Proper Placement
For Optimal Signal Integrity
MODEL: W-HD3DIR-50M

The Avenview Wireless 5G HDMI Transmitter and Receiver need to be placed within the ideal environment in order for the products to function optimally. These units use 5GHz Wi-Fi technology, broadcasting on channel 149 with a transmission rate of 18MB/s. Note that devices operating on channels 36-64 (200mW) transmit with less power than devices operating on channels 100-140 (1000mW). More transmission power means the signal can travel farther before becoming too weak to use.

Tips for Installing the Product

- Identify potential mounting locations.
- Determine potential obstructions to line-of-sight.
- Identify and remove any obvious sources of wireless interference (eg. Other 5GHz devices, microwaves, power generators)
- Ensure proper grounding, lighting and surge protection
- Identify any possible environmental restrictions. (eg. Pacemakers…)

The correct placement of the Avenview Wireless 5G HDMI Transmitter and Receiver units is integral to the performance of your video system and the quality of the picture. This document will provide tips on proper installation and advice on how to improve signal quality.

Installing and Using InSSIDer

InSSIDer is a program developed by Metageek that allows users to visualize wireless networks and measure signal strength and signal interference. InSSIDer is paid software but a trial version can be obtained from www.metageek.com. This chapter will go over how to use InSSIDer, along with a laptop, to optimize the placement of your transmitter and how it can help you improve your wireless networks. This software uses your computer's Wi-Fi device to scan the area around you for wireless networks and displays the signal's strength measured in -dBm.

After downloading the program from metageek.com and applying for a trial key, run the installer and follow the prompts on screen. After installation, run the program by navigating to Program Files(x86)/Metageek and clicking on the InSSIDer.exe file. You will be prompted to enter your credentials and your trial key. Afterwards, you will be shown the screen below:

The left panel will list nearby wireless access points (APs). The bottom panel shows the same info but in a graphical manner. Here, you can see how wireless networks are spread out over the Wi-Fi spectrum. As with people, too many talkers in one room makes it difficult for anyone to listen. Similarly, too many APs on the same frequency or "channel" leads to interference and reduced performance. Below is an example of a noisy office building, with many overlapping wireless networks. Ideally, each of the different networks would operate on a different channel. (Colours inverted for clarity)
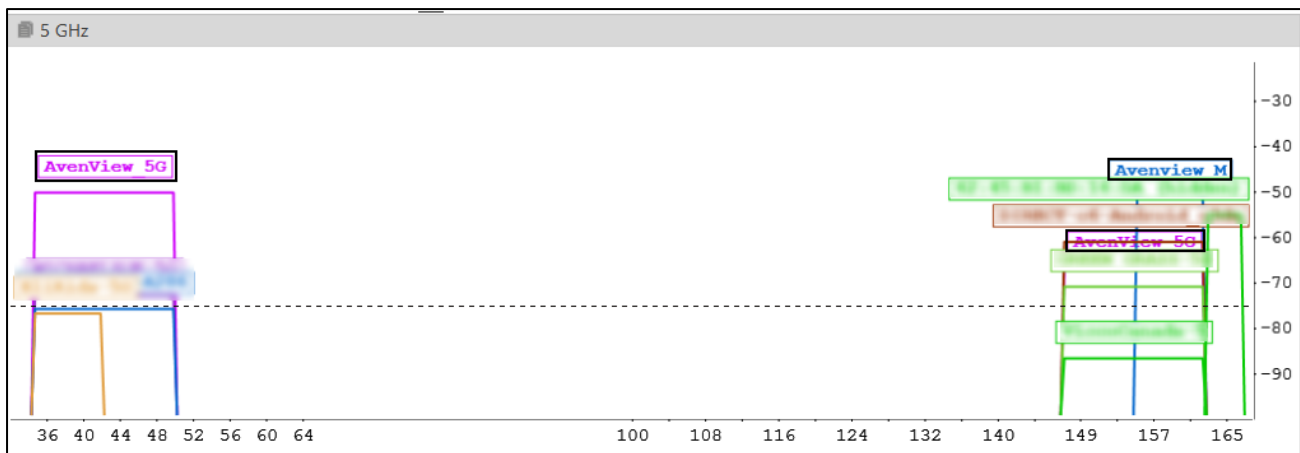
To optimize the placement of your transmitter, we will use InSSIDer in two ways:

1. To view the wireless networks around you and how they interfere with the transmitter's signal.

2. To measure the signal strength of the transmitter to verify correct placement.

While you cannot control how your neighbors configure their wireless APs, you can ensure that your own wireless devices do not interfere with your Avenview 5G HDMI Transmitter which operate on channel 149. Using the example on the previous page, we can see several networks operating on or near that channel.

