completely dry, re-attach the boot to the VeriFinder (refer to page 187 – Remove and Replace the VeriFinder Boot).

10.2 Corrective Maintenance

Corrective maintenance includes the remove and replace actions required as a result of damage / wear and tear of the VeriFinder external components.

10.2.1 Remove and Replace the VeriFinder Strap

Refer to Figure 229 during this procedure.

To remove the strap:

1. Unclip the strap from the strap clip (1).
2. Push the strap clip through the strap loop (2) and remove it from the retaining bar (3).

To replace the Strap:

1. Insert the strap clip loop behind the retaining bar (3) and pull the strap clip through the strap clip loop to secure it (2).
2. Clip the strap to the strap clip (1). Adjust the strap for fit when worn.

Figure 229: Remove and Replace the VeriFinder Strap

10.2.2 Remove and Replace the VeriFinder Boot

Refer to Figure 230 during this procedure.

To remove the boot:

1. Hold the VeriFinder firmly by the handle, and with your other hand prise and pull the back of the boot from the back of the unit (1).
2. Once released, pull the VeriFinder away and out of the boot (2).

To replace the boot:

1. Insert the VeriFinder into the front of the boot (2).
2. Hold the VeriFinder firmly by the handle, and with your other hand pull the back of the boot up and over the back of the unit (1).
3. Adjust the fit so that the boot fits tight to the Verifinder and the electrical connector cover is able to seal around the electrical connectors.

Figure 230: Remove and Replace the VeriFinder Boot

SECTION 11 ADDITIONAL INFORMATION

11.1 Full Isotope Library

The following table details radiological/nuclear material categories and their attributes.

Some isotopes are always a threat and cannot be changed. This is indicated by the **Lock** icon.

ANSI Name	Display Name	Threat	Category	Locked
NORM	NORM	Innocent	NORM	
Unknown	UNKNOWN	Threat	Unknown	
H(n,g)	Neutron Capture	Threat	Suspicious	
Annihilation	Fluorine-18	Threat	Medical	
Scatter	X-Ray Scatter	Innocent	NORM	
Fluorescence	Fluorescence	Innocent	NORM	
Na-22	Sodium-22	Threat	Medical	
K-40	Potassium-40	Innocent	NORM	
Cr-51	Chromium-51	Threat	Medical	
Mn-54	Manganese-54	Threat	Industrial	
Co-57	Cobalt-57	Threat	Industrial	
Co-60	Cobalt-60	Threat	Industrial	
Ga-67	Gallium-67	Threat	Medical	
Se-75	Selenium-75	Threat	Medical	

ANSI Name	Display Name	Threat	Category	Locked
Y-88	Yttrium-88	Threat	Industrial	
Sr-89	Strontium-89	Threat	Medical	
Sr-90	Bremsstrahlung	Threat	Industrial	
Mo-99	Molybdenum-99	Threat	Medical	
Tc-99m	Technetium-99m	Threat	Medical	
Pd-103	Palladium-103	Threat	Medical	
In-111	Indium-111	Threat	Medical	
I-123	Iodine-123	Threat	Medical	
I-125	Iodine-125	Threat	Medical	
I-131	Iodine-131	Threat	Medical	
Cs-131	Cesium-131	Threat	Medical	
Xe-133	Xenon-133	Threat	Medical	
Ba-133	Barium-133	Threat	Industrial	
Cs-134	Cesium-134	Threat	Industrial	
Cs-137	Cesium-137	Threat	Industrial	
La-138	Lanthanum-138	Innocent	NORM	
Eu-152	Europium-152	Threat	Industrial	

ANSI Name	Display Name	Threat	Category	Locked
Sm-153	Samarium-153	Threat	Medical	
Ho-166m	Holmium-166	Threat	Medical	
Ir-192	Iridium-192	Threat	Industrial	
Tl-201	Thallium-201	Threat	Medical	
Tl-204	Thallium-204	Threat	Industrial	
Bi-207	Bismuth-207	Threat	Industrial	
Ra-226	Radium-226	Innocent	NORM	
Th-228	Thorium-228	Innocent	NORM	
Th-232	Thorium-232	Innocent	NORM	🔒
U-232	Uranium-232	Threat	SNM	
U-233	Uranium-233	Threat	SNM	🔒
U-235	Uranium-235	Threat	SNM	🔒
Np-237	Neptunium-237	Threat	SNM	🔒
U-238	Uranium-238	Threat	Suspicious	
Pu-238	Plutonium-238	Threat	Suspicious	🔒
Pu-239	Plutonium-239	Threat	SNM	🔒

ANSI Name	Display Name	Threat	Category	Locked
Am-241	Americium-241	Threat	Industrial	
Pu-241	Plutonium-241	Threat	SNM	

11.2 Default Settings

The following details the default settings when VeriFinder is delivered from factory.

