



Delta Electronics, Inc.

UNOKIT2

2nd Generation UNO Sensor Calibration System

User Manual v1.0



[Revision History]

| Date | Version | Description |
|------------|---------|----------------------------|
| 2024/01/05 | 1.0 | Release the first version. |

[Overview]

UNOKIT is the official calibration tool for the UNO Sensor (multi-in-one air quality detector) devices. It allows for the calibration of sensor module readings on the test UNO Sensor device by comparing them with the readings of the UNO Sensor benchmark, ensuring the accuracy of the sensor readings.

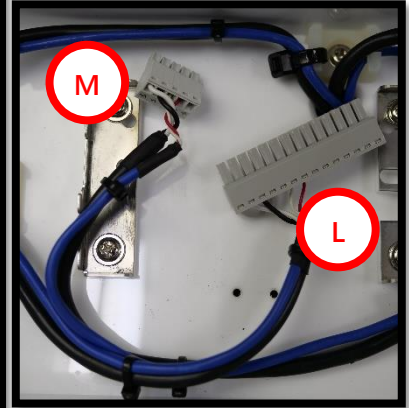
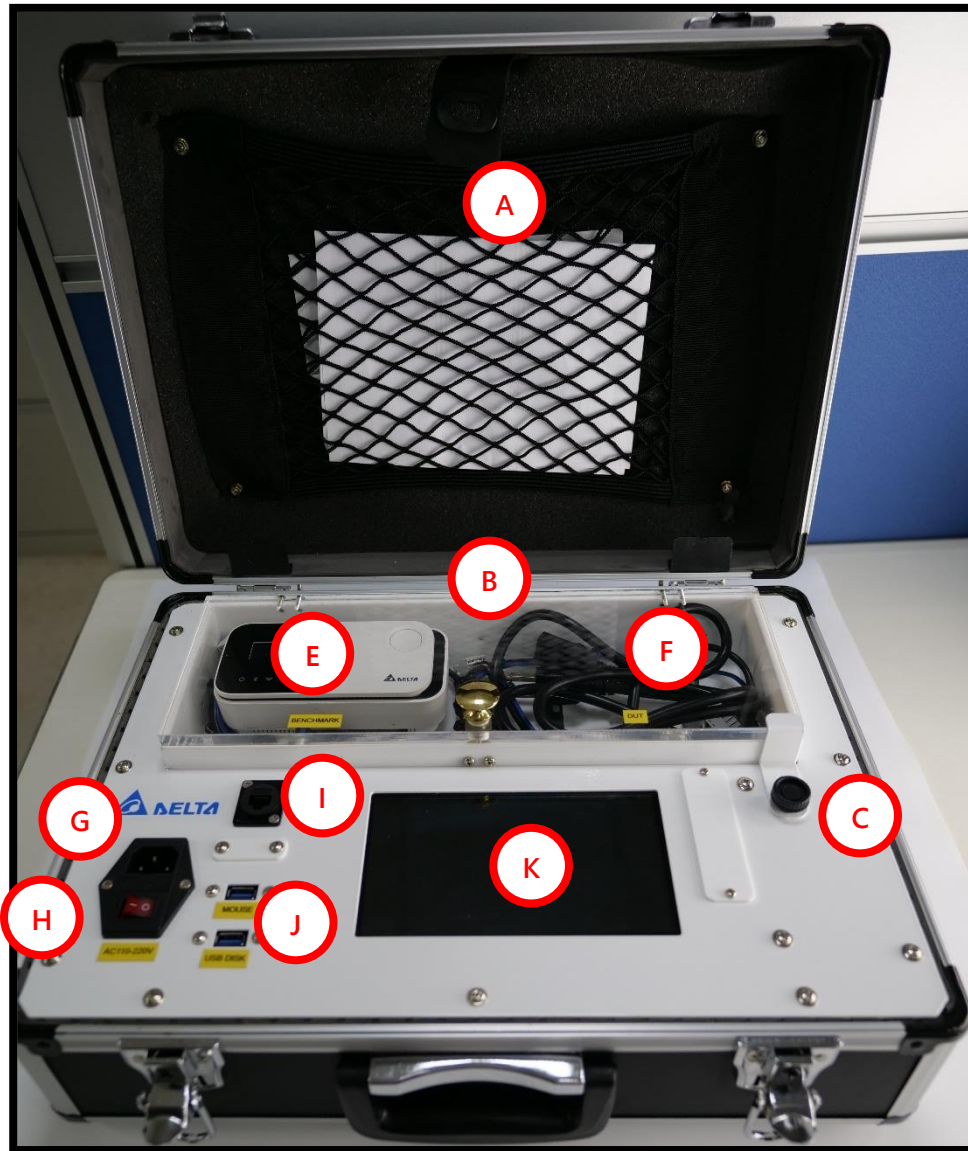
The UNOKIT supports the following models of UNO Sensor devices: UNOnext series and UNOlite series. The sensor modules can be calibrated are listed.

- Carbon Dioxide (CO₂)
- Particulate Matter (PM₁/PM_{2.5}/PM₁₀)
- Total Volatile Organic Compounds (TVOC)
- Carbon Monoxide (CO)
- Formaldehyde (HCHO)

* The calibration of the test device will be performed based on the sensor combination of the benchmark, typically UNO-9SW, which includes carbon dioxide (CO₂), particulate matter (PM_{2.5}/PM₁₀), total volatile organic compounds (TVOC), carbon monoxide (CO), and suspended, formaldehyde (HCHO).

* After calibration, sensor readings of the test device will be within the valid range of sensor readings of the benchmark but may not be identical totally.

[Contents]



| | |
|-------------------------------------|--------------------------------------|
| A. Storage Bag | G. Power Supply: AC100V-240V |
| B. Calibration Chamber | H. Power Switch |
| C. Safety Clasp * | I. Ethernet Port for Engineering Use |
| D. Power Cord * | J. USB Port: MOUSE / USB DISK |
| E. Benchmark Installation * | K. Display LCD |
| F. Test Device (DUT) Installation * | |

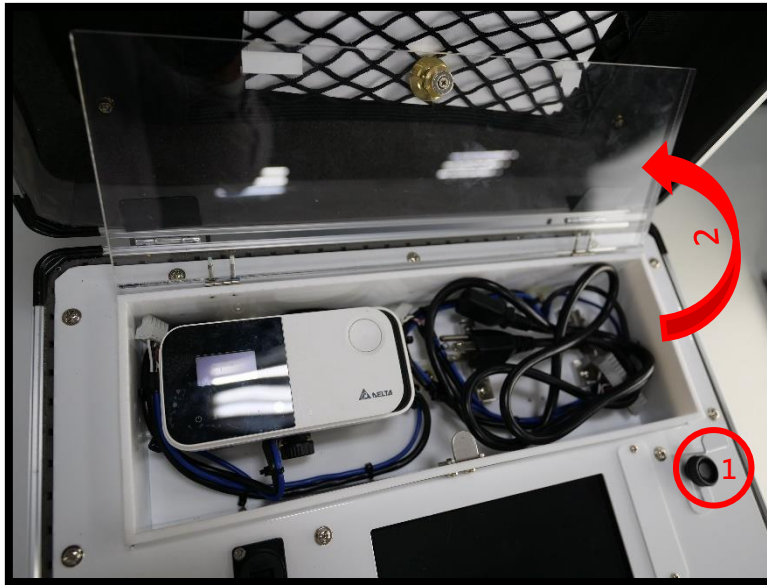
* The power cord is recommended to be stored inside the calibration chamber when not in use.

