Temperature and Light Sensor (TLS) Demonstration

Supports modules
GS2011Mxx

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Release History

Version	Date	Remarks
1.0	June 2014	Initial Release

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Chapter 1 Introduction

This GainSpan Temperature and Light Sensor (TLS) application provides a graphical interface used for viewing sensor node data in time series graphs on an iOS® and Android® based Smart Phone or device. This embedded application is an mDNS based method to discover sensor devices and services available on the wireless network.

Chapter 2 How It Works

In this demonstration, the GS2011M evaluation board acts like a limited access (AP) allowing the DHCP server and Multicast DNS to get enabled. Once enabled, a mobile device (iOS or Android) that has the TLS mobile application will be able to join the wireless network created by the module.

Once connected, launch the TLS mobile application. The mobile device discovers the TLS service (announced by the mDNS feature on the module). You can then start monitoring temperature and light sensor data on the module or control LEDs (switching ON and switching OFF) on the module (see Figure 1).

Figure 1: TLS Device Communicating with TLS Application on a Mobile Device

GS2011M Evaluation Board (TLS Device)   TLS APP
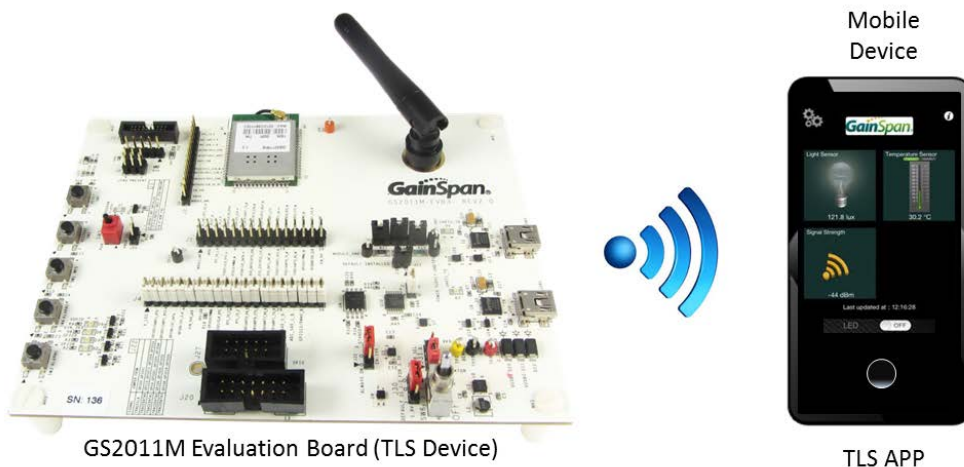
Chapter 3 Programming the GS2011M Evaluation Board

ESD Alert! Charged devices and circuit boards can discharge without detection. Although this product features patented or protection circuitry, damage may occur on devices subjected to high energy. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

The GainSpan GS2011M evaluation board is programmed using the Graphical User Interface (GUI) application. The following steps will guide you through programming the evaluation board with TLS binaries (see Figure 2):

1. Plug the mini-USB cable into the **USB0** port on the GS2011M.

2. Plug the other end of the mini-USB cable into a **USB** port on your computer.

3. Turn the PROGRAM/RUN switch (SW5) to the **PROGRAM** position.

4. Turn the ON/OFF power switch (SW5) to the **ON** position. The Program Flash LED (D1) will be lit **RED**, indicating that the module is ready to be programmed.

Figure 2: Programming the Flash on the GS2011M Evaluation Board
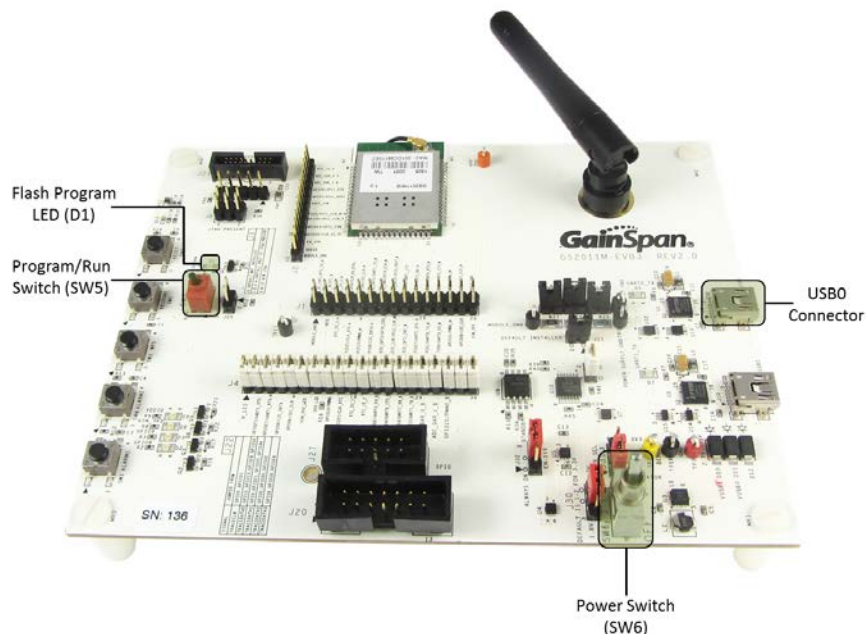
WARNING! Make sure you unplug/plug the mini-USB cable with the power switch (SW6) in the OFF position.

