



TechSafe
Schools

WIRELESS TECHNOLOGY IN THE CLASSROOM

An Emerging Public Health Issue

TechSafe Schools is a project of...



An award-winning, science-based non-profit organization
recognized by the EPA for Excellence in
Children's Environmental Health

The Modern Classroom



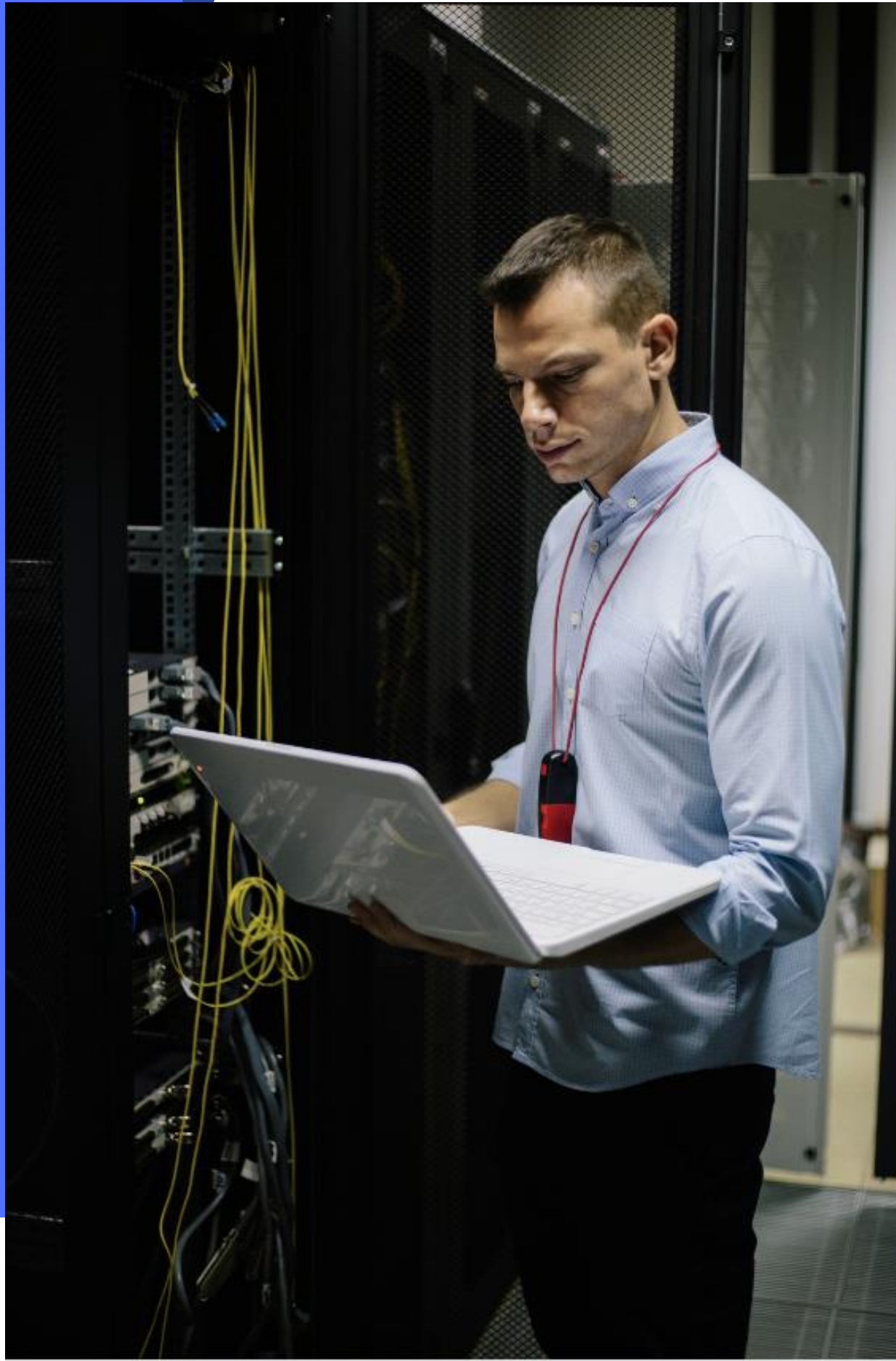
Cell Towers On School Property



Cell Phones At School

1. Phones are a major distraction in class.
2. Student behavior and concerns about mental health have prompted many schools to ban cell phones during school hours.
3. More than 75% of U.S. schools have adopted cell phone policies





Tech Mitigation Strategies

- Any reduction in RF radiation exposure is a step in the right direction
- Government guidelines are outdated and inadequate.
- Why not do it?

