



Boosting Weak Emissions Measurements

As Antennas, particularly omni-directional ones such as monopoles, have a low capture area and hence present a low voltage signal to the receiver in an emissions test set-up.

One answer to this is to boost the signal level using a RF preamplifier and the antenna / preamplifier pair is known as an active antenna. However, it is important to understand the physics behind maintaining and enhancing the separation between the emitted signal and the noise surrounding it.

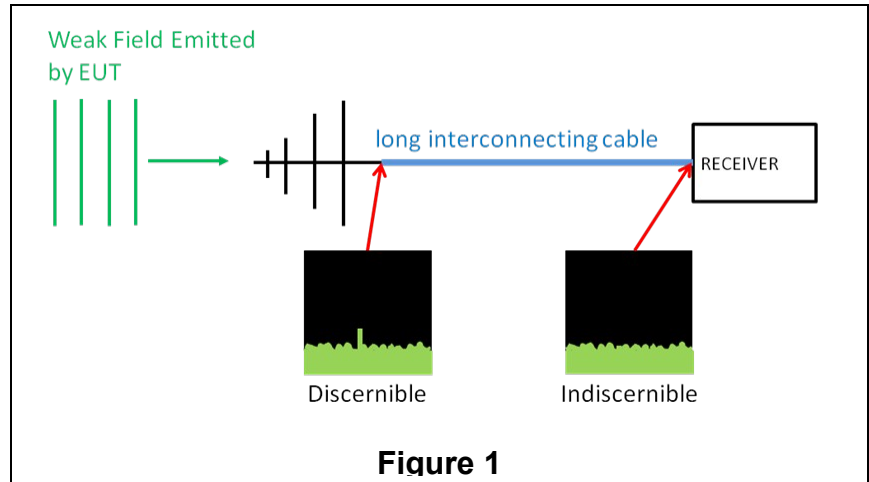


Figure 1

A captured weak emission can be lost in the noise floor of the emissions test set-up. This is shown in **Figure 1**. The loss associated with the long interconnecting cable has attenuated the captured signal to the extent that it is lost in the noise floor of the receiver. Note, it is important to be aware that if, at the antenna connector itself, the signal is so low it cannot be discerned from the surrounding noise, then no amount of amplification will make it discernible.

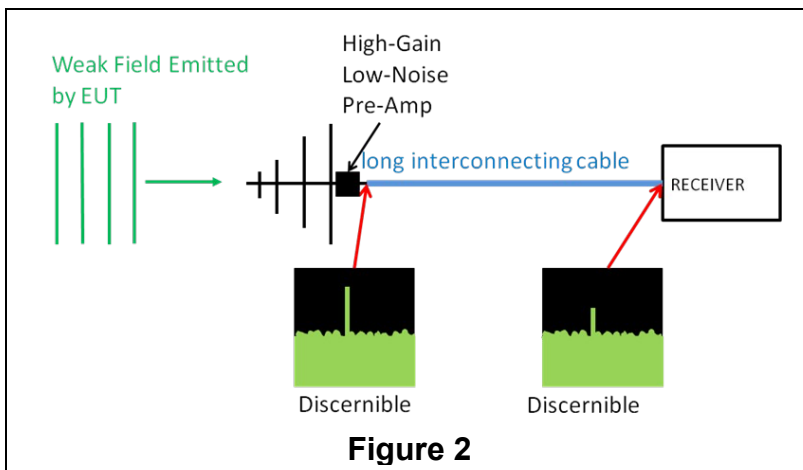


Figure 2

This is the key reason the preamplifier is placed before the cable.

It is true that all amplifiers create their own noise, however, if the amplifier exhibits high gain / low noise, the trade is worth it as shown in **Figure 2**. A typical high gain, low noise preamplifier will have a gain of 30dB and a noise figure (noise added in dB) of only 5dB. Note when

comparing Figure 1 and Figure 2 that the amplifier noise causes the noise floor to rise, but the captured signal level rises higher.

