# MR/LR/XLR XBee Radio

Some notes regarding the range of the XBee radios:

The MR Starter Kit lets you send corrections up to 1200m, in perfect conditions. In practice, this means with RF line of sight:

- 250m in urban environment.
- 600m in rural environment.
- 1000m in rural environment with perfect installation.

The LR Starter Kit lets you send corrections up to 10km, in perfect conditions. In practice, this means with RF line of sight:

- 2km in urban environment.
- 5km in rural environment.
- 10km in rural environment with perfect installation..

The XLR radios (with 500mW configuration) let you send corrections up to 50km, in perfect conditions. In practice, this means with always line of sight:

- 5km in urban environment.
- 20km in rural environment.
- 50km in rural environment with perfect installation. And up to 80km if you use a high gain antenna. But RTK corrections are not valid so far ?

There are 2 very good application notes done by the XBee manufacturer Digi, explaining what does “perfect installation” mean:

http://ftp1.digi.com/support/images/XST-AN019a_XBeeAntennas.pdf

http://ftp1.digi.com/support/images/XST-AN010a-MaximizingRange.pdf

A shorter version is available in this post.

Note 1: All above ranges have been measured with the evaluation kits, with perfect antenna installation, and far away from any direct source of noise. If you are installing the kits onto a robot, drone or a car, the range might get strongly reduced do to local interference from the other intentional and unintentional radio transmitters onboard.

Note 2: Range figure estimates are based on free-air terrain with limited sources of interference. Actual range will vary based on transmitting power, orientation of transmitter and receiver, height of transmitting antenna, height of receiving antenna, weather conditions, interference sources in the area, and terrain between receiver and transmitter, including indoor and outdoor structures such as walls, trees, buildings, hills, and mountains.

Note 3: For US and Canadian customers only. It has been reported that the unlicensed ISM frequencies in this territory is getting more and more crowded. This might negatively affect the range.