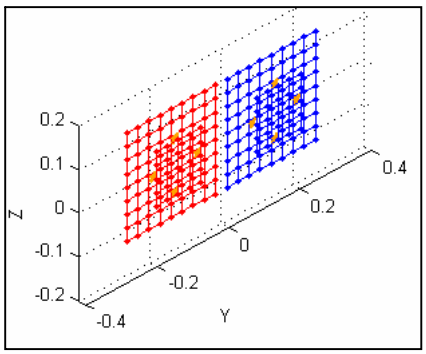
Poynting Innovations (Pty) Ltd

: info@poynting.co.za www.poynting.co.za
(+27-11-262-5155 3 +27-11-262-5156
* Box 76579, Wendywood, 2144, South Africa

Narrow-beam patch configurations

This document gives some guidance on the positioning of two patch antennas to achieve a narrower beam in the horizontal plane.



Arrangement of antennas

This antenna configuration is intended to replace each of the antennas in a 4-antenna dock door configuration.

Two PATCH-A0003-02 antennas are mounted as follows :

- Facing in the same direction
- Same orientation
- Centres about 28-30cm apart
- Connected to one reader port using a COMB-A0002 combiner, with cable lengths from combiner to splitter being equal to within 2cm.

To remain within ERP limits, the reader power must be reduced by 3dB, (half), to compensate for the increase in far field gain caused by the array.

Advantages

Reduced beam width

Less chance of detecting passing fork-lifts, etc

Higher gain, could help with low power readers, long cables, etc.

Disadvantages

Reduced read volume

More difficult to read X-aligned tags, the ones facing the antenna. These would generally be read only when they are at some angle to the reader, which happens as they enter or leave the edges of the field.

Simulation Graphs

Definition of axes

X is towards and away from the face of the antenna (across the dock door)

Y is past the antenna, parallel to its flat face (through the dock door)

Z is up and down