* The safety clasp can be used to quickly detach terminal connectors.

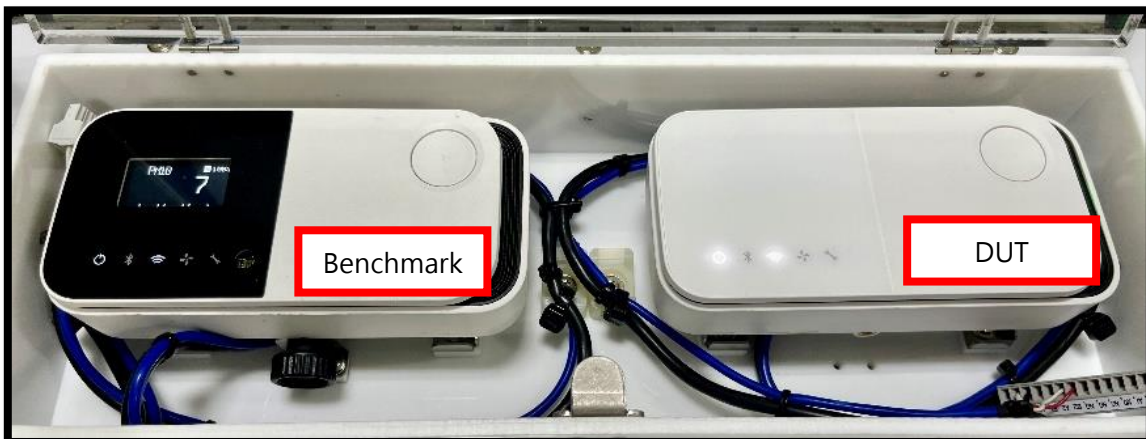
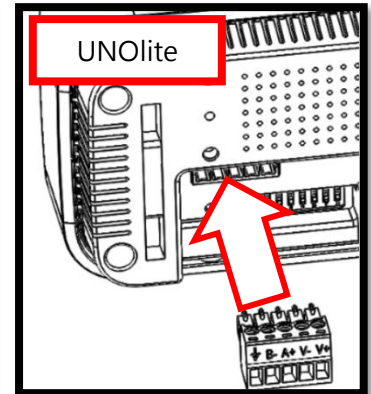
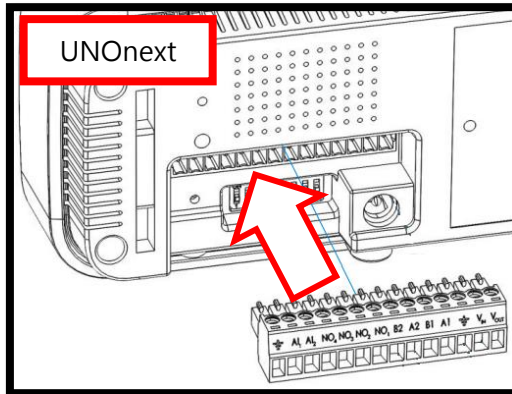
* There are two sets of terminal cables for both benchmark and the test device. The 14-pin cable is for use with the UNOnext series (L), while the 5-pin cable is for use with the UNOLite series (M).

[Installation Guide]

1. Counter-clockwise release the safety clasp and open the calibration chamber.



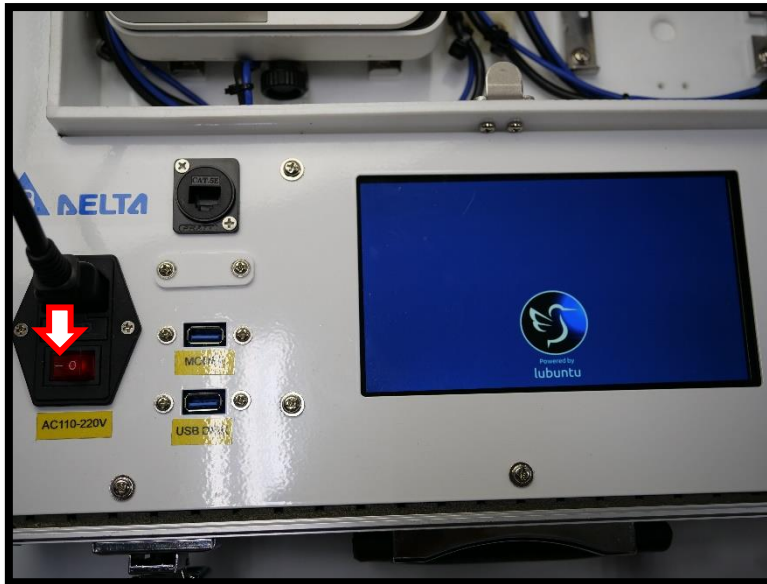
2. Ensure all dip switches on the Benchmark are down, then install it on the left and the test device (DUT) on the right. Connect the UNOnext with the 14-pin cable and the UNOLite with the 5-pin cable. Close the chamber to complete the installation.