Testing is Critical

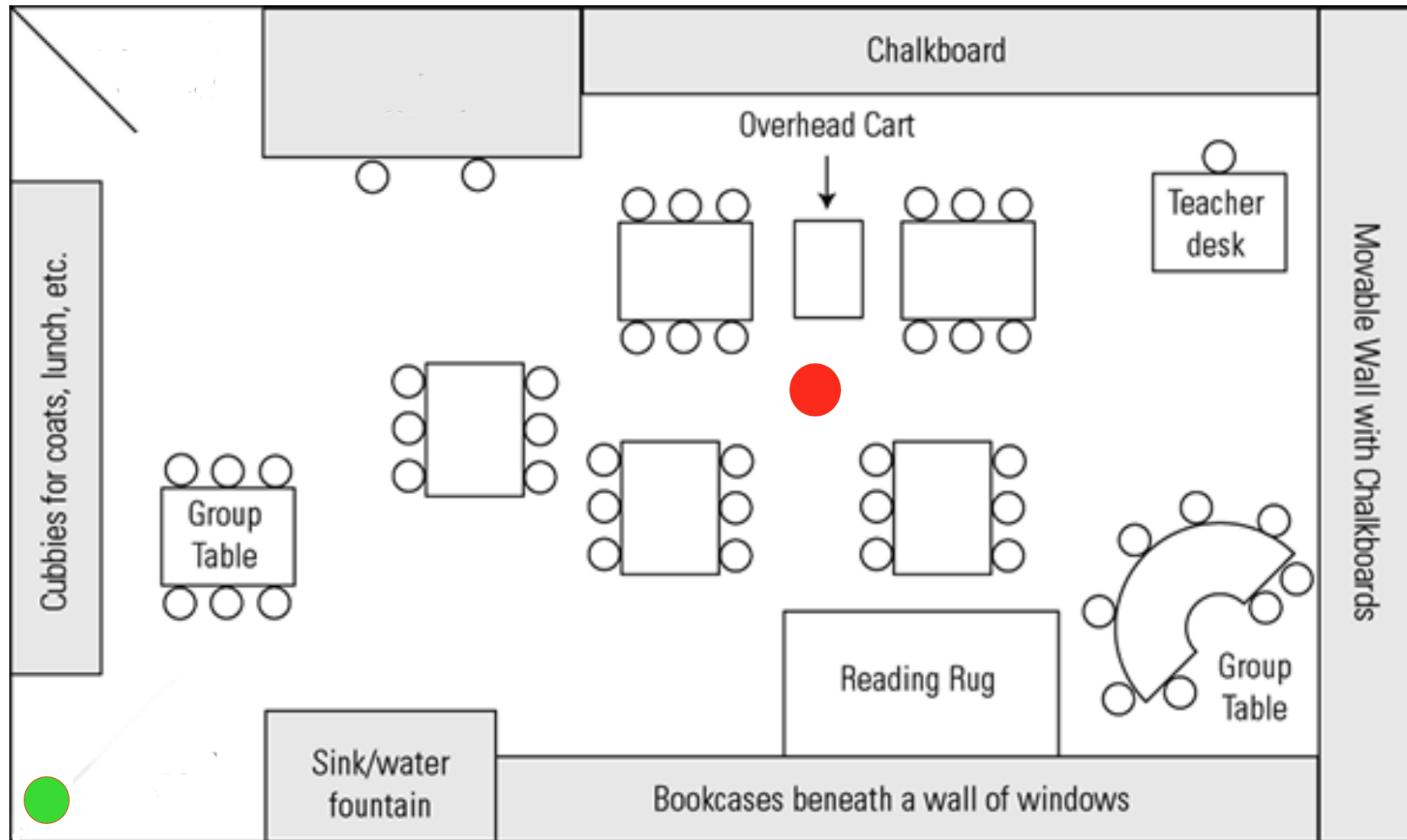


School administrators have a legal responsibility to be informed about any potential harm to students and staff.

