

## Using SoftLINK Classroom Management Software In a Wireless Classroom or Environment

Wireless networks generally do not perform as reliably as wired networks due to the interference they are susceptible to on their operating radio frequencies. In addition, connecting a large number of devices to a wireless access point can have a negative impact on the bandwidth allocated to each connected device.

Using SoftLINK in a wireless environment that has not been properly optimized can result in poor performance. It can also lead to student devices disconnecting from the Tutor console on occasions when bandwidth is completely allocated.

SoftLINK uses advanced techniques to limit the effects of unreliable wireless networks. However, when planning an installation of SoftLINK within a wireless environment, a number of factors that should be considered to ensure you experience the best performance possible.

- Selecting of a wireless access point
- Different types of wireless networks
- Positioning of the wireless access point
- Wireless channel congestion and overlapping
- Detecting wireless channel congestion or wireless overlapping
- Sources of wireless interference
- Optimizing SoftLINK for use in the wireless environment

### Selecting a Wireless Access Point

One of the main considerations is to ensure that the wireless access point is designed to support the number of devices that you and your organization are planning to connect to simultaneously. For this information, please refer to the manufacturer's guidelines.

Typically a wireless access point designed for an enterprise or business environment will be required in an educational setting of 10 or more simultaneously connected devices. Enterprise grade wireless access points do not necessarily offer faster wireless performance but will on average provide a more stable connection to your wireless devices. They also will be able to better avoid interference from surrounding networks and their signals will be able to penetrate structures that residential units would not be able to.

### Different Types of Wireless Networks

Most wireless access points/wireless routers use the IEEE 802.11 set of standards. However, there are a variety of IEEE 802.11 protocols available. Please refer to the provided chart for some of the commonly available protocols.

IEEE 802.11 Protocol	Data Rate (Maximum)	Support Frequency
802.11a	54 Mbps	5 GHz
802.11b	11 Mbps	2.4 GHz
802.11g	54 Mbps	2.4 GHz
802.11n	600 Mbps	2.4 GHz or 5 GHz
802.11ac	3.2 Gbps	5 GHz

Different wireless access points will include varying levels of support for the different IEEE 802.11 protocols. Depending on the protocol(s) supported by your wireless access point, you will find different levels of performance.

### Positioning your Wireless Access Point

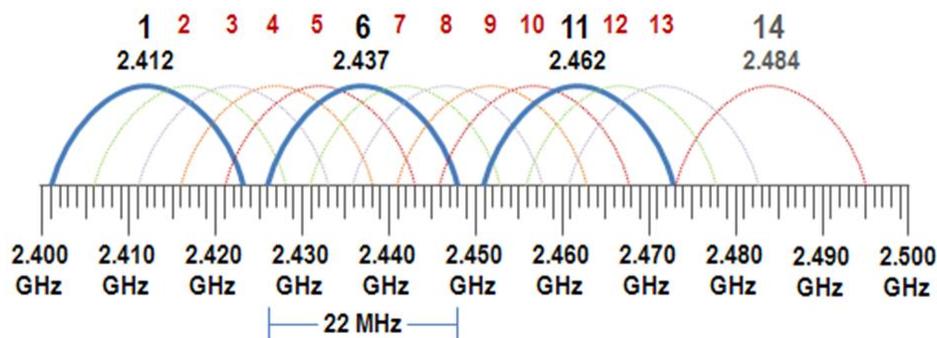
When choosing the location of the wireless access point within the classroom, we recommend the following:

- Locate the wireless access point in close proximity to the devices that will be connected
- Place the device on a high shelf or mount it close to or on the ceiling
- Ensure that the device is not situated near any metal objects, such as filing cabinets
- Ensure the wireless antenna is in a vertical position
- Ensure that you have conformed to the manufacturer’s guidelines.

### Wireless Channel congestion and overlapping

Most wireless access points can be configured to broadcast on either 2.4 GHz or 5 GHz frequency bands. The 5 GHz frequency band is less congested – however, not all connecting devices are able to use this frequency (refer to the manufacturer’s specification for further information).

For wireless access points using the 2.4 GHz frequency band, it is also possible to specify a channel ranging between 1 and 14.



The diagram above depicts a spectrum analyzer view of the frequency space occupied by these 14 channels. Within the 2.4 GHz band, only three channels have non-overlapping frequency space: channels 1, 6 and 11.

**Please note:** In the United States, only channels 1 to 11 can be used – and in Europe, the Middle East and Africa only channels 1 to 13. For other countries, please refer to the manufacturer’s guidelines or check with your local regulatory authority.

When deploying wireless access points, you should ensure that there are no other access points in close proximity using the same or an overlapping channel. Details of how to detect other wireless

networks can be found in the following section “Detecting wireless channel congestion or wireless overlapping”. Please also read the section on “Sources of interference”.

If you detect another wireless access points in close proximity using the same or an overlapping channel, performance on each wireless access point will be affected. We recommend that you use different non-overlapping channels whenever possible.

In order to change the wireless channel utilized by your wireless access point, please consult the manufacturer’s instructions.

### **Detecting wireless channel congestion or wireless overlapping**

Third-party Wi-Fi scanner tools such as inSSIDer are available to allow you check for nearby wireless networks and confirm the channels that they are using.

This type of tool will allow you to detect nearby wireless networks, confirm the different channels these are using and determine which wireless channels may be the least congested.