3. Connect the power cord, and then connect the USB mouse. * Please prepare your own USB mouse.

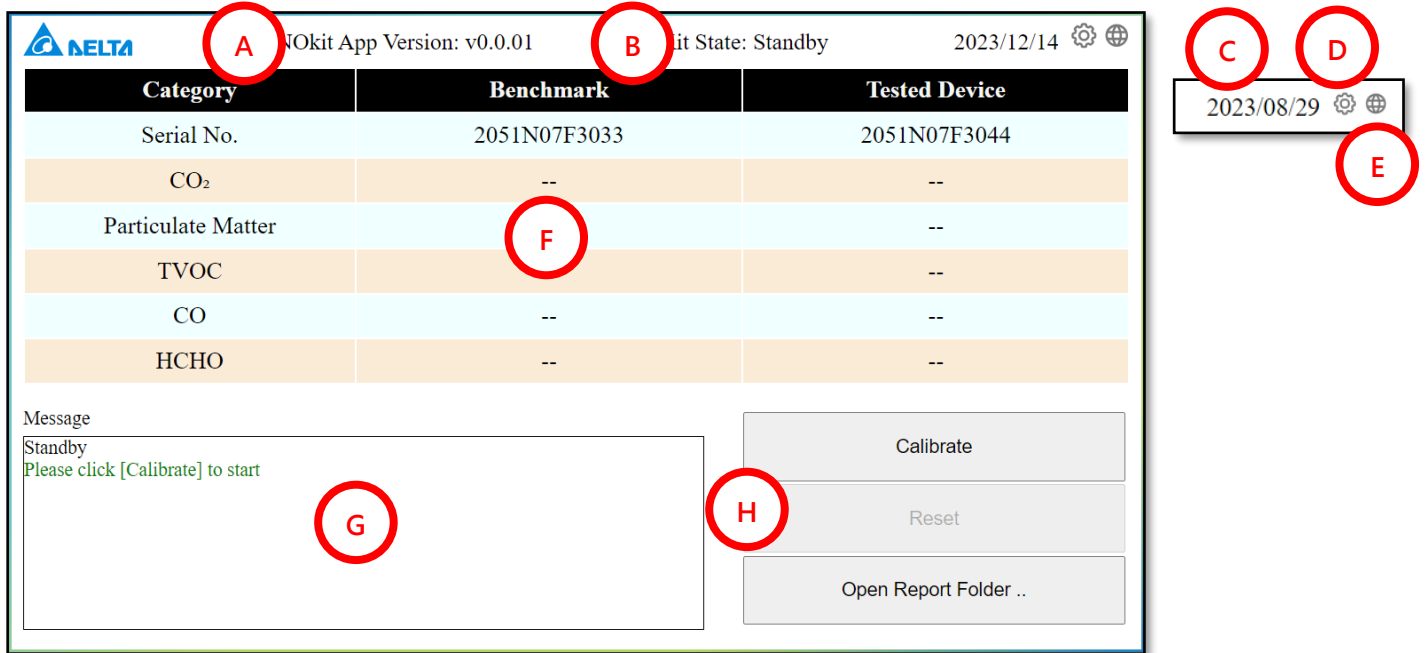


4. Power on.



- * The benchmark does not need to be removed after installation unless there is a need for replacement.
- * After installing the benchmark, please go to [System Settings] and update the [Time Zone] and [Benchmark Calibration Date] for the first-time use.

[User Interface Guide]



UNOKIT App Version: v0.0.01 UNOKIT Status: Standby 2023/12/14

| Category | Benchmark | Tested Device |
|--------------------|--------------|---------------|
| Serial No. | 2051N07F3033 | 2051N07F3044 |
| CO ₂ | -- | -- |
| Particulate Matter | -- | -- |
| TVOC | -- | -- |
| CO | -- | -- |
| HCHO | -- | -- |

Message
Standby
Please click [Calibrate] to start

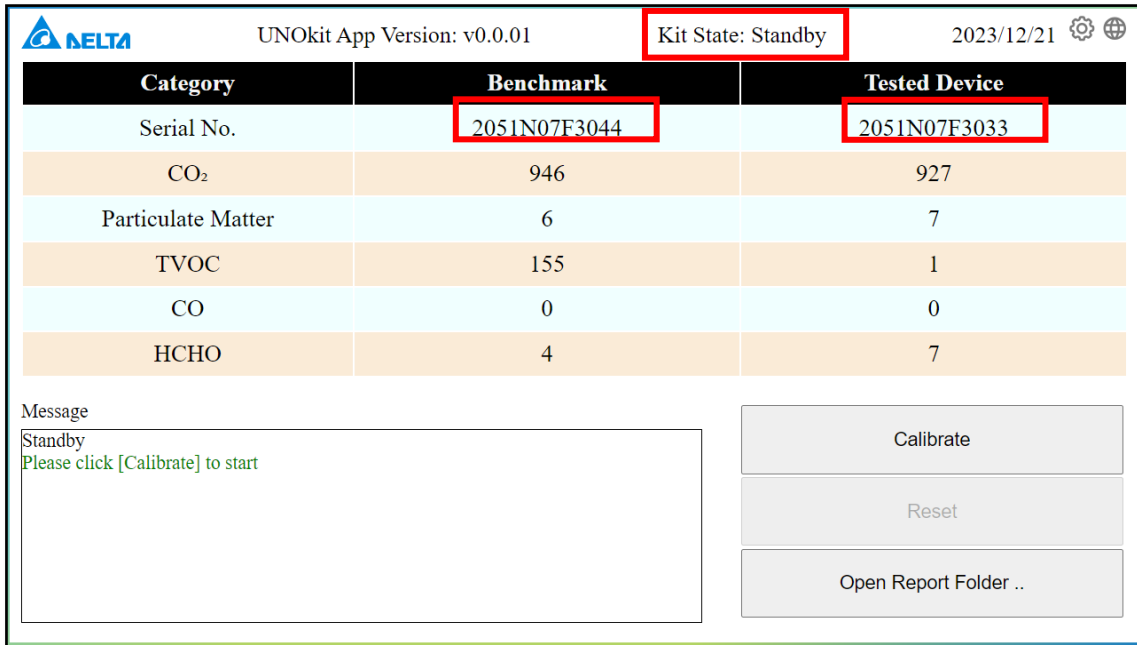
Calibrate
Reset
Open Report Folder ..

2023/08/29

| | |
|-------------------------|---|
| A. UNOKIT App Version | F. Connection Status and Sensor Values of Benchmark and Test Device |
| B. UNOKIT Status | G. Message Box |
| C. Current Date | H. Buttons of Calibrate / Reset /Open Report |
| D. UI Language Settings | |
| E. System Settings | |

[Calibration Process]

1. Follow the installation guide to set up the benchmark, test device and mouse and power UNOKIT on. After the system starts up, the UNOKIT status will display 'Standby,' and the serial numbers of the benchmark and test device and sensor readings of mounted sensors should both be displayed correctly. *** If there is an error message, please follow the instructions.**