Establishing a baseline for measurement:

1. Test with empty classroom, all WAPs and devices off
2. Re-test with classroom devices and WAPs operating
3. Test with students using their devices in normal classroom activities of devices using devices normally

Time & Distance



Power & Beacon

To set the transmit power and channel of the radio, navigate to **Configuration > Access Points > 5 GHz radio or 2.4 GHz radio** > select the AP. From here you can change the channel and transmit power of your APs radio by changing the Assignment Method from Global to Custom, setting the required values, then clicking **'Update and Apply to Device'**

Edit Radios 5 GHz Band

Configure Detail

General

AP Name AP7069.5A74.7C2C

Admin Status **ENABLED**

Antenna Parameters

Antenna Type Internal

Antenna Mode Omni

Antenna A

Antenna B

Antenna C

Antenna D

Antenna Gain 10

RF Channel Assignment

Current Channel 36

Channel Width 40 MHz

Assignment Method Custom

Channel Number 36

Tx Power Level Assignment

Current Tx Power Level 8

Assignment Method Custom

Transmit Power 8

BSS Color

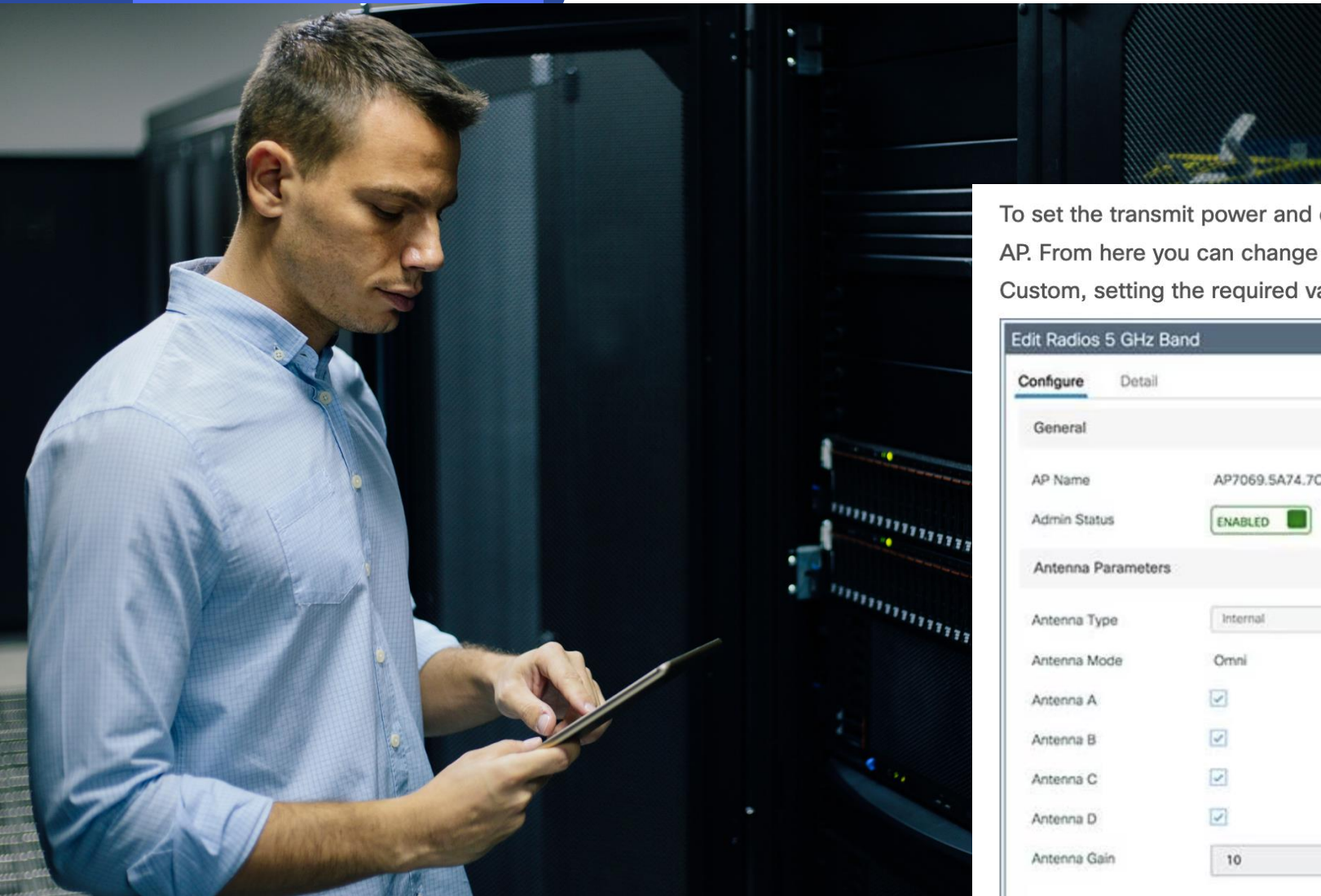
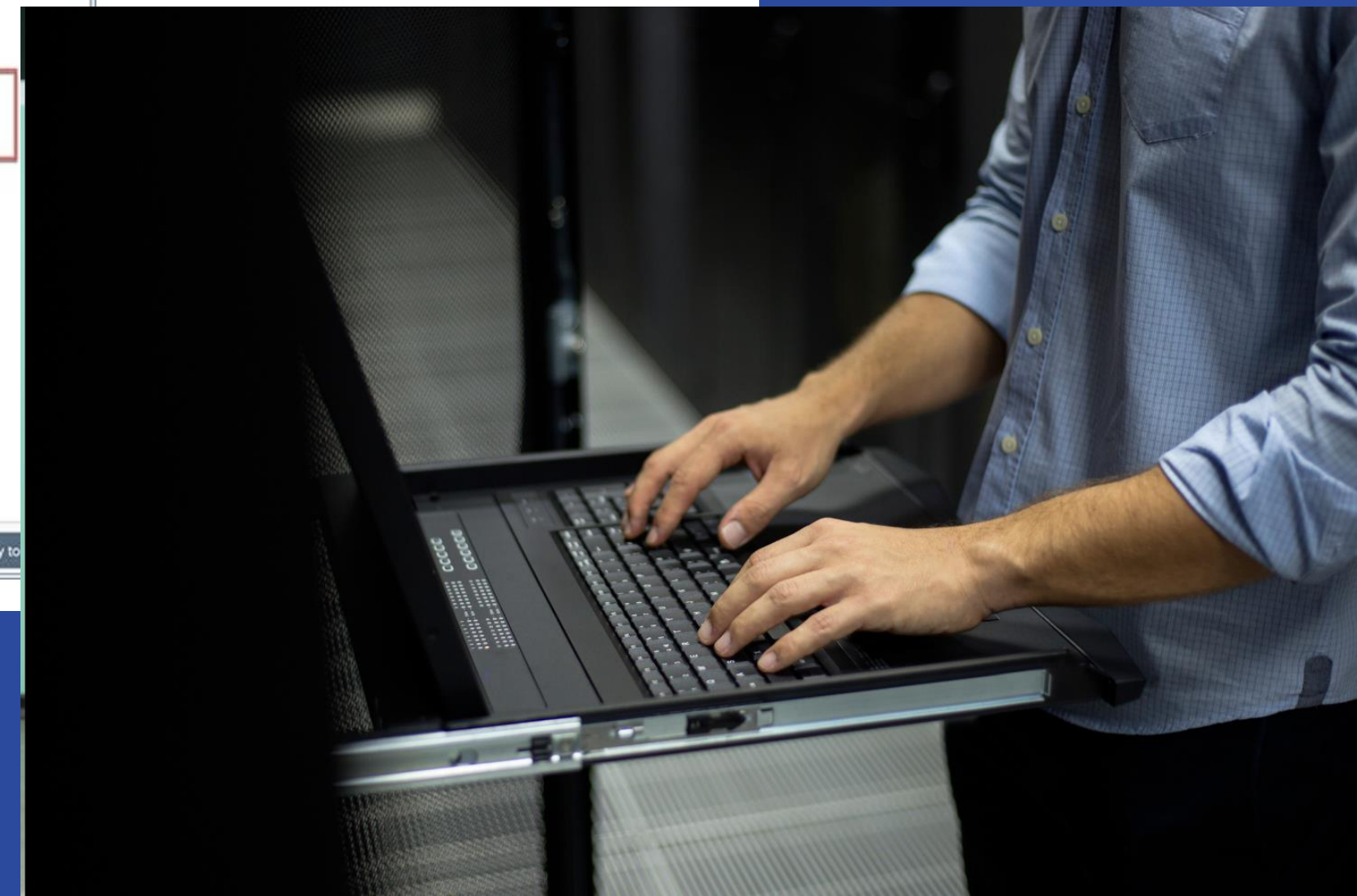
BSS Color Configuration Global