5. Open the directory and folder where the GUI application resides, and double click on the **gs2k_flashprogram** application file (see Figure 3).

NOTE: The gs2k_flashprogram application is generated when building an SDK package. Refer to the GainSpan GS2000 Based Module Software Developer Kit (SDK) User Guide for instructions on how to build SDK packages.

Figure 3: Open the GS2K Flash Program
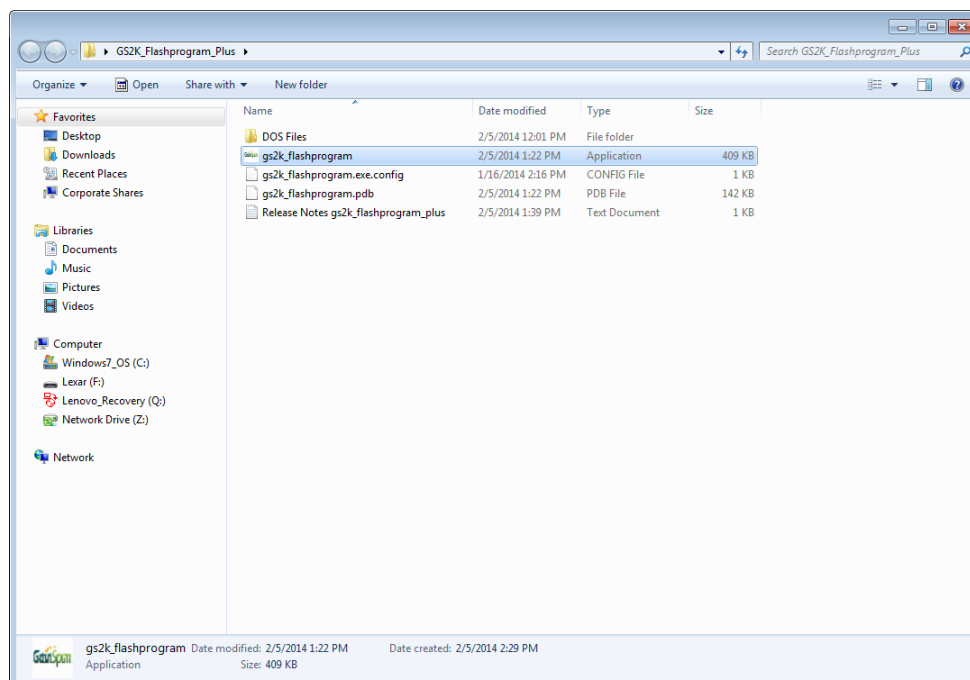
6. The Preparing the GainSpan Device for Programming window will display.

7. Turn the PROGRAM/RUN switch to the **PROGRAM** mode and turn the ON/OFF power switch **ON**. The **RED** LED will be lit indicate the evaluation board is ready to program the Flash.

8. There are several selections that are needed to program the GS2011M module.

- Select the **Interface** from the pull-down tab. Single UART is used.

- Select **the UART** port. Once you select the UART port the Module and GEPS will automatically be detected.

- Select **Baud Rate**. The Baud Rate 115200 will automatically be selected. When selecting 921600 Baud Rate there are additional hardware instructions that need to be followed. Refer to the *GainSpan GS2000 Based Module Programming User Guide*.

- Click the **Check Connection** button. The software will communicate with the evaluation board to check the connection. A **Green** check will display with the Timestamp and Status indicating the board is connected.

9. Click the **Browse (...)** buttons next to the associated binaries. Select the TLS Super Block and TLS Firmware Image to download (see Figure 4 and Figure 5).