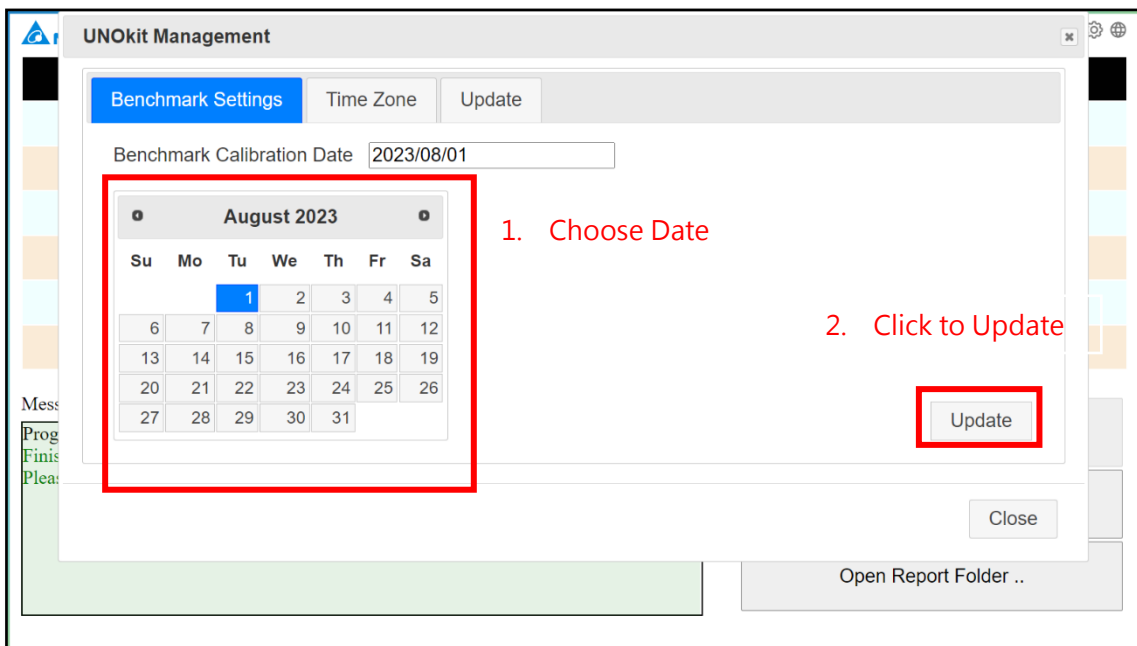
UNOKIT App Version: v0.0.01 Kit State: Standby 2023/12/21

| Category | Benchmark | Tested Device |
|--------------------|--------------|---------------|
| Serial No. | 2051N07F3044 | 2051N07F3033 |
| CO ₂ | 946 | 927 |
| Particulate Matter | 6 | 7 |
| TVOC | 155 | 1 |
| CO | 0 | 0 |
| HCHO | 4 | 7 |

Message
Standby
Please click [Calibrate] to start

Calibrate
Reset
Open Report Folder ..

2. For the first-time use or when replacing the standard machine, please set the [Benchmark Calibration Date] according to the benchmark information.



UNOKIT Management

Benchmark Settings Time Zone Update

Benchmark Calibration Date 2023/08/01

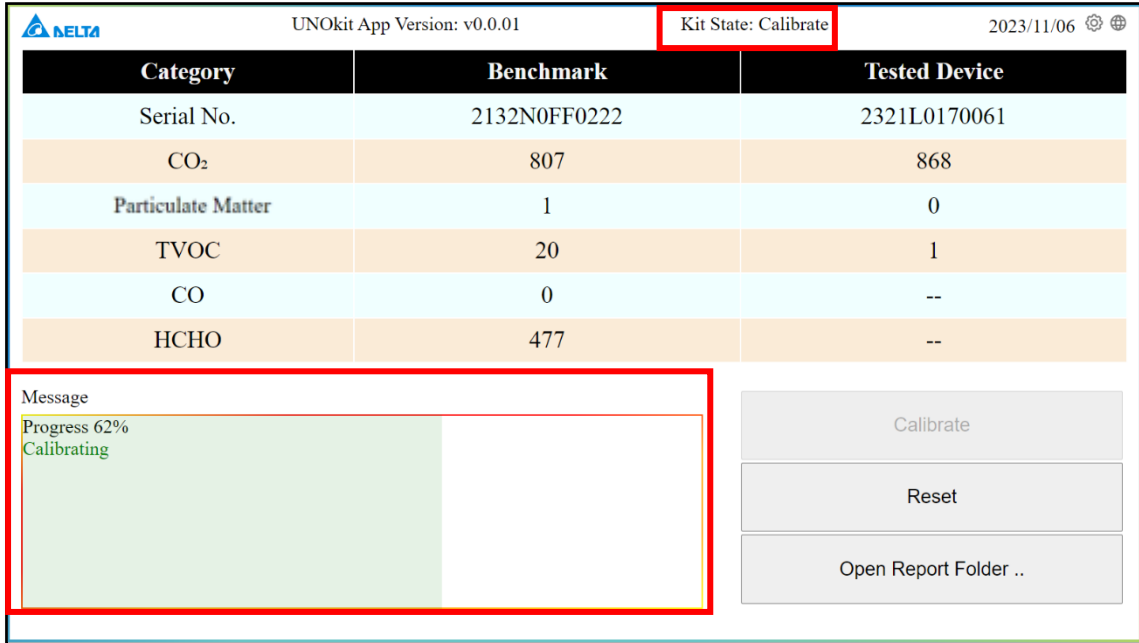
1. Choose Date

2. Click to Update

Update
Close
Open Report Folder ..

3. After the sensor readings mounted on benchmark and test device are displayed (not --), click on [Calibrate], and UNOKIT will start the calibration process.

UNOKIT will perform the following actions: [Warmup] → [Analyze] → [Calibrate] → [Finish]. The message block will also be keeping update according to the progress.