BSS Color Status **ENABLED**

Current BSS Color 29

Download [Core Dump](#) to bootflash

Cancel Update & Apply to Device



Arrival on-site: 9:00 AM
 Testing Time: 9:10 AM – 11:00 AM

Location	Sunday September 27 th , 2015		Sunday February 7 th , 2016 Measurements in Center of Room		Sunday February 7 th , 2016 Measurements at Seat Closest to Router		Measurement Location: Center of Room		Measurement Location: Closest Seat to Router	
	HFE59B 27 MHz - 3.3 GHz μW/m ² (microwatts/ sq. meter) WiFi ON	HFEW59D 2.4 GHz - 10 GHz μW/m ² (microwatts/sq . meter) WiFi ON	HFE59B 27 MHz - 3.3 GHz μW/m ² (microwatts/ sq. meter) WiFi ON	HFEW59D 2.4 GHz - 10 GHz μW/m ² (microwatts/sq . meter) WiFi ON	HFE59B 27 MHz - 3.3 GHz μW/m ² (microwatts/ sq. meter) WiFi ON	HFEW59D 2.4 GHz - 10 GHz μW/m ² (microwatts/sq . meter) WiFi ON	HFE59B Percent Reduction	HFEW59D Percent Reduction	HFE59B Percent Reduction	HFEW59D Percent Reduction
Art Room	18,000	37,000	1100	2200	2800	4600	93.89%	94.05%	84.44%	87.57%
I.T Office	1100	15,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S.K Classroom	15,000	23,000	450	750	2200	2500	97.00%	96.52%	85.33%	89.13%
J.K Classroom	16,000	28,000	470	470	1800	2200	97.06%	98.32%	88.75%	92.14%
Grade 2 Classroom	17,000	22,000	530	800	1600	950	96.88%	96.36%	90.59%	95.68%
Grade 1 Classroom	26,000	50,000	600	800	1700	1850	97.69%	98.40%	93.46%	96.30%
Gymnasium	9000	9700	175	121	470	430	98.06%	98.75%	94.78%	95.57%
Grade 3 Classroom	27,000	30,000	1270	1550	2500	2650	95.30%	94.83%	90.74%	91.17%
Office Room 118 - Amber	2000	5000	78	20	N/A	N/A	96.10%	99.60%	N/A	N/A
Office Room 119 - Mike	31,000	33,000	5000	4300	N/A	N/A	83.87%	86.97%	N/A	N/A
Grade 4 Classroom	19,000	19,000	4300	2700	2300	1700	77.37%	87.79%	87.89%	91.05%
Grade 5 Classroom	17,000	23,000	440	600	3100	3100	97.41%	97.39%	81.76%	86.52%
Grade 6 Classroom	18,000	33,000	370	580	1000	1400	97.94%	98.24%	94.44%	95.76%
Grade 7 Classroom	15,000	22,000	500	350	780	1000	96.67%	98.41%	94.80%	95.45%
Grade 8 Classroom	32,000	37,000	500	1440	1360	1800	98.44%	96.11%	95.75%	95.14%
Library	2700	6000	1440	1590	1440	1590	46.67%	73.50%	46.67%	73.50%
Outside - near Park	650	130	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Music Room	70	150	189	73	N/A	N/A	-	170.00%	51.33%	N/A
Gymnasium(On Stage)	1800	1500	20	77	20	77	98.89%	94.87%	98.89%	94.89%

Hardwire Options



WARNING: This device emits radiofrequency (RF) radiation when operating. Do not place in close contact with your body. Do not hold device in your lap. Keep screen at least 16-18 inches from your face. Use in "airplane" mode or connect with hardwired connection to avoid radiation exposure.

More info at www.TechSafeSchools.org

Best Practices for Using Wireless Technology in Schools

All wireless devices emit microwave or radio-frequency radiation (RFR). Scientific studies have shown that this type of radiation, previously thought to be relatively safe, has measurable and harmful biological effects on humans. Developing fetuses and young children are among the most vulnerable to this type of radiation.