SSIDS	CHANNEL ▼
	165
Avenview M	157+161
AvenView_5G	149/155(ac)
	157/155(ac)
	149/155(ac)
	149/155(ac)
	44/42(ac)
	36/42(ac)
AvenView_5G	48/42(ac)

One of our 5GHz APs has already been moved to a different channel (ch 48/42), moving the other 2 APs to a different channel means less interference for Transmitter's signal to cut through. These settings can be found in your AP's configuration menu. Consult your AP's user manual for configuration instructions.

Now that we've cleared the airwaves as best we can, we must decide on where to place the transmitter's and receiver's antennas. The optimal placement is when the antennas have a clear line of sight to each other with no obstructions. Obviously, this isn't possible in all installations. Instead, we will use InSSIDer to measure the signal strength of the transmitter and position the receiver as best we can.

To start, place the transmitter in an open area, free of any obstructions near the antenna. Try to avoid placing the transmitter behind TVs or near microwaves, other high-power devices, or any other appliances that create radio frequencies like cordless phones, desktop PCs and other wireless networking equipment. Also, keep in mind how high off the ground the unit is. You'll want to place the receiver at the same general elevation as the transmitter. (See note on elevation on last page)
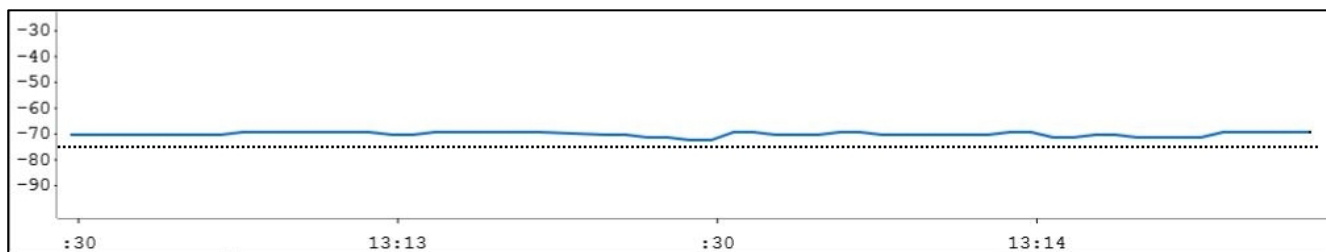
Pictured above -Capture at 50m (Line of Sight (LOS) and open air) [Colours inverted for clarity]

Go to the receiver's installation site, open InSSIDer and locate the unit's SSID, "HbitTX". Click on the SSID and you will be presented with a real-time chart plotting the signal strength of the network measured in -dBm. (See above) **-30dBm** is measured when your wireless device is directly beside the transmitter.

Testing indicates that the signal strength needs to be at least **-75dBm** for the receiver to operate. By default, the software displays a dotted line at this threshold.

Once you are viewing the transmitter's signal strength, walk around the installation area with your laptop noting where the signal strength is the strongest. Like with the transmitter, the optimal position of the receiver will be away from other equipment in an accessible area free from obstruction. Walk slowly and keep in mind the layout of the room; furniture such as cabinetry and couches can influence how the wireless signals propagate. Also, remember the elevation of the transmitting antenna and the elevation of your laptop.

Once you think you've found a spot with a good signal, wait a few moments to ensure the signal is consistent. Be sure to install the antennas such that they are parallel to each other.

