

## **Optimizing Wireless Mic Performance**

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If you're like me, you might feel some anxiety when you bring up the fader for a wireless microphone. "Is it switched on?" "Will the signal drop out?" "Is the battery fresh?" And of course, "Will the user hold it close to the mouth?"

Clearly, wireless mics present a number of issues to overcome, but you can optimize their performance to make them as reliable as possible. In this article we'll offer some tips to do just that.

### **Minimizing Dropouts**

Basically, a wireless mic and its receiver are a miniature radio broadcast station and a radio. We want the radio to receive a strong signal from the station without interference. In other words, we want the transmitter to put out a strong signal in a short, line-of-sight path to the receiver. Also, we want the receiver to respond only to that signal -- not to interfering signals from other stations or from reflections of the radio wave off metallic surfaces.

When all those conditions are met, we hear a robust, clear signal. But if any of those conditions are not met, dropouts can occur when the receiver loses the transmitter's signal. Usually a dropout sounds like a short burst of hiss.

Let's look at our list of requirements for clear reception and explain how we can meet them.

The transmitter puts out its strongest signal when it has a fresh battery. So before the event, install a new battery (or a completely charged one) in the transmitter. To be safe you might want to measure the battery voltage with a voltmeter. Don't take chances with a partially discharged battery, because you don't want dropouts to distract from the event. Some wireless mic receivers have a battery level indicator -- a very useful feature.

Next, ensure that the signal path between transmitter and receiver is open. There should be a line-of-sight from the transmitter to the receiver, and vice versa. Put your head near the receiver. Can you see the wireless mic wherever it will be? You might place the receiver on a raised shelf so that the congregation does not block the radio waves coming from the transmitter.

The shorter the path between transmitter and receiver, the stronger is the received signal. If your receiver is very far from the stage, and you are getting dropouts, consider putting the receiver on stage instead. Then run a line-level signal from the receiver back to your mixer. A drawback of this arrangement is that you lose control of the receiver during the event.

See this online application for determining the best antenna location:  
<http://www.akgfrequency.at/farnear/>.

Next, keep the receiver away from electronic gear and metallic surfaces that can reflect radio waves and cause interference. Electronic devices also produce electromagnetic emissions that can prevent the receiver from "hearing" a clear signal.

Other sources of interference are computers, wireless networks and broadcast stations. Make sure that each wireless mic and its receiver are set to a channel

that has clear reception in your area. If your wireless system can be set to various channels, experiment with each channel to see which one is the most problem-free. Some systems have a scanner that automatically selects the clearest channel. One channel selection guide is here:  
<http://www.akgfrequency.at/index.html>.

Attach the antenna directly to the receiver rather than using a cable between them, which can cause signal loss.

Always specify a wireless receiver with diversity antennas. If one antenna receives a weak signal as the mic user wanders around, the other antenna is likely to receive a strong signal because the radio-wave field varies in intensity over a few inches. To ensure that both antennas receive a different part of the field, angle them apart (Figure 1). Don't set them parallel to each other. That way, the receiver will sense different signals from the two antennas and can select the stronger one.

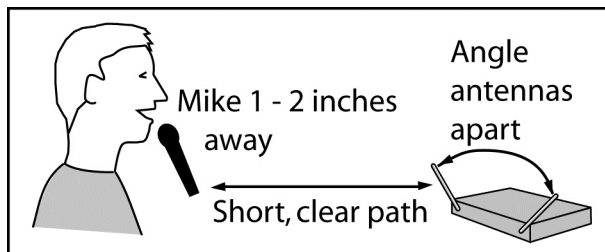


Figure 1. Suggested wireless system setup.

Wireless mic transmitters in the form of a body pack have an antenna wire. In order for it to transmit a strong signal, this antenna wire should be pulled out to its full length, not rolled up in the user's pocket.

### Setting Mic Switches

**Okay**, we've reduced the chances for dropouts. Now let's make sure that the mic is always on during an event.

Many wireless mics have two switches. One turns on the transmitter and the other mutes/unmutes the mic. If you turn off the transmitter while the mic is in use, you'll hear a thump and maybe an explosion of hiss. Not good. But if you mute the mic while the transmitter is on, there will be no thumps or hiss.

When you turn on the transmitter switch, you should see a high level on the receiver's RF signal strength meter. Then when you mute or unmute the mic, the RF signal strength should stay high, but the audio will be off or on.

Shortly before the event, turn on both switches (transmitter and mic). Talk into the mic and turn up its fader to make sure it works. Then put a piece of tape over the transmitter switch so it can't be turned off accidentally during the event. The mic user can still mute the mic without problems. If you want to be absolutely safe, tape over both switches and mute the mic only at your mixer.

After the event, remove the tape and turn off the mic so the battery doesn't drain.

## **Mic Placement**

Now the system is free of dropouts and the mic is reliably switched on. But you still need to instruct the mic users on where to place the mic to get a natural sound without feedback.

Clip a lavalier mic about 6 inches below the chin and centered left-right on the body. Farther placement results in quiet sound which needs a lot of mixer gain, causing feedback. Closer placement sounds muffled.

Hold a handheld mic about 1-2 inches from the mouth, at chin height aiming up (Figure 1). Again, farther placement can result in feedback when you try to bring up the mic's fader. Closer placement tends to sound bassy or boomy due to the mic's proximity effect (the up-close bass boost of directional mics). Always use a foam pop filter on the mic to prevent breath pops from the letters P, B, and T.

How about drama productions? If possible, tape the lavalier mic cable to the actor's cheek. Use flesh-colored medical tape such as Hy-tape, 3M Nexcare waterproof bandages, or Band-aid Water-Block Plus bandages. They are available online or in the first-aid section of pharmacies. You might color the bandage with theatrical makeup to match the performer's skin color. Other options are a headworn mic clip such the Provider Series ([www.providerseries.com](http://www.providerseries.com)) or a headworn mic.

Position the mic off to the side of the actor's mouth for best clarity and gain-before-feedback. Some sound techs prefer to route the mic cable through the user's hair and place the mic on the forehead near the hairline. Run the mic cable down the actor's back to the belt pack (or inside clothing), and tape the cable in place.

## **Summary**

- Use a fully charged battery.
- Have a short line-of-sight path between transmitter and receiver.
- Place the receiver away from electronics and metal surfaces.  
Angle the antennas apart and connect them directly to the receiver. Extend the body pack antenna.
- Test the mic before the event and tape the switches in the ON position.
- Place the mic as recommended.

I hope these suggestions will let you use wireless mics with more confidence.