STRATIO, INC.

LS SWIR SDK

SWIR Spectral Sensor

USER GUIDE

STRATIO, INC.

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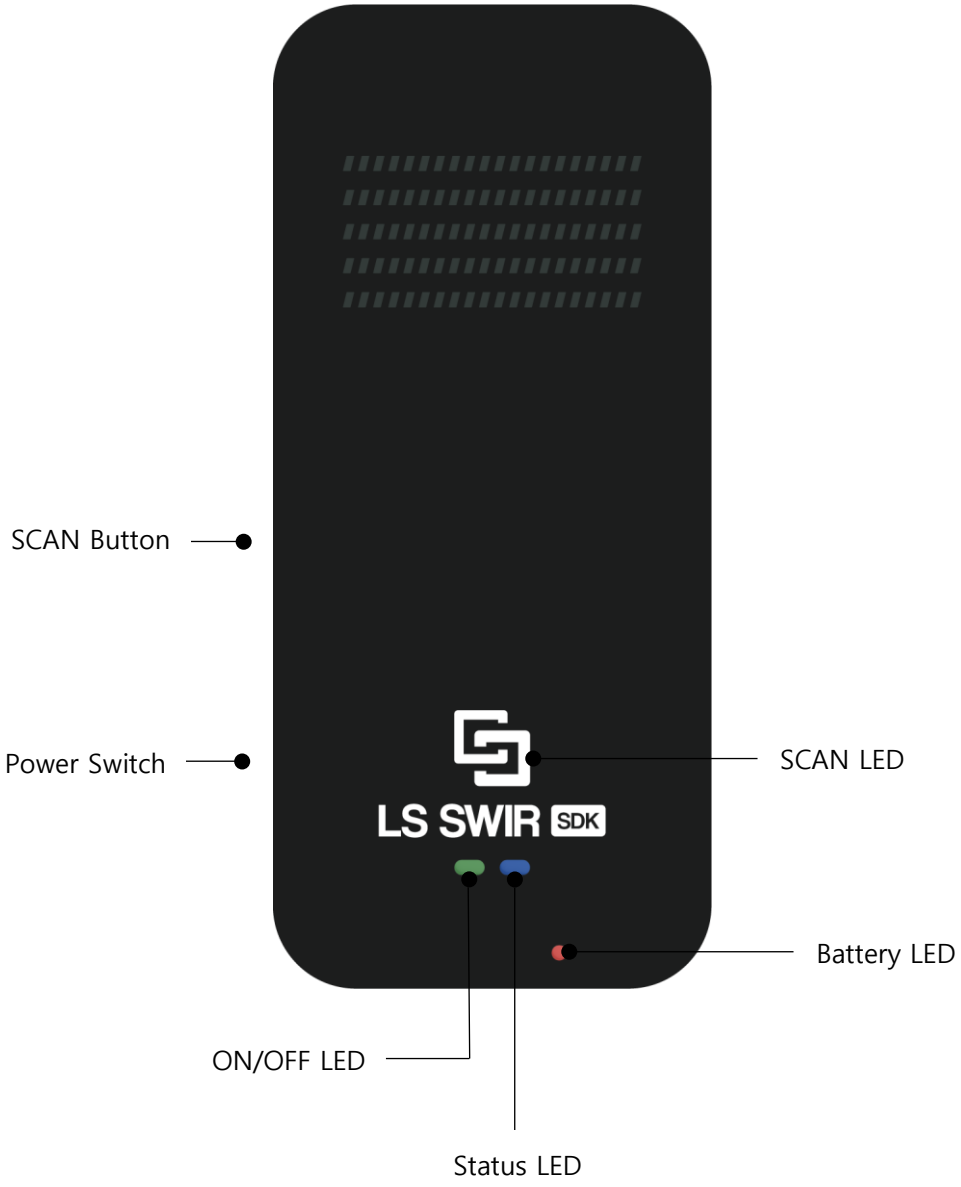
Product Specifications

Item	Spec
Wavelength Range	1225 nm - 1625 nm
Number of Channels	8
Bandwidth	50 nm / channel
SNR	1000 : 1
Sample Coverage (diameter of collected light beam)	Φ 10 mm
Max Power	5.5 W
Battery Life	> 2,000 scans
Battery Type	Rechargeable Li-ion 18650 batteries
Battery Charging Method	USB-C connector
Battery Charging Time	5 hours
Connectivity	Bluetooth Low Energy (BLE) V5.2, USB
Operating Temperature	-5°C to +40 °C
Size	49 x 56 x 128 mm
Weight	260 g

Device Components



Getting Started

1. Preparing the Device

Turn on the power switch on the side of the LS SWIR SDK device. After the switch is turned on, the green ON/OFF LED will blink for up to 12 seconds while the device initializes. When the device is ready, the green LED on the top of the device will light up.