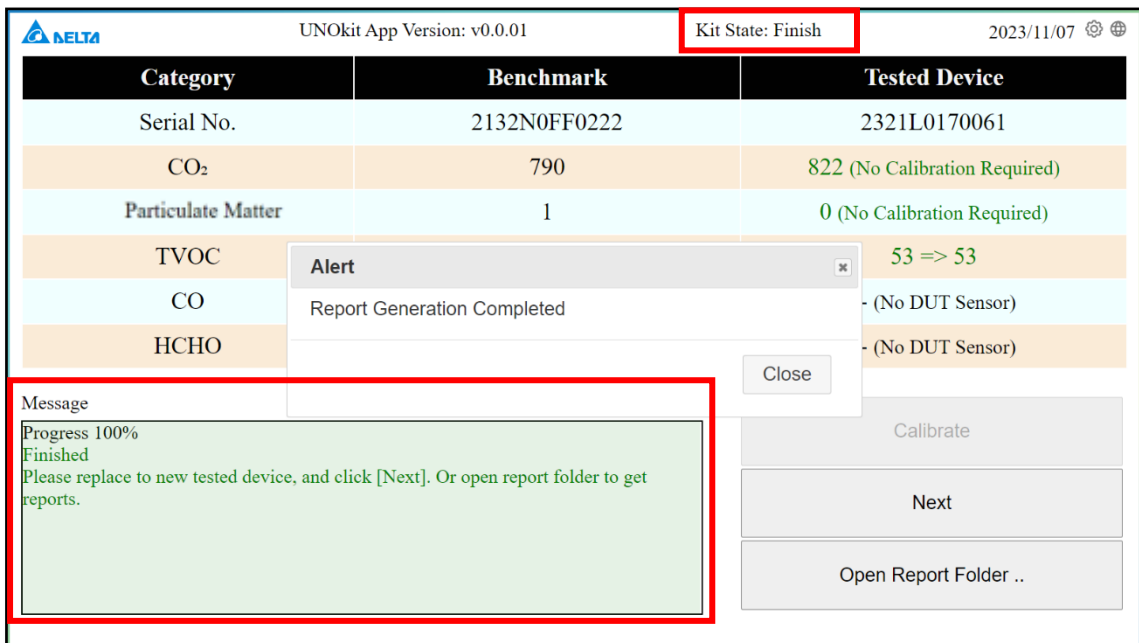
| Category | Benchmark | Tested Device |
|--------------------|--------------|---------------|
| Serial No. | 2132N0FF0222 | 2321L0170061 |
| CO ₂ | 807 | 868 |
| Particulate Matter | 1 | 0 |
| TVOC | 20 | 1 |
| CO | 0 | -- |
| HCHO | 477 | -- |

Message
Progress 62%
Calibrating

Buttons: Calibrate, Reset, Open Report Folder ..

Note: If the sensor readings persistently do not display, it may indicate that the benchmark or test device **lacks this module**, or **the module is malfunctioning**.

4. When the calibration process is finished, the UNOKIT status will display [Finish], and the information for the benchmark and test device will be updated to their final states. At this point, the report has been generated.



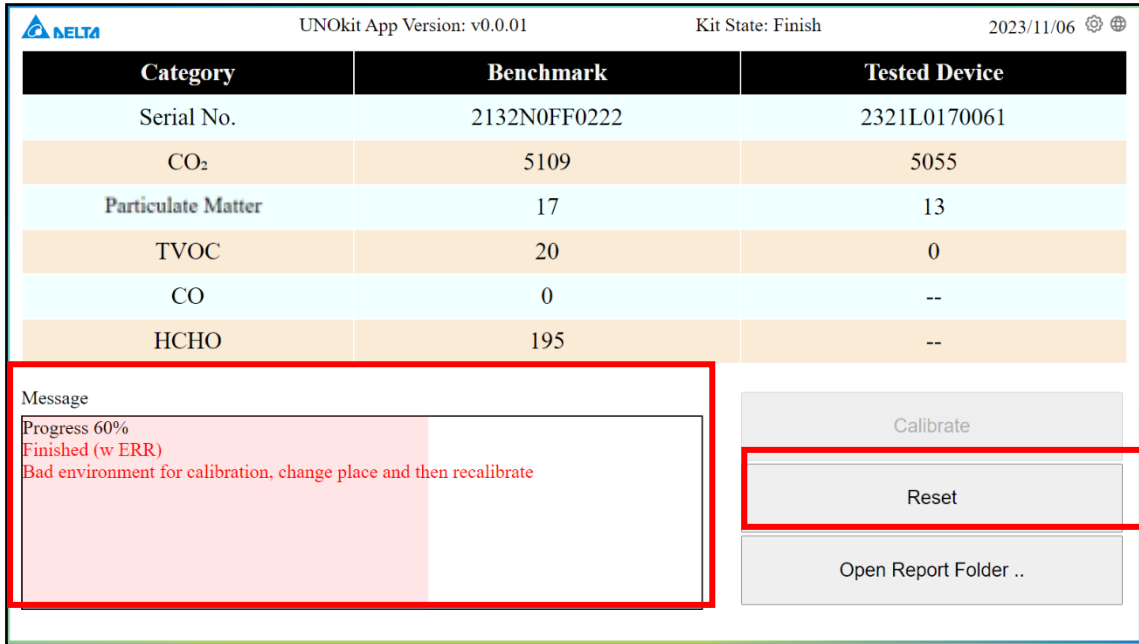
| Category | Benchmark | Tested Device |
|--------------------|--------------|-------------------------------|
| Serial No. | 2132N0FF0222 | 2321L0170061 |
| CO ₂ | 790 | 822 (No Calibration Required) |
| Particulate Matter | 1 | 0 (No Calibration Required) |
| TVOC | | 53 => 53 |
| CO | | (No DUT Sensor) |
| HCHO | | (No DUT Sensor) |

Alert: Report Generation Completed

Message
Progress 100%
Finished
Please replace to new tested device, and click [Next]. Or open report folder to get reports.

Buttons: Calibrate, Next, Open Report Folder ..

5. If any **errors** occur during the process, the message block will display a red warning. **Please follow the message instructions to resolve the issue**, then click [Reset] / [Next] or reboot UNOKIT.



UNOKIT App Version: v0.0.01 Kit State: Finish 2023/11/06

| Category | Benchmark | Tested Device |
|--------------------|--------------|---------------|
| Serial No. | 2132N0FF0222 | 2321L0170061 |
| CO ₂ | 5109 | 5055 |
| Particulate Matter | 17 | 13 |
| TVOC | 20 | 0 |
| CO | 0 | -- |
| HCHO | 195 | -- |

Message

Progress 60%
 Finished (w ERR)
 Bad environment for calibration, change place and then recalibrate