Signal Strength in Different Situations

This capture was taken 1m away from the transmitter, at the same elevation, with no obstructions. This represents the strongest possible Wi-Fi signal, between -30dBm and -40dBm, and can be used as a baseline to ensure your transmitter is operating properly.
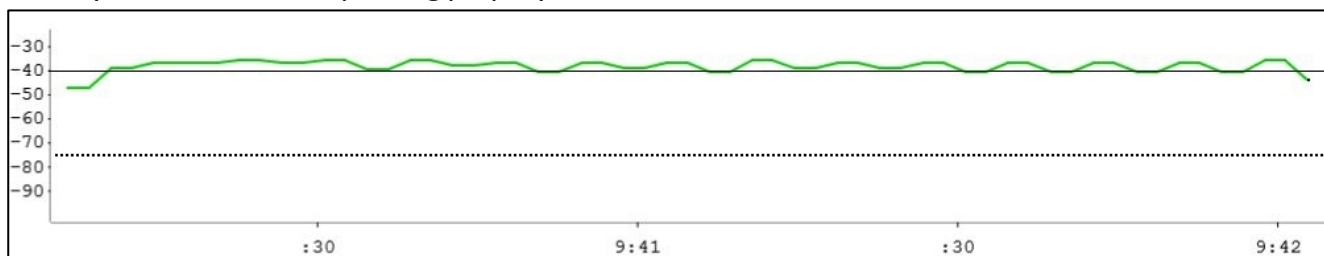
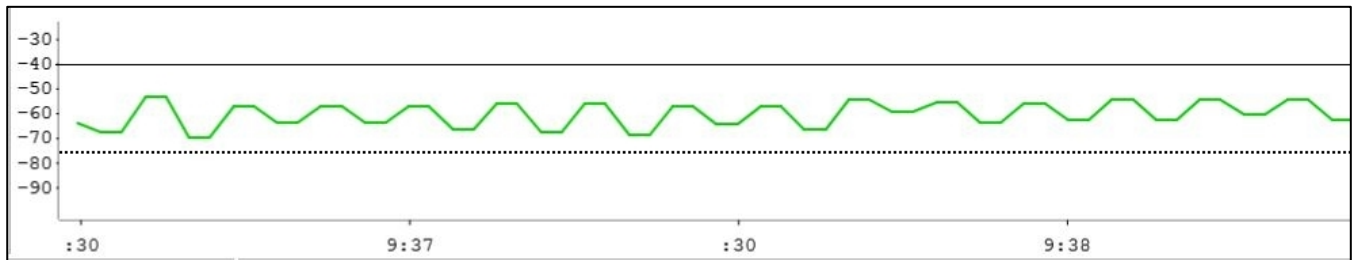**Pictured above -Capture at 1m (Next to Transmitter)**

This capture was taken 20 meters away, line of sight with the transmitter. Though the signal strength is 20dBm weaker than the previous example (which represents a 4-fold decrease in received power) the received picture is stable and full HD quality.
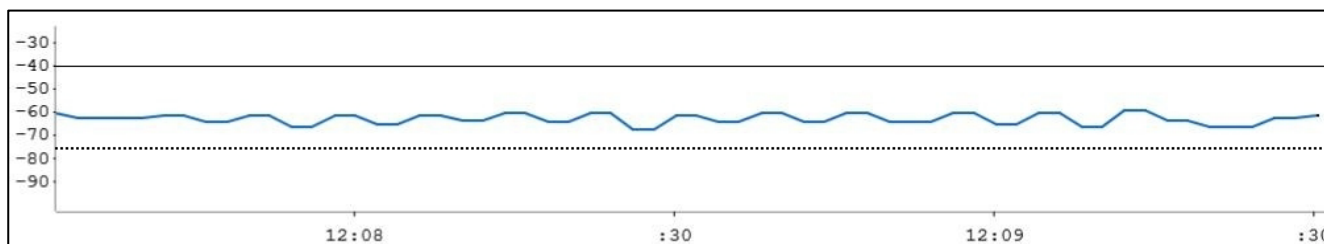
Pictured above -Capture at 20m (Line of Sight (LOS) and open air)

This capture was taken 10 meters away from the transmitter, with one standard office wall in between the transmitter and receiver (aluminum studs, 0.5" drywall). Here we can clearly see the effects obstructions have in signal integrity. Note how the signal's strength is not stable, but still strong enough to transmit a clear 1080p picture.

Pictured above -Capture at 10m (No Line of Sight, behind 1 wall)

This capture was taken at 15 meters from the transmitter, with 1 standard door and 1 glass wall in between the transmitter and receiver. Here, the effects to signal integrity are significant and proper transmission cannot be accomplished. The displayed picture is choppy and unstable.
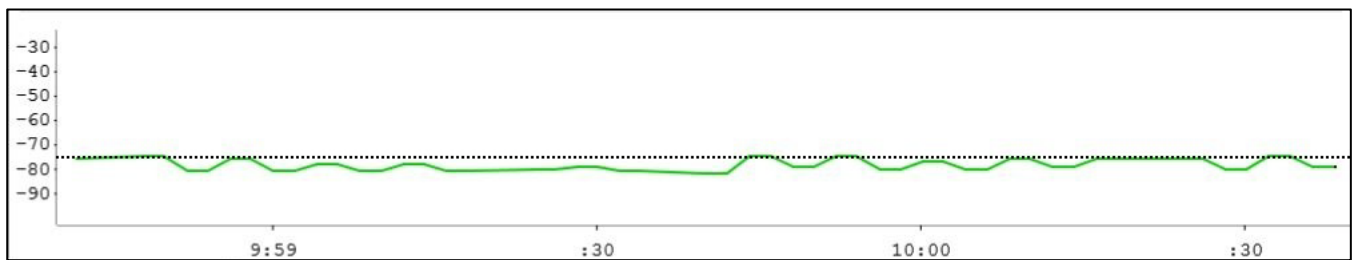
**Pictured above -Capture at 15m (No Line of Sight, behind 1 door and 1 glass wall)**

