5 ways to improve 2G, 3G and 4G signal strength for M2M devices

Systems are only as reliable as their weakest link and when it comes to M2M wireless, the weakest link is poor, intermittent signal strength. Low signal levels result in poor system performance, slow response times and reliability issues. For system installers and other M2M vendors, how do you ensure the very best cellular signal strength?

1. Checking the 2G/3G/4G signal strength
   Typically, most M2M cellular systems will simply not work, or the performance is substantially degraded by low signal strength. This may result in data not being transmitted, irregular polling success or complete lack of connection. Some wireless devices (routers/modems) have a signal strength indication facility, but only report on the connection available to them.An independent check of signal strength can be performed using a cellular signal strength analyser such as the Siretta SNYPER. These testers are hand held, network independent, and analyse the signal strength for all available networks. SNYPER can be connected to the deployed antenna to check the actual signal strength of the installed system.

2. Which network SIM to use?
   Depending on location, you may find one cellular network has a better signal strength than other networks. The SNYPER product checks this for you without the need to buy a SIM from each network. Once the network has been decided, the next step is to optimise the antenna and RF cables routing back to the M2M device.

3. Re-positioning the antenna
   Fitting the antenna in the best possible location has a significant effect on the signal levels received by your M2M equipment. This may mean moving the antenna further away from the M2M device (router/modem) and/or positioning it higher up by mounting to a wall or pole. Directional antennas (e.g. Yagi) can also help improve the signal if you know the direction of the receiving station. For most applications, this information will not be easily available and due to reflections from walls, buildings and other surfaces, more often the signal is not received from the expected direction making omni-directional antennas more appropriate.

4. Go “High-Gain”
   Some antennas are far better than others at specific frequencies, ensuring the right antenna is selected for an application is key. Antennas with higher gain will perform far better than low cost alternatives.

5. Reducing signal losses
   Running a length of RF cable between antenna and router/modem introduces further degradation of signal strength. Replacing a standard RG58 style RF cable with a low loss equivalent can solve signal strength issues and potentially mean that the antenna does not have to be repositioned. Additionally, low loss cables enable longer RF cable lengths to be used if required.

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So, before losing hope with RF signal, remember there exists a number of tried and tested approaches to help improve signal strength for antennas. For most applications, the starting point will be to determine the best cellular network and be able to accurately measure the 2G, 3G and 4G signal strength using a signal tester such as the SNYPER.

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