Figure 4: Download TLS Super Block and TLS Firmware Image
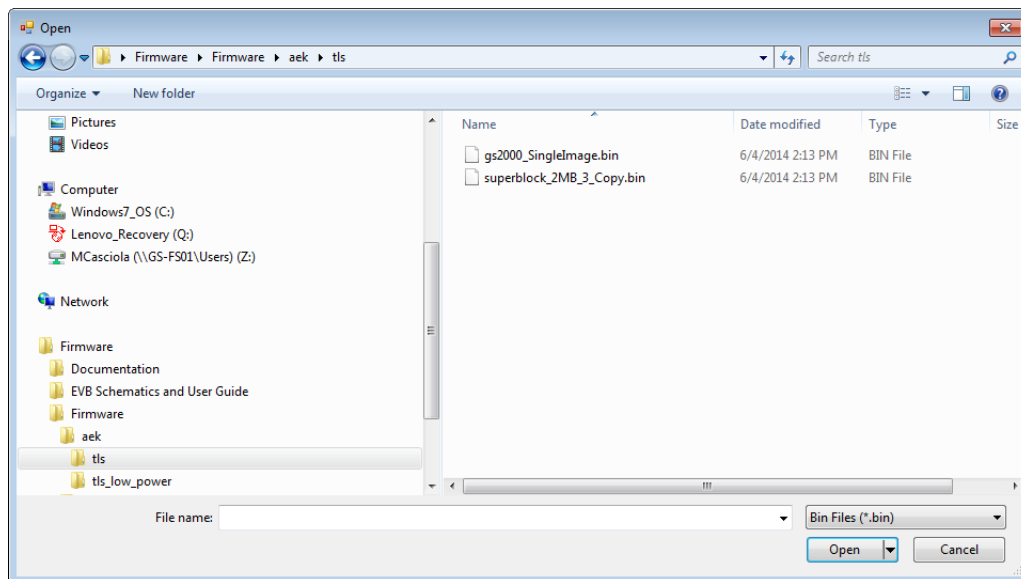
Figure 5: Programming GS2000 Device
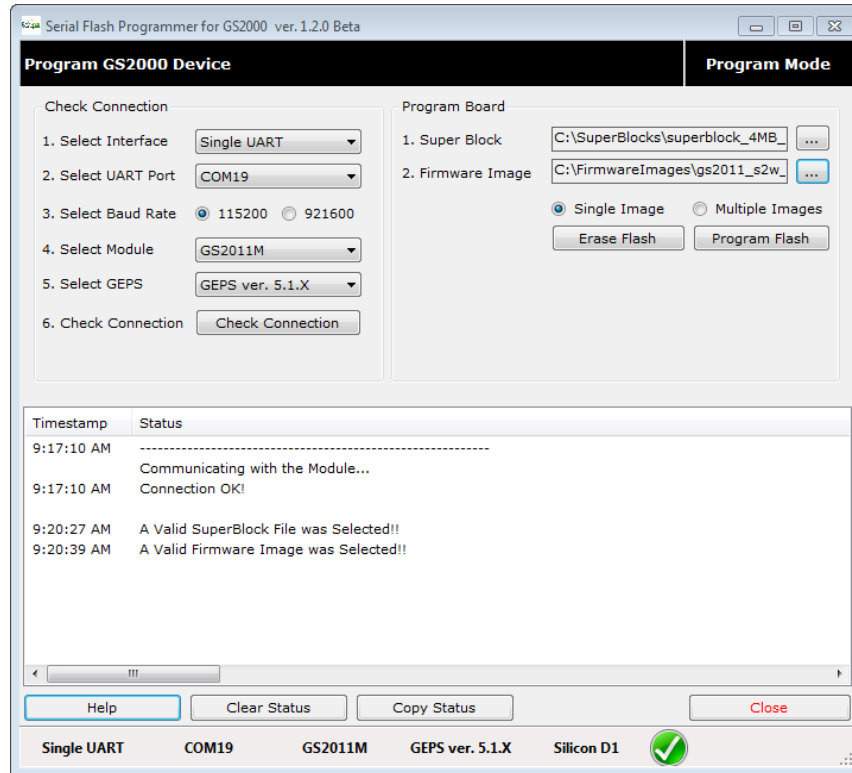
There are two (2) types of images to program:

- Single Image - this will program the module with a single firmware binary image. *This is the default and recommended method*.

