Antenna selection and implementation

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 The antenna has the single largest impact on the performance of any Telit radio implementation, whether it's cellular, GPS or short range. It can be very difficult for developers without the proper tools and experience to select and implement an antenna properly. Antenna performance is influenced by conductive and absorptive system elements like PCBs, batteries, cable harnesses and enclosure plastics. Environmental factors such as nearby metal/conductive objects and absorbing materials like carbon graphite, many liquids and body tissue also affect performance.

The easiest way to ensure good performance is to use an external antenna. If you're application requires an internal antenna, two options exist: off-the-shelf and custom antennas. When using an off-the-shelf antenna, you must design the enclosure and mechanicals around the antenna and its mechanical requirements. When doing so, it's important to remember that off-the-shelf antennas must be implemented exactly as shown on the development board and design documentation. This is especially relevant for multi-band antennas like cellular as it can be difficult or impossible to retune the antenna electrically to make up for the mechanical features that pull the antenna off frequency.

The other option is to design a custom antenna around the enclosure and mechanical details. Custom antennas provide the best performance for a given physical space because they're designed around that space from the start. Custom antennas also provide the lowest per-unit cost because you've paid for the design up-front, so the only per-unit costs are the materials used to implement the antenna. When custom antennas are done as printed traces on a PCB or simple metal stampings this can be as little as a few pennies per unit.