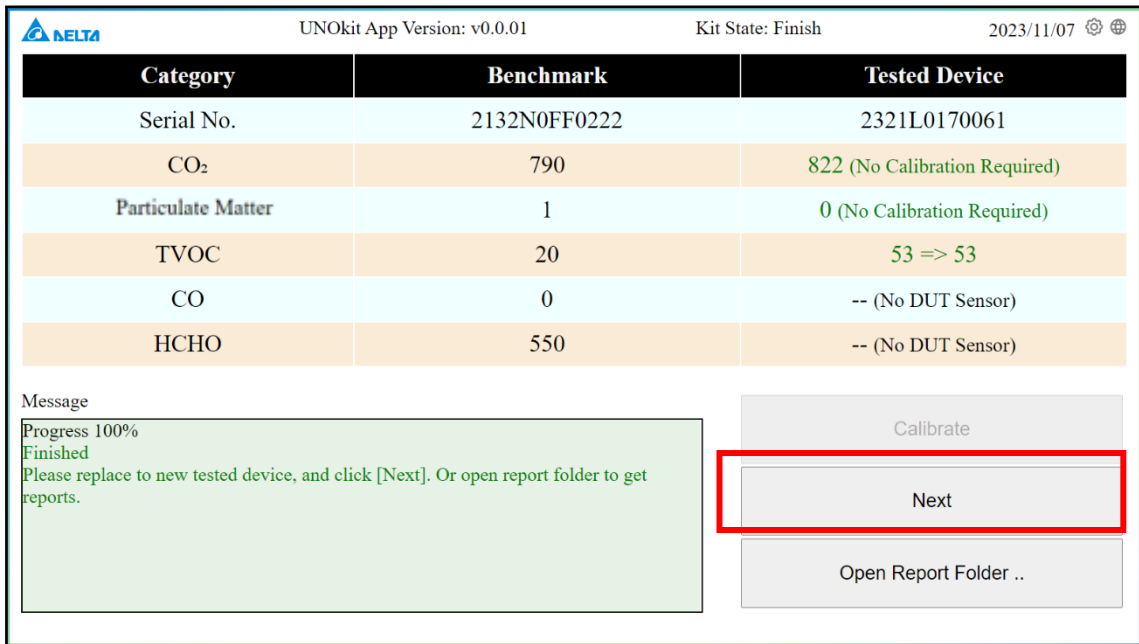
Calibrate

Reset

Open Report Folder ..

Note: In some case, errors are discovered after [Finish] stage, a fail-calibration report also be generated.

6. After calibrating the test machine, you can refer to the [Installation Guide] to replace it with the next one and click [Reset] or [Next]. Then, repeat steps 1 to 4 for a new round of calibration. Or refer to [Retrieve Report] to get report. *** No need to restart UNOKIT power after replacing the next test device.**



UNOKIT App Version: v0.0.01 Kit State: Finish 2023/11/07

| Category | Benchmark | Tested Device |
|--------------------|--------------|-------------------------------|
| Serial No. | 2132N0FF0222 | 2321L0170061 |
| CO ₂ | 790 | 822 (No Calibration Required) |
| Particulate Matter | 1 | 0 (No Calibration Required) |
| TVOC | 20 | 53 => 53 |
| CO | 0 | -- (No DUT Sensor) |
| HCHO | 550 | -- (No DUT Sensor) |

Message

Progress 100%
 Finished
 Please replace to new tested device, and click [Next]. Or open report folder to get reports.

Calibrate

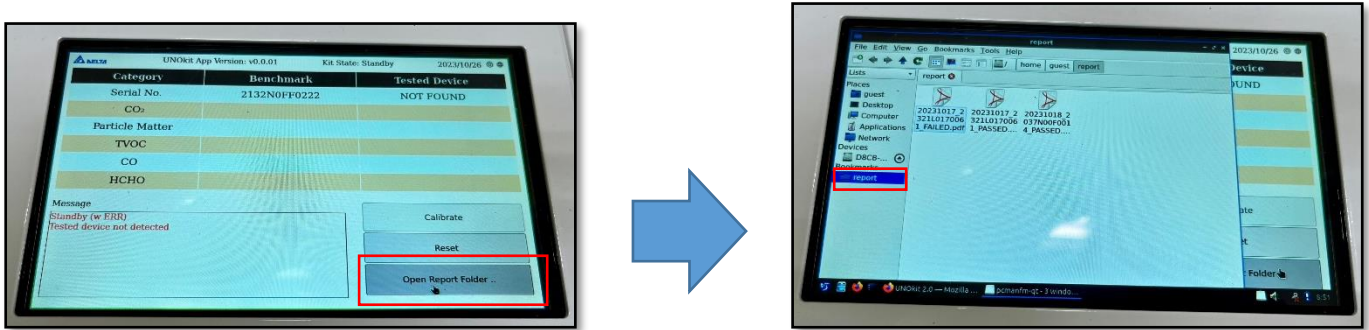
Next

Open Report Folder ..

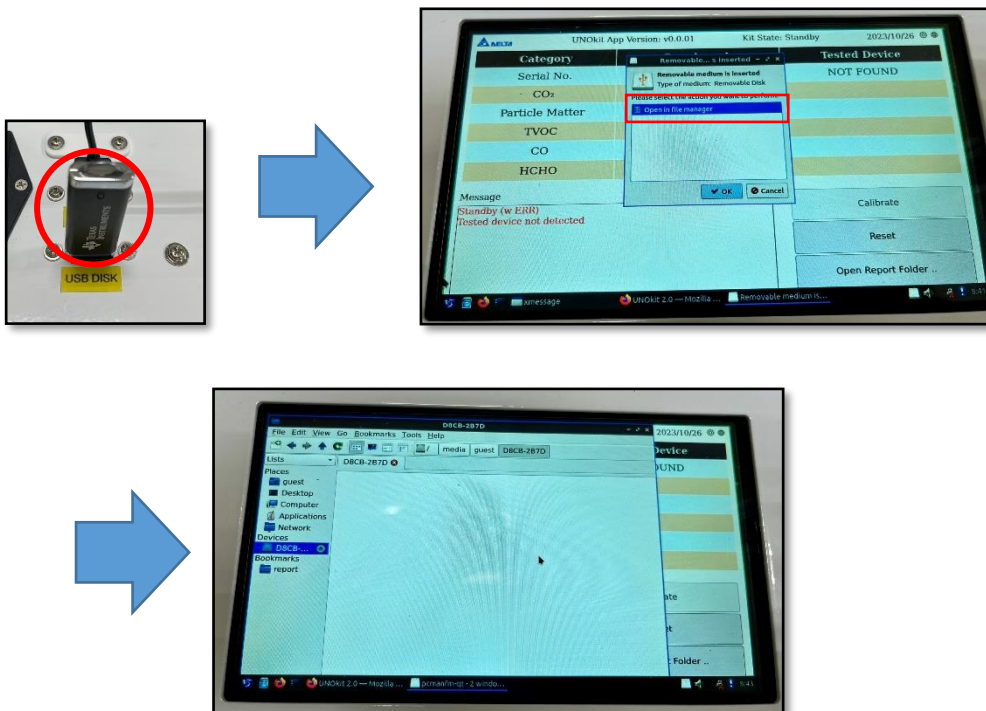
7. After completing all calibrations and retrieving the reports following the next section, please remove the test device, turn off the power, and store the power cord.