2. Running the Program

① **Install the Program**: Run the provided LS SWIR SDK installer file and follow the on-screen instructions to install the program.

② **Launch the program**: After installation, find **LS SWIR SDK** in the Start menu or on the desktop, and double-click to launch it

3. Connecting the Device

① Click the **Device** tab in the menu on the left side of the screen.

② Connect the LS SWIR SDK device to your PC with a USB cable, then switch the device power to **ON**.

③ The detected device will appear under the **Bluetooth** and **USB** sections.

④ Select the connection type and click **Connect** button.

> Note
>
> For Bluetooth connection, ensure your PC's Bluetooth is enabled.

4. Create a Project and Sample

4-1. Create a New Project

① Go to the **Project** tab.

② Click the New button at the top of the screen to open the **New Project** window.

③ Select a **Scan Mode**. This setting is permanent for the project.

- **Quick**: Fast scan, lower accuracy.
- **Standard**: Balanced speed and accuracy.
- **Precise**: Slowest scan, highest accuracy.

④ Enter a project name and click the **Create** button to create the project.
Project files are saved in **"My Documents/LinkSquare/Projects/(Project Name).proj"**.

4-2. Adding a New Sample

① In the **Project** screen, click the **+** button under **Samples**.

② In the **New Sample** window, enter sample details.

- **Name**: Enter the material name.
- **Description (Optional)**: Add a reference note.
- **Choose file... (Optional)**: Upload an icon (512 x 512 pixels recommended).
- **Regression Value**: This is an advanced feature; leave it blank for classification tasks.
- **Color**: Assign a chart color for the sample.

③ Click the **OK** to create the sample.

④ Repeat for all required samples.

5. Collecting Scan Data

Collect spectrum data for each sample.

① Go to the **Data Collection** tab.

② **Select the sample** corresponding to the material you want to scan.

③ Place the device's sensor against the material, and click the **SCAN** button on the screen or press the physical button on the side of the device.

④ When the scan proceeds, the scan result will appear in the Spectral Graph area.

> Note
>
> The **SCAN** button is only active when the device is connected and a sample is selected.

6. Training a Model

Using the collected data, you can train a model to distinguish between the samples.

① Go to the **Training** tab.

② Select a **Training Algorithm** from the dropdown menu at the top.

③ In the **Training Data** panel, choose the samples to be included in the training process.

④ (Optional) Adjust algorithm-specific hyperparameters in the **Hyperparameters** section.

⑤ Click **Start Training** at the top right, and the training results will be displayed in the Result area.

⑥ If the model performance meets your expectations, click the Save Result to store the trained model. If you do not click the Save Result, the trained model will not be saved.

> Note (Training can only begin if both of the following conditions are met.)
>
> √ Each sample must contain **at least 10 scans.**
>
> √ The number of scans per sample must be greater than the total number of samples.

7. Infrared AI

① Go to the **Infrared AI** tab to test the trained model.

② From the **Select AI Model** dropdown menu, choose the model you saved.

③ Press the SCAN button, and the classification result and spectrum chart will appear on the screen.