Elevation and Antenna Orientation

The antennas used in the Avenview HDMI Wireless Set are unidirectional dipole antennas. This means that the Wi-Fi waves travel in a doughnut-shaped pattern around the antenna but do not propagate directly above or below the unit. Optimal placement of your transmitter and receiver units requires that they be at similar elevation to each other and that their antennas be parallel to each other; i.e. pointing in the same direction. The figure on the next page illustrates this.
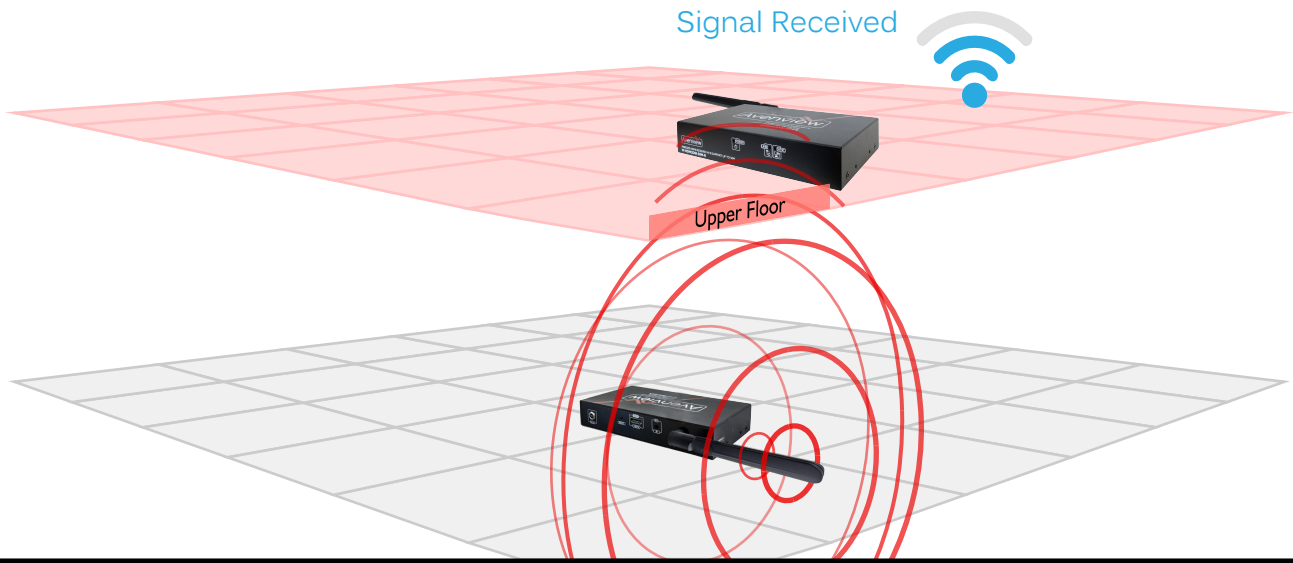
W-HD3IR-50M

Position : Out-of-sight
(antennas placed upwards)

Weak/No Signal

Upper Floor

50 m
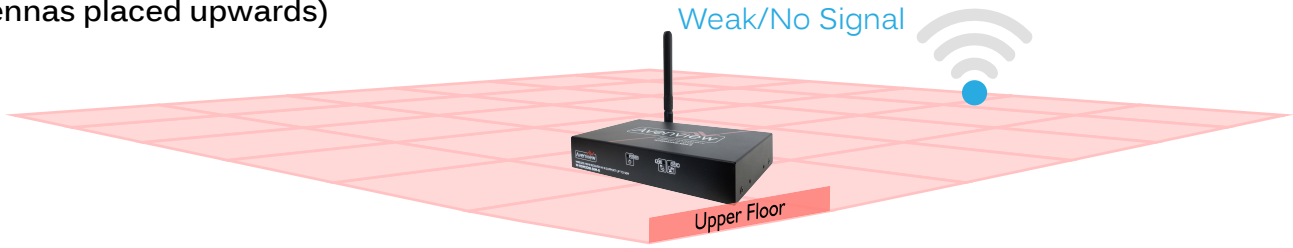
Position : Out-of-sight
(antennas turned sideways)

Signal Received

Upper Floor

Position : LOS (line-of-sight)
(antennas placed upwards)

OPTIMAL

Signal Received

50 m

Avenview
Control Your Video