[Retrieve Report]

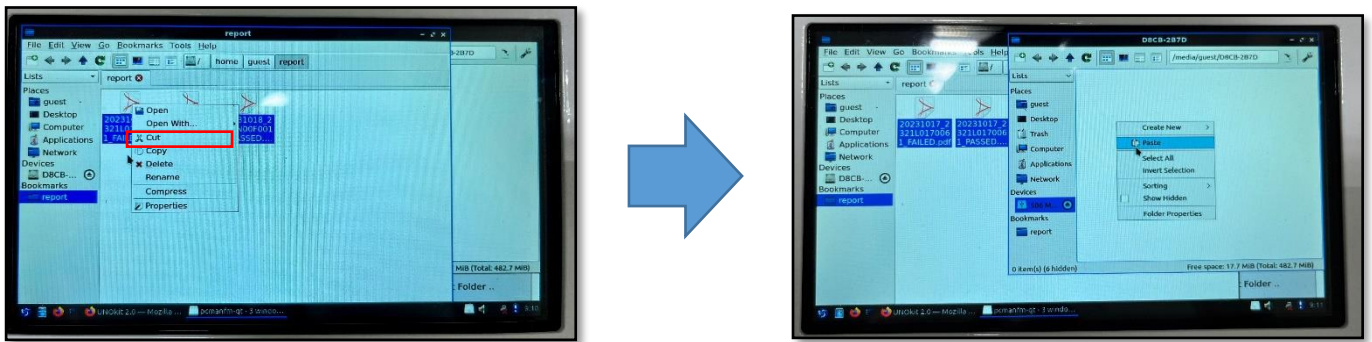
1. Click on [Open Report Folder ...], and the screen will display the report storage directory. All calibration reports are PDF file, the filename format is *[Calibration Date]_[SN of Test Device]_[PASSED/FAILED].pdf*. e.g., 20231215_2321L0170099_PASSED.pdf.



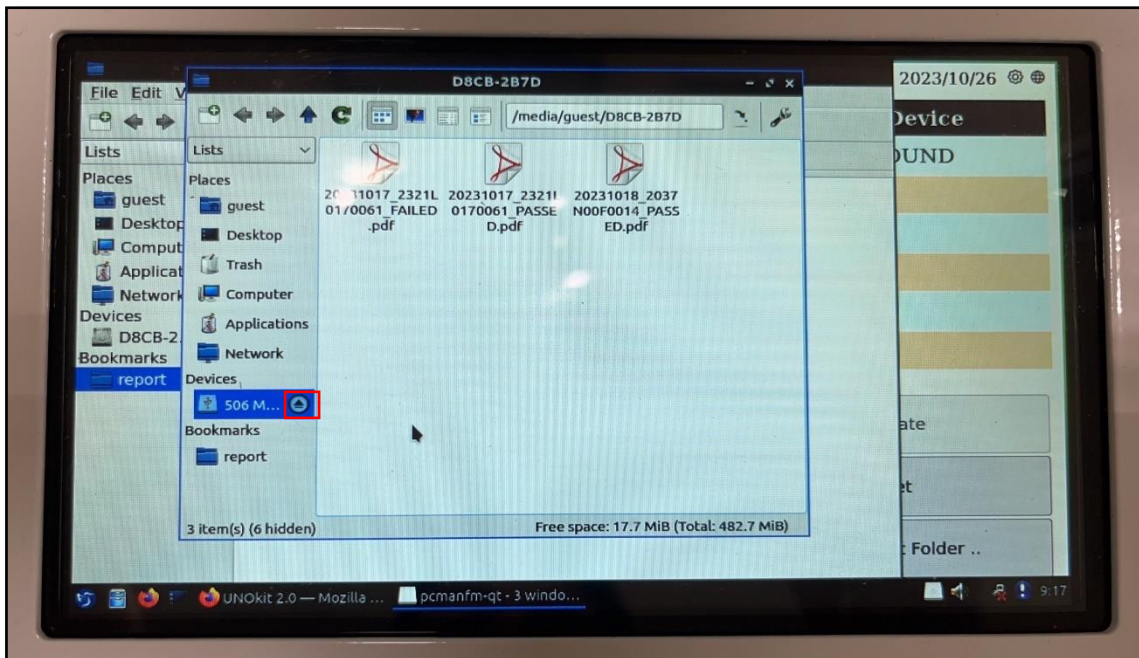
2. Insert the USB flash disk into [USB DISK], and the LCD will display a permission allow window. Select [Open File Manager], click [OK], and the USB flash disk directory will appear.



3. Move the PDF file from the report directory to the USB flash disk directory. Select the PDF file, right-click, choose [Cut], and then go to the flash disk directory, right-click, and select [Paste].