Using this information, you can then select the best wireless channel for your wireless access point to broadcast on.

### **Sources of interference**

Wi-Fi uses publicly designated radio bands to provide wireless access. Non-Wi-Fi devices like mobile and cordless phones, Bluetooth transmitters, and security cameras may use the same radio bands and can interfere with and cause performance issues for a wireless network. Wi-Fi scanning tools cannot detect such interference; therefore you will need to take this into consideration.

### **Optimizing SoftLINK for use in a wireless environment**

Once you have established a reliable wireless connection between the devices in your classroom, there are some settings within the Tutor console that you can change to optimize performance on your wireless network.

All Wi-Fi networks have a finite amount of network bandwidth available; viewing the students’ screens, distributing files or broadcasting the teacher’s screen simultaneously will consume this bandwidth.

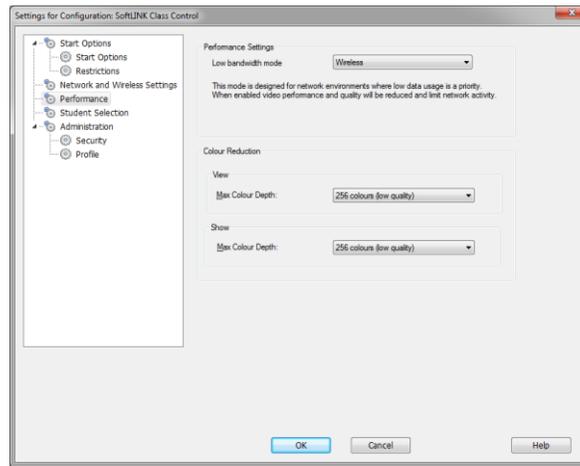
SoftLINK provides multiple configuration options designed to reduce the amount of data sent across the network, all of which can help to improved performance. These options can be found under their respective configuration sections in the Tutor console.

If your wireless network has a low amount of bandwidth and is already stressed, it is recommended that both of the options within the Performance section of the Tutor settings are selected:

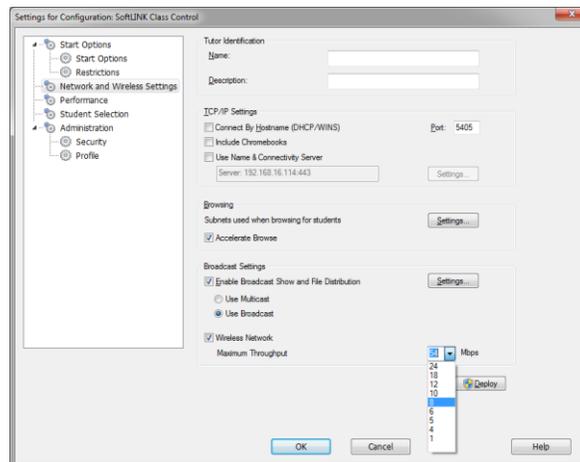
**Low bandwidth mode** - The number of video frames transferred will be reduced to around 5 per second.

**Color reduction** – The view window, thumbnails and the teacher’s screen when broadcast will be restricted to 256 colors.

These options can be found in the SoftLINK Class Control Tutor console. To configure them, select {School}{Configurations...}{Performance} and ensure that the options are selected as shown in the picture below.



Additional settings can be modified for a wireless network by selecting “Network and Wireless Settings.” If the “Settings for Configuration” window is not currently open, navigate to it by selecting {School}{Configurations...}{Performance}.



It is recommended that the following options are enabled when using SoftLINK on a wireless network:

**Enable Broadcast Show** – When broadcasting the teacher’s screen or distributing files to multiple students, enabling this option will result in the screen data or files being sent to all machines simultaneously.

Finally, performance can further be enhanced by reducing the speed that the Tutor console sends data onto the network to match the speed that the wireless access point can deliver the data. Sending data onto the network too quickly may result in packets being lost, which will result in the students requesting the data again and additional traffic being produced on the network.

For a wireless environment, it is recommended that the following options are set:

**Wireless Network** – Select this option to optimize SoftLINK for the best performance in a wireless environment.

**Maximum Throughput** – This option provides the ability to fine tune the speed that the Tutor Console sends data to the connected student devices.

When configuring SoftLINK for use in a wireless classroom, consideration should be given to the number of student computers that will be connected to the access point at any one time. Due to the nature of wireless networking, only one device at a time can send and receive data through the access point, so performance will reduce as the number of students connected increases.

For a typical class of 30 students, we recommend starting with the default Maximum Throughput value of 8 Mbps. However, depending on the actual performance of your wireless network and whether the teacher's device is connected to the network using a cable (which will result in better performance), this value could be increased to match the faster network speed or decreased accordingly until the optimal settings are found for your specific environment.

IEEE 802.11 Protocol	Data Rate (Maximum)	Suggested Maximum Throughput
802.11a	54 Mbps	8 Mbps
802.11b	11 Mbps	6 Mbps
802.11g	54 Mbps	8 Mbps
802.11n	600 Mbps	12 Mbps
802.11ac	3.2 Gbps	24 Mbps

## Technical Support

Contact Applied Computer Systems, Inc. if you need further assistance optimizing SoftLINK to work with your wireless network.

Email: [support@acs-linksystems.com](mailto:support@acs-linksystems.com)

Online: [Live Chat](#)

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