Settings Menu:

Setting	Value
Sensitivity Volume	Medium
Volume (Alarms and Alert)	70%
Volume (Headphones)	30%
Vibrator (tactile alert)	Enabled
Background Updates (Automatic)	Disabled
Screen Backlight (Brightness)	Auto
Background Collection Duration	300 s

Connectivity in Settings Menu:

Setting	Value
Wi-Fi	Disabled
Bluetooth*	Disabled
Cellular (3G)	Disabled
Reachback*	Disabled
GPS	Enabled

***** Optional

Advanced Mode Menu:

Setting	Value
Advanced Mode Password	00000
Dose Units	µSv/h
Spectrum in Normal Mode	Disabled
Default ID Collection Duration	30 s

Adjust Thresholds and Banners in Advanced Mode Menu:

Setting	Value
Gamma Alerts Outside Events (Banner)	Yes
Neutron Alerts Outside Events (Banner)	Yes
Gamma Sensitivity	5
Neutron Sensitivity	5
Gamma Hazard Limit *****	100 µSv/h
Neutron Hazard Limit	93 cps
Low Battery Warning ******	5%

***** IAEA Protected Radiation Zone Threshold

****** It is recommended that this setting is not changed.

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SECTION 12 DEEP DISCOVERY SOFTWARE

Deep Discovery is an optional non-standard software, which provides management, analysis and configuration capabilities. If this software has been purchased, install following the procedures below.

For purchasing of Deep Discovery, contact Symetrica support for details.

12.1.1 Installing the Deep Discovery Software

To install the Deep Discovery software:

1. Open the protective boot cover on the rear of VeriFinder and use the supplied USB cable to connect to a USB port on the PC.

Figure 231: Connecting VeriFinder to a USB Port on the PC

2. VeriFinder is recognized as a mass storage device with a new drive letter. The AutoPlay dialog box is displayed.

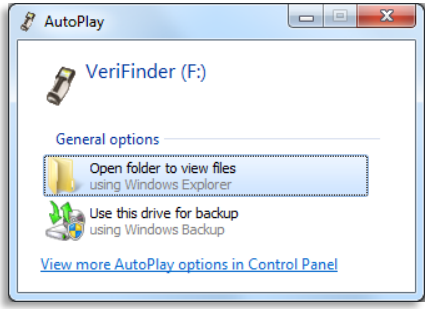

Figure 232: AutoPlay Dialog

Note: If the AutoPlay dialog box does not appear, then the AutoPlay feature has been disabled in your Windows operating system. In this case, use Windows Explorer to navigate to the new drive letter taken by VeriFinder.

3. From the AutoPlay dialog box, click Open folder to view the files. Alternatively, use Windows Explorer to navigate to the new drive letter assigned to VeriFinder.

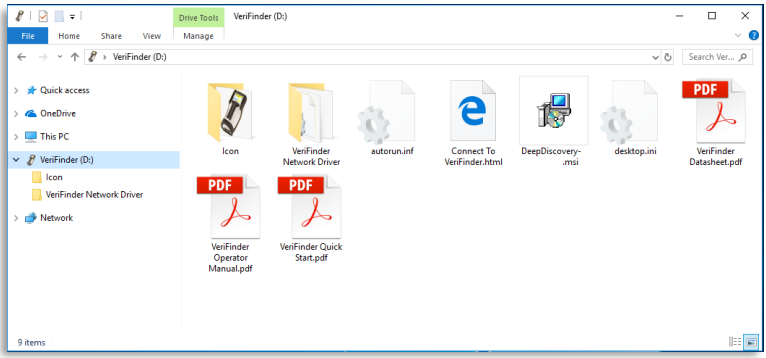

Figure 233: Windows Explorer

4. Double click on the Deep Discovery.msi file and follow the installer instructions that appear to install the Deep Discovery software on the PC.

5. If required, drag and drop the VeriFinder Operator Manual PDF file to your Windows Desktop or preferred location within your PC. Double clicking on the VeriFinder Operator Manual PDF file will open it in your preferred PDF viewer software installed on your PC.

12.1.2 Using Deep Discovery

Deep Discovery is launched from the Offload Tool > Open Folder button.