The safest solution is to provide wired connections. Wired connections are faster, more secure, more economical and safer than wireless networks. Most wireless routers have Ethernet connections, and allow the wireless function to be disabled. Your IT department can install wired Ethernet connections in classrooms. Computers and tablets can be hardwired to the Internet using adapters.

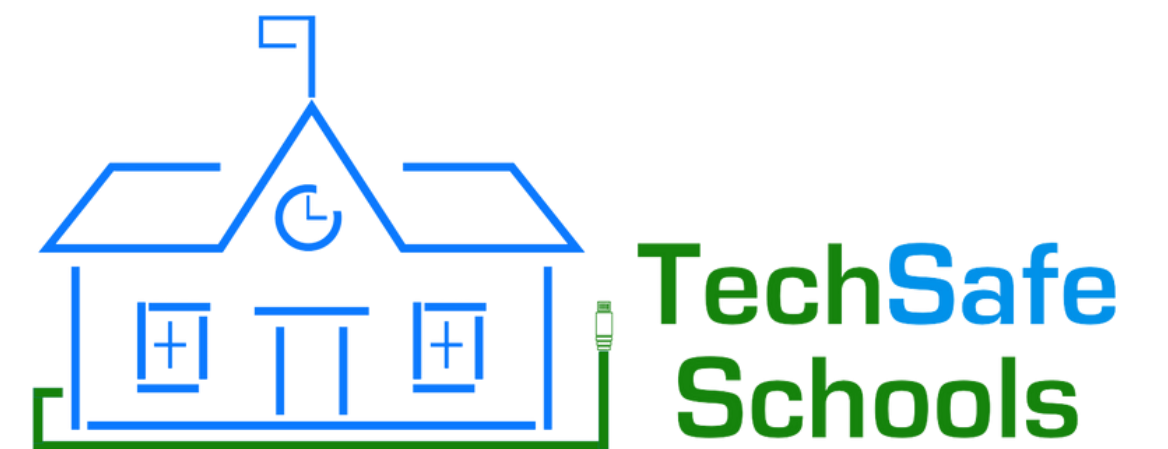
For situations where hard-wired installations are not yet possible, we recommend the following no-cost guidelines below.

- 1. Distance is critical.** Proximity to wireless devices is the most important factor in determining the amount of radiation exposure. The exposure decreases significantly as you move away from the source.
- 2. Avoid prolonged contact by keeping wireless devices away from the body.** Always place devices on a solid surface. Do not permit students to use devices in their laps. Viewing distance should be a minimum of 12 inches from the screen.
- 3. Turn off antennas when not in use.** On all devices for learning, the default settings should be set to OFF for cellular, Bluetooth, Siri, location services, Wi-Fi and mobile hotspot. Turn specific antennas on for the device only when needed. Typically, students only use Wi-Fi in class.
- 4. Stream only when necessary.** Download necessary apps beforehand and then work offline (in airplane mode) as much as possible. If students are not using the internet, make sure they put their device in airplane mode AND disable Wifi and Bluetooth antennas. These antennas must be disabled, even in airplane mode, in order to eliminate radiation emissions.
- 5. Turn off wireless devices when not in use.**
- 6. Power down routers when possible.** The router is usually the most significant source of radiation in a classroom. The strongest radiation from a router typically extends out from the router 5 to 10 feet in every direction. Find out if the router has an easily accessible power switch that can be turned off when not in use. A router can be moved near the classroom door rather than placed in the middle of the room above student tables or desks.
- 7. Reduce transmit power of routers and access points.** Commercial routers are more powerful than those for home use and are often overpowered for classroom needs. Ask your staff IT person to reduce radiation emissions w/o affecting connectivity to devices by:
 - Reducing the transmit power to 25% or less on wireless access points
 - Disabling either the 2.4GHz or 5GHz radio on the wireless access point.
 - Changing beacon signal interval time from 100 ms to 1000 ms.
- 8. Require cell phones be turned OFF in classrooms.**

For links to scientific studies, as well as legal and technical information regarding the use of wireless technology in schools, please visit www.TechSafeSchools.org

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Thank you.



www.TechSafeSchools.org