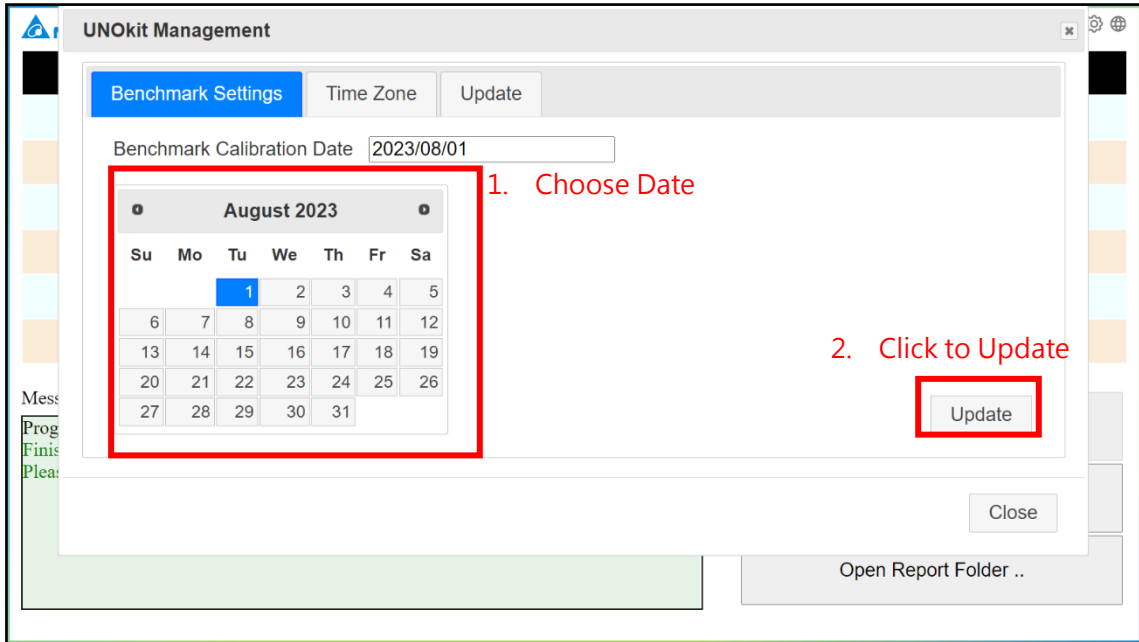


4. Click the [Eject USB Drive] button and eject the USB flash disk.

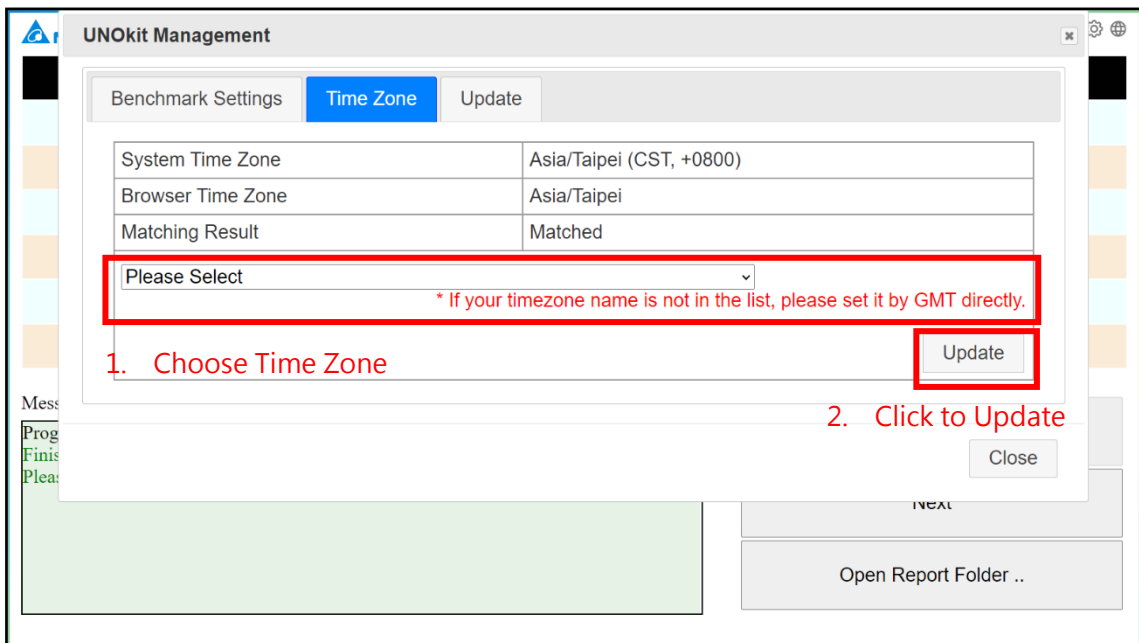


[System Settings (UNOKit Management)]

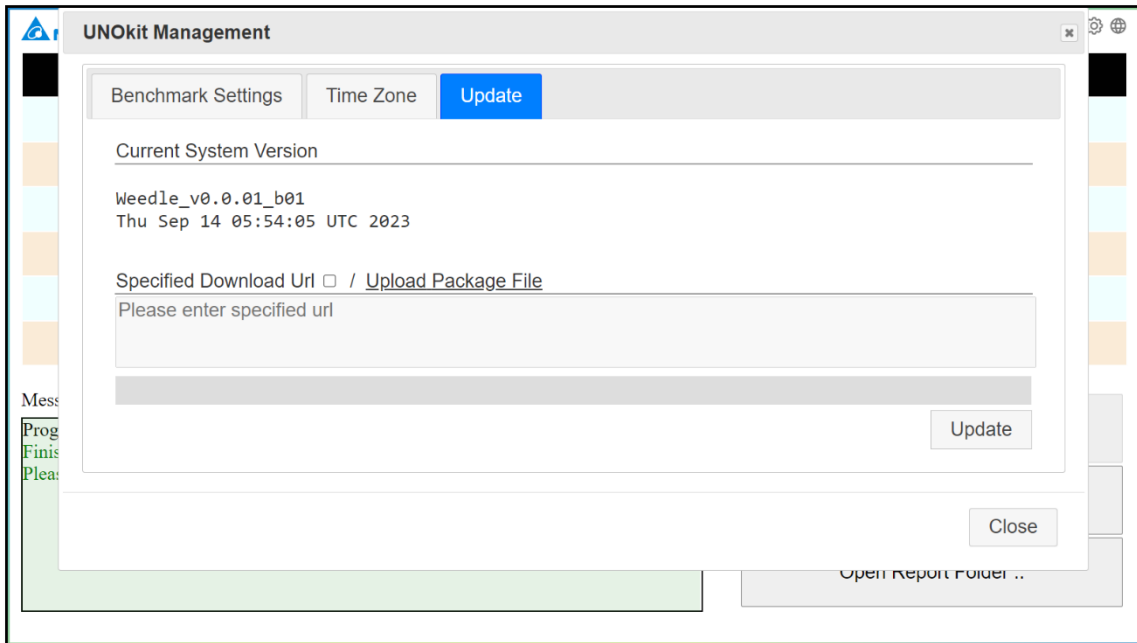
- Benchmark Calibration Date: If a benchmark replacement is performed, please update the calibration date according to the information of the new benchmark.



- Time Zone: Please set the time zone correctly to ensure the accuracy of the report date. (e.g. +0800 → Taiwan).



- System Update: When UNOKIT is connected to the internet and can access the external network, it can perform system updates. * This operation should be carried out as instructed by an engineer.



[Common Errors]

| Error | Description |
|------------------------------|--|
| alert_check_fail | Calibrate fail, please re-calibrate |
| alert_cmd_fail | Unknown failure, please re-calibrate |
| alert_dut_decline | Sensor offset is too large, reset or replace it |
| alert_dut_err | Sensor error, reboot or replace it |
| fatal_alert_bad_env | Bad environment for calibration, change place and then recalibrate |
| fatal_alert_bench_err | Benchmark sensor error, please reboot or replace Benchmark |
| fatal_alert_bench_offline | Benchmark is offline, please re-connect and reset |
| fatal_alert_disk_full | Disk is full, please delete extra reports |
| fatal_alert_dut_changed | Tested device is changed, please reset |
| fatal_alert_dut_offline | Tested device is offline, please re-connect and reset |
| fatal_alert_modbus_fail | COM port error, try to reboot UNOkit |
| fatal_alert_no_bench | Benchmark not detected (0xDO) |
| fatal_alert_no_dut | Tested device not detected |
| fatal_alert_no_target | No target item |
| fatal_alert_unknown_dut | Unknown Test device (SN, Model, Ver) |
| fatal_alert_bench_invalid_fw | Please update the benchmark firmware |
| fatal_alert_dut_invalid_fw | Please update the test device firmware |