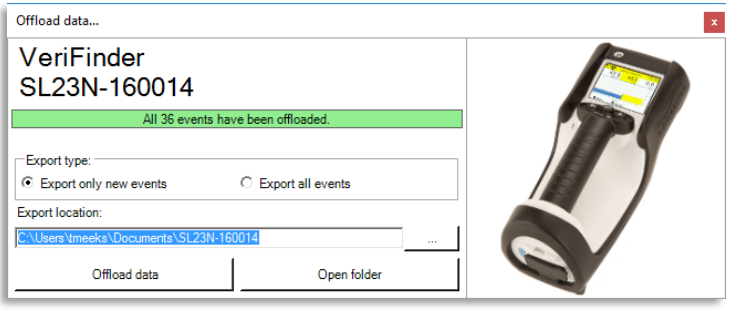

Figure 234: Offload Tool – Open Folder for Deep Discovery

1. Click the 'Open Folder' button. Deep Discovery loads all the SMLGZ files in the folder and presents them in the Occupancy Tab.

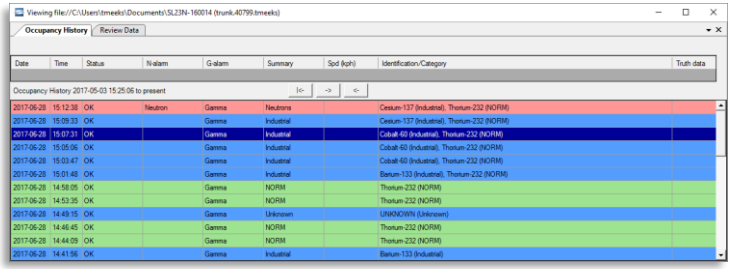

Figure 235: Deep Discovery – Occupancy History

2. Right-click an event to display the context menu and export options available.

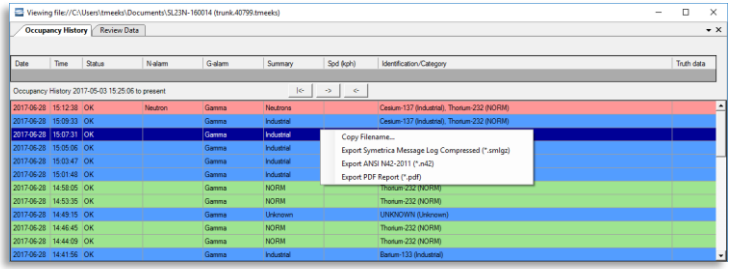

Figure 236: Deep Discovery Export Options

or…

3. Double-click the event to display the Review Data tab.

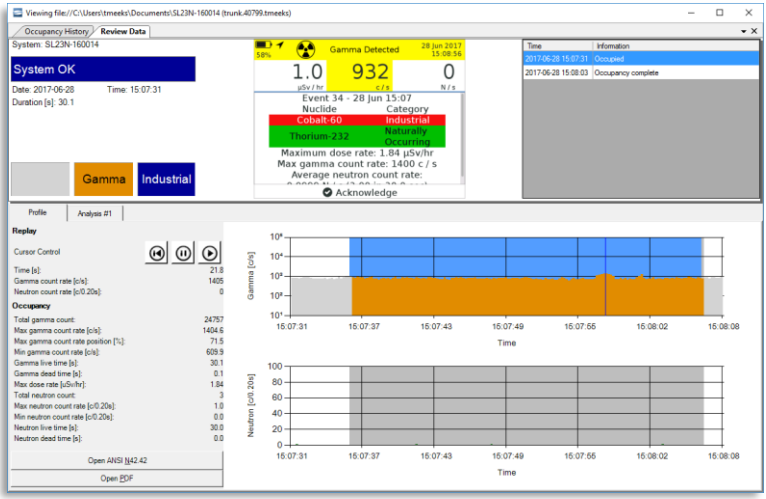

Figure 237: Deep Discovery Review Data

Note: You can export files using the Open ANSI N42.42 and Open PDF buttons on the bottom left of this screen.

4. Click the Analysis #1 tab to review analysis data.

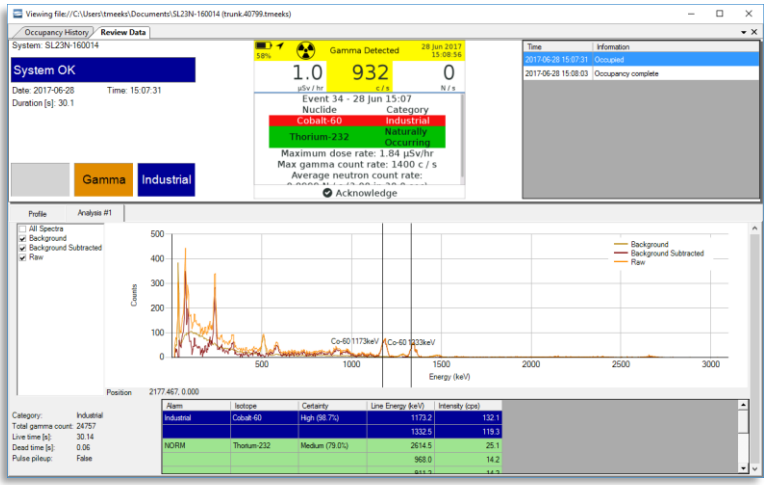

Figure 238: Deep Discovery Analysis Data

Note the following:

- Observe the percentage in the Certainty column
- If multiple analyses / or no analyses were performed, there will be more or less Analysis tabs
- If you click on a line, it will display it on the graph above.
- The graph can be zoomed and put into log mode using the mouse and the right-click menu.

