3 Tips to Avoid Vandalism to Cellular Antennas in IoT Systems

Remote installations fitted with cellular telemetry equipment often come under attack, especially in un-monitored or dimly lit areas such as car parks and other public spaces.

Locations with telemetry equipment include vending machines, bus stops fitted with RTPI (real time passenger information) equipment, utility boxes acting as a local information gateway from homes back to service providers and remote weather stations for transmitting local weather to a centralised point. All have a critical requirement for ensuring products are built to last in their particular environment and wireless connectivity over a cellular network is becoming a low cost way of interacting with remote sites.

Use a Low Profile Antenna

Although most cellular antennas are vertically polarised, a growing trend of low profile antennas are being introduced in to the market. These are designed to be fitted using the through hole bolt which passes through a hole on the enclosure. This ensures that the antenna cannot be removed without access to the inside of the enclosure and no cabling is visible. Good quality low profile antenna products from Siretta are designed with robust plastic enclosures to give adequate protection against all but the most sustained attack. These offer cellular connectivity and often provide multi technology operation including ISM, WiFi and GNSS all in one physical antenna casing.

Elevate the Antenna

Cellular communication operates on a line of site principle so it is advantageous to raise the height of the antenna above ground level as high as possible. This gives the additional bonus of keeping the antenna out of reach whilst providing improved communications at the same time.

Cables in these installations can be easily targeted as they can be seen routed up sign posts, bus stop poles, drainpipes and other suitable mounting points; therefore, it is recommended to route these cables through a protective conduit or within a post. Alternativel,y route the cable underground to minimise vulnerability and reduce elements of the system being targeted. Siretta offer outdoor wall/pole mount antennas which are water resistant and come with a mounting bracket for fixing to poles or the side of buildings. In addition they are provided with long low loss cables which offer a good link budget and can place the antenna in an elevated position which improves the performance of the installation.

For very weak signal areas such as remote rural sites with only one cell site available, a Yagi antenna from Siretta can be installed at a high point and pointed in the direction of the cell site to offer a good signal connection to the remote equipment. To facilitate installation of the antenna, Siretta also provide the SNYPER cellular signal analyser which can provide a real time graphical output to help determine the optimum placement of the antenna.

As with all exterior mounted antennas, it is a good idea to add a lightening surge arrestor to the feed line to reduce the risk of high voltage transients destroying communications equipment downstream. This simple GDT (Gas Discharge Tube) device is a simple low cost 'insurance' premium which could avoid costly equipment replacement and engineer call outs. The Siretta accessory line contains surge arrestors with the most common connection types in the market today.

Hide the Antenna

Providing the equipment is not inside a metal enclosure (RF signals do not transmit well inside a metal case), internal antennas can be used. These are available with varying lengths of cable according to the distance between antenna mounting site and telemetry unit. If the antenna is going inside equipment then a less rugged non weatherproof antenna can be used to directly connect to the communication equipment. Siretta provide a comprehensive range of embedded antennas or adhesive antennas to install within your enclosure.

The above pointers should always be observed in all installations to overcome concerns about longevity, performance and robustness of products installed in the field. Field trials are essential to ensure that the end solution is robust. Once field trials are completed satisfactorily then you can be sure that you have a practical compromise to maintaining suitable signal integrity whilst not having any weak spots in your system design.

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