- Multiple Images - this will program the module with the same firmware image at multiple locations, giving each copy a separate revision number. Refer to the *GainSpan GS2000 Based Module Programming User Guide* for instructions.

10. Click the **Program Flash** button. The GUI software will go through a process of programming the module flash with the new firmware and binaries. When complete a **Green** check will display indicating the flash has been programmed successfully (see Figure 5).

Figure 6: Programming Single Image Complete
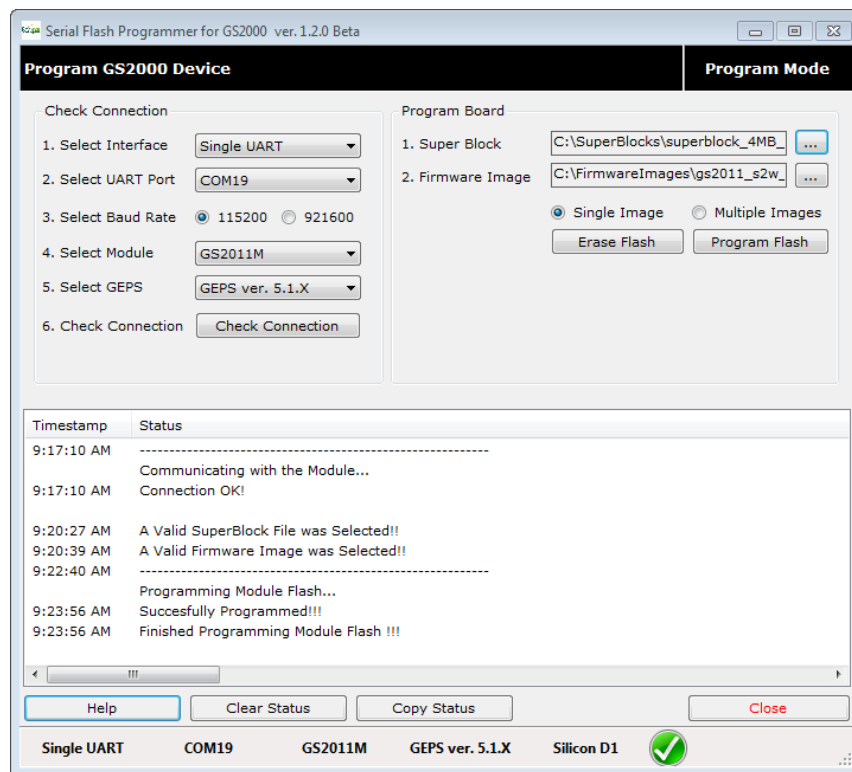
11. Click the **Close** button. Turn the ON/OFF switch to the **OFF** position. Turn the PROGRAM/RUN switch to the **RUN** position.

12. Turn the ON/OFF switch back to the **ON** position. Next, install the mobile applications on a smart device (see Installing the Mobile Application on a Smart Device on page 14).

Chapter 4 Installing the Mobile Application on a Smart Device

The GS2011M evaluation board includes Smart Phone Application for both iOS (*tls_server iOS App*) and Android (*tls_server APK File*).

NOTE: The screens throughout this document are examples only. The location and name of the mobile application may vary.

Installing the TLS Application on an iOS Device

NOTE: Make sure you have iTunes installed on your PC. If you do not have iTunes installed on your PC go to the Apple website: http://apple.com/itunes/download to download the latest version of iTunes.