5. Click Open PDF to display the PDF report.

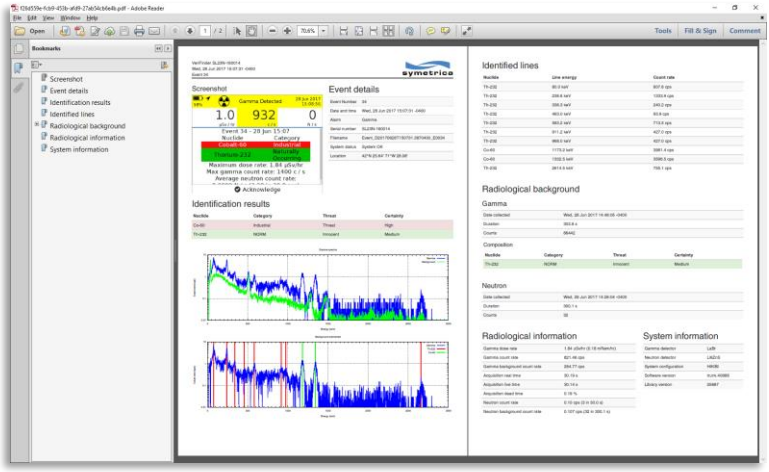

Figure 239: Open PDF (Example File)

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SECTION 13 SPARE PARTS LIST

Part Number	Part Nomenclature
400-0089	VERIFINDER SL23-N
172-0002	BAT, NB2037 SMART LI-ION
390-0003	VERIFINDER CARRY STRAP
410-0363	ASSY, VERIFINDER PACKING CASE
410-0364	ASSY, VERIFINDER AA CADDY
410-0365	ASSY, VERIFINDER CAR CHARGER
410-0381	ASSY, VERIFINDER AC CHARGER
410-1193	ASSY, VERIFINDER HANDHELD
420-0157	CABLE, USB OTG MINI USB TO USB A SOCKET
420-0158	CABLE, AC LINE CORD 3 CONDUCTOR USA
420-0161	CABLE, USB A TO MINI-B 5-PIN CABLE 3 FOOT
430-0085	Li-ION BATTERY CHARGER
430-0086	Li-ION BATTERY CHARGER POWER SUPPLY
430-0421	USB 2.0 TO ETHERNET ADAPTOR
360-0023	VERIFINDER BOOT

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Revision History

Revision	Reason for Revision	Date Revised
Rev 01	Initial release version	2015-10-01
Rev 02	Minor updates	2016-01-01
Rev 03	Regulatory information for NRC submission	2016-10-01
Rev 04	Transfer to new template, major updates	2017-06-23
Rev 05	Release after T Meeks review	2017-06-29
Rev 06	Updates for 2.25 software	2017-08-30
Rev 07	Release after T Meeks review	2017-09-04
Rev 08	Added wording on battery protection and part numbers	2017-09-13
Rev 09	Changed wording of battery compatibility.	2017-09-18
Rev 10	Photographs updated for hard-tooled version	2017-10-24
Rev 11	Updated model numbers to remove hyphens.	2017-10-24
Rev 12	Re-instated hyphens.	2017-11-07
Rev 13	Small graphic and procedure change section 6 RNDIS drivers	2018-05-02
Rev 14	Integrated supplement 1	2018-07-23
Rev 15	Addition of NORM radionuclides added to Table26 (SN Series)	2019-06-18
Rev 16 /17	Updated to new Symetrica template. Additions / changes added as a result of internal intensive review. Addition of Section 8 – Using the Web Management Interface.	2020-04-27
Rev 18	Updated to version 3.4.5 software	2021-04-19

Revision	Reason for Revision	Date Revised
Rev 19	Updates to manual including: Section 3 – Event Actions – Send via Bluetooth (images added) Addition of Section 9 – Troubleshooting Addition of TM validation review comments.	2021-06-11
Rev 20	Update to Section 6.2 – Offloading Events to the PC, to include step for manual entry of an IP address. Addition of Section 8.11.7.6 - ANSI N42.42 Settings.	2022-01-06

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