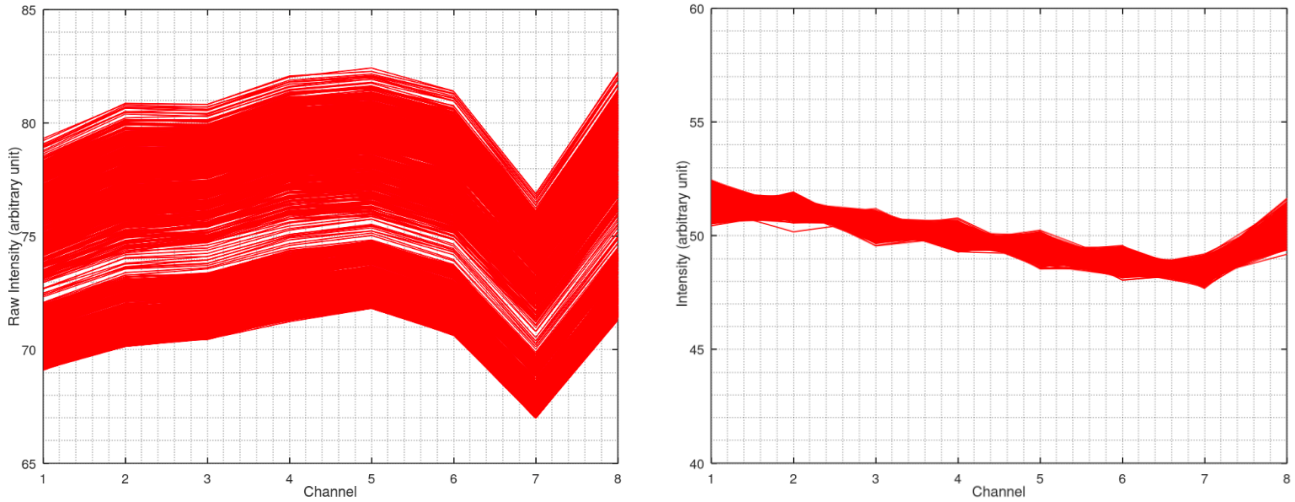
> Notice
>
> To proceed with a scan, the device must be connected.

Device Performance Data

- **9-hour 1,250 Scan Test (Repeatability and SNR)**

  A. Result Raw Data vs. Corrected Data (Preprocessing: Standard)

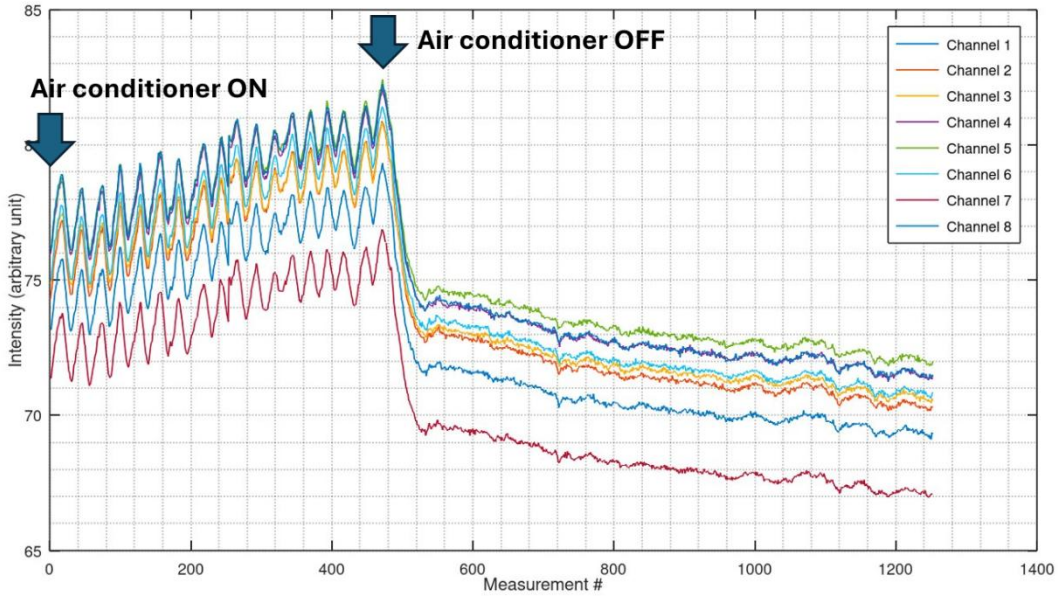
  : After applying sensor-specific correction (standard preprocessing), the variation between repeated measurements is significantly reduced.



< Figure: 1,250 scans; Raw Data (left) vs. Corrected Data (right), Sample: Cotton, LS SWIR SDK Serial #0016 >

B. Channel Drift in Raw Data (1,250 Scans)

: Even during extended operation, raw data shows minimal drift across channels.



< Channel drift results over 1,250 scans – Raw Data>

FCC Compliance Statement
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Interference Statement
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:
• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

FCC Caution
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.