1. Copy the iOS TLS Demo application to the iTunes folder (see Figure 8).
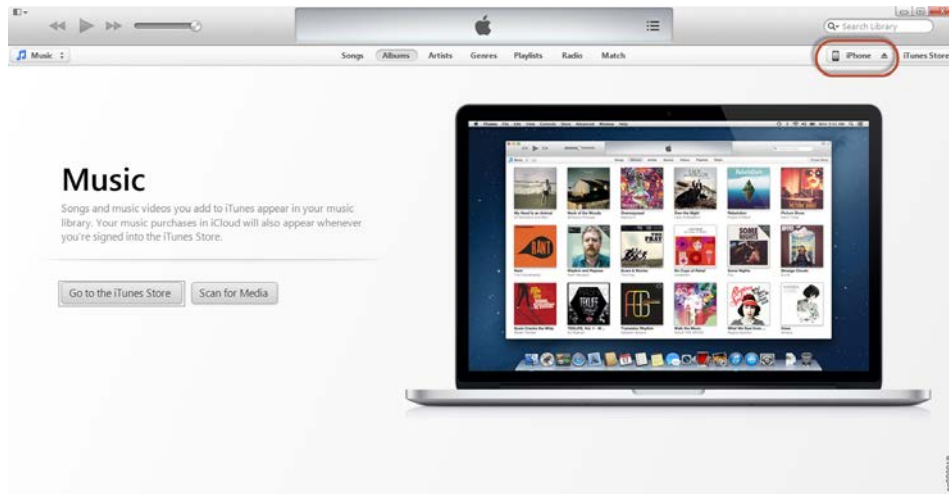
Figure 7: Copying the iOS Application to iTunes Folder
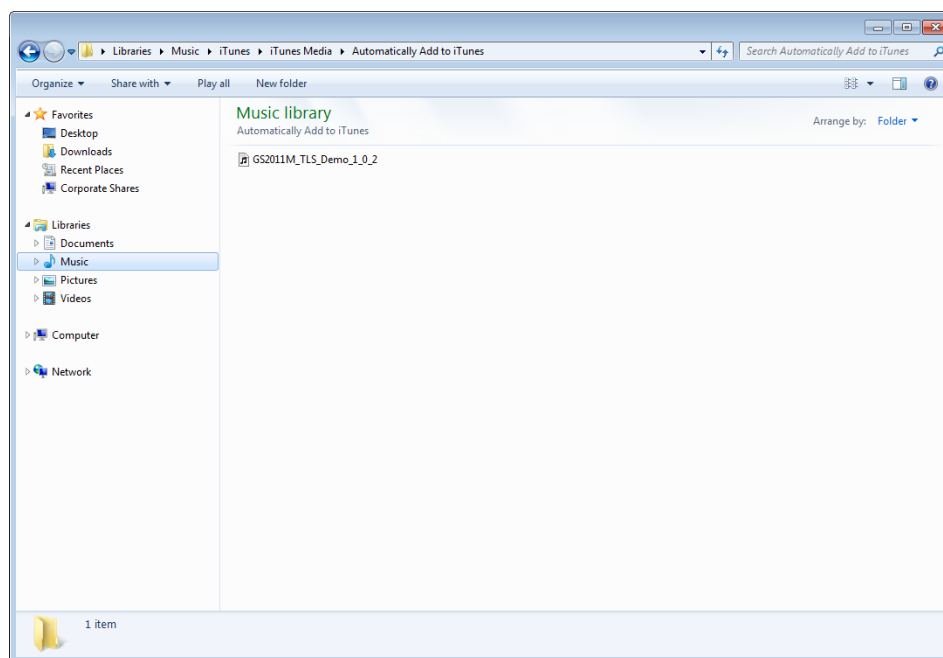
2. Connect your **iOS** device to your PC and start iTunes.

3. Select the **iOS** device to connect to (see Figure 9).

Figure 8: Connect iOS Device to iTunes

4. Click the **Apps tab** at the top of the iTunes screen. The iOS device information will display (see Figure 10).

Figure 9: Selecting Application

5. Locate the GainSpan TLS application and click the **Install** button (see Figure 11).

Figure 10: Installing the TLS Demo Application on the iOS Device

6. Turn the ON/OFF switch (SW6) to the **ON** position on your GS2011M evaluation board.

NOTE: Make sure your iOS device is connected to the WiFI device tls_gs2k_813bb8. The TLS WiFi device name may vary.

7. Click the **Apply** button to start installing the iOS TLS Demo application on your mobile device (see Figure 12).

Figure 11: Install the TLS Demo Application on the iOS Device

8. The iOS TLS Demo application is installed on your device (see Figure 13).

Figure 12: GS2000 TLS Demo Application Installed on iOS Device

Installing the TLS Application on an Android Device

Since installation procedures are different between Android devices, refer to your Android based device User Manual for installation of the Android TLS APK file.

## Chapter 5 Running the Temperature and Light Sensor Demo

ESD Alert! Charged devices and circuit boards can discharge without detection. Although this product features patented or protection circuitry, damage may occur on devices subjected to high energy. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

1. Plug the mini-USB cable into the **USB0** port on the GS2011M evaluation board (see Figure 14).

2. Plug the other end of the mini-USB cable into a **USB** port on your PC.

3. Turn the PROGRAM/RUN switch (SW5) to the **RUN** position.

4. Turn the ON/OFF switch (SW6) to the **ON** position.

5. The LED (D2) will be lit **AMBER**, indicating that the board is in limited AP mode with SSID *tls_gs2K-813bb8_tls* (default SSID).

