

Donor Antenna Testing Procedure

This testing will be performed at two points, once on the roof at the donor antenna, and again at head-end where the donor antenna cable is attached to the BDA. On the roof, with a portable radio next to the donor antenna and measure the signal level coming from the fire department radio system. This measured signal strength will be the "reference point" and is a very important value for RSI Project Manager. At the second point, go to the BDA equipment room and connect the portable radio to the donor antenna coaxial cable and measure the same signal coming from the fire department radio system. Again, this value is important and should be recorded and submitted to the RSI Project Manager.

For example, the reading of the reference point (at the donor antenna on the roof) is -55dBm, and the second reading at the BDA is -63dBm. This means that the signal, which is being received through a portable radio, on the roof at the donor antenna, is 8dB stronger than the same signal being received at the point right before it enters the BDA. This makes sense because from the Yagi antenna to the BDA there will be cable loss, meaning the longer the cable the more loss of signal strength.

The reason for measuring the signal strength at these two points is that if the signal level is lower than what it should be than that would indicate a problem with either the antenna direction (i.e. not pointing to the radio repeater/donor site), a bad connector or cable, or there may be a problem with the antenna.

Note: It is more efficient to perform the DAS Testing Procedure before performing the Donor Testing Procedure.

Procedure:

1. Make sure the donor antenna is connected to the coaxial cable leading to the BDA.
2. Measure the signal "reference point". On the roof, stand next to the donor antenna. Using a portable radio, key into the fire department radio system (or any other frequency requested by the Project Manager).
3. Record signal strength reading (e.g. -55dBm).
4. Measure the same signal from the BDA equipment room.
5. Detach the portable radio's antenna and attach a test cable from the donor antenna cable head-end (the coaxial cable that is going to be wired into the Donor Antenna port of the BDA) to the portable radio's antenna port.
6. Record signal strength reading (e.g. -63dBm).
7. Compare the two readings.

Depending on the type of donor antenna being used (gains can range from 6 dB - 12 dB) and depending on the length of cable, from the donor antenna to the BDA, this reading difference can be deemed consistent or not with the expected results.

For this example, the antenna being used has a 10dB gain, and there is about 100 ft of cable (meaning roughly 2 dB of cable loss) between the two points.

$$(-55\text{dBm}) - (-63\text{dBm}) = 8 \text{ dB difference}$$

The signal reading on the roof, through the directional donor antenna is 8dB greater than the signal coming into the BDA through the cable, from the donor antenna. This is as expected.

The 10dB gain of the Antenna – 2 dB of cable loss = expected 8dB difference.

Once found, submit the signal readings to the designated RSI Project Manager