   NOTE: Make sure your iOS device is connected to the WiFi device tls_gs2k_813bb8. The TLS WiFi device name may vary.

Figure 13: Connecting and Running the TLS Application on the Evaluation Board
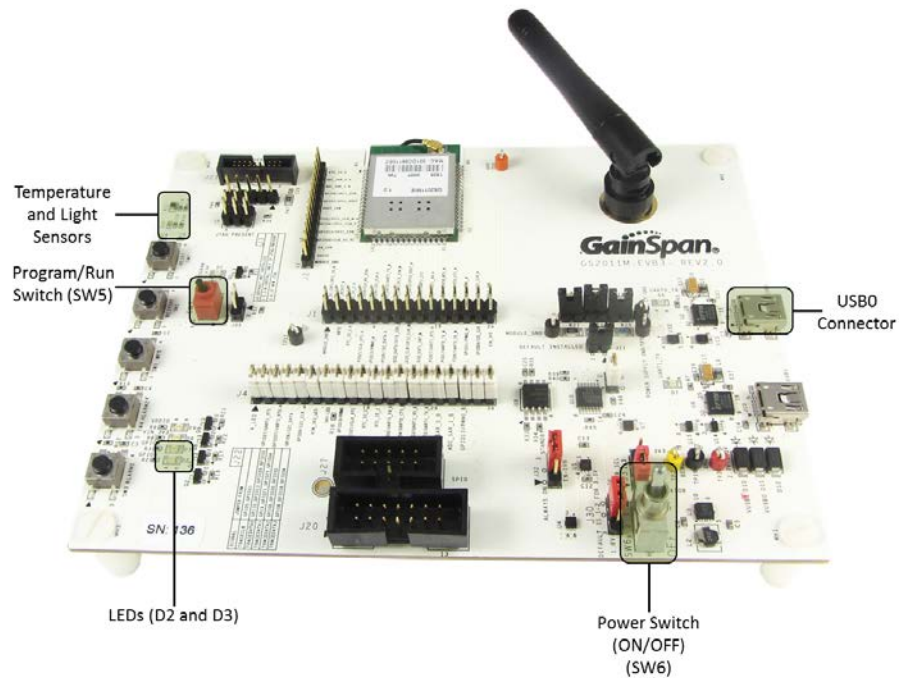
6. Enable WiFi on your Smart Phone device and connect your device to the TLS wireless network created by the GS2011M evaluation board. Once connected, launch and run the TLS application.

7. The TLS application will discover the TLS device (see Figure 15). Select the TLS service.

Figure 14: Connect Smart Phone to TLS Wireless Network

8. On successful discovery you would be able to read the sensor data and control the LED (D3) using the TLS application.

9. With the TLS application open on your Smart Phone, slide the LED ON/OFF tab to turn the LED (D3) on your GS2011M evaluation board **ON** and **OFF** (see Figure 16).

**Figure 15: Reading TLS Sensor Data and LED Control**

Chapter 6 Displaying and Reading TLS Embedded Web Application Sensor Data

The GainSpan TLS Web Application displays TLS state in a browser as well as automatically refreshing the state according to the user configured interval.

To start the TLS Web Application connect your PC to the TLS device (see Figure 17).

Figure 16: Connecting TLS to Network Device
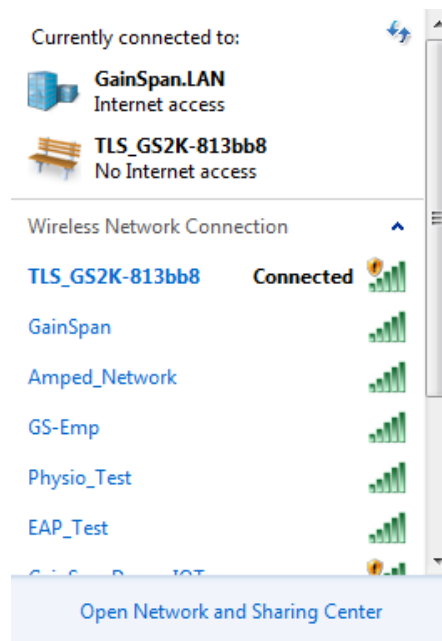
Open a web browser and enter the web address **192.168.240.1/tls.html** to open the GainSpan TLS Web Application. The TLS Web Application displays information for Light (Lux), Temperature, and RSSI information (see Figure 18).

Figure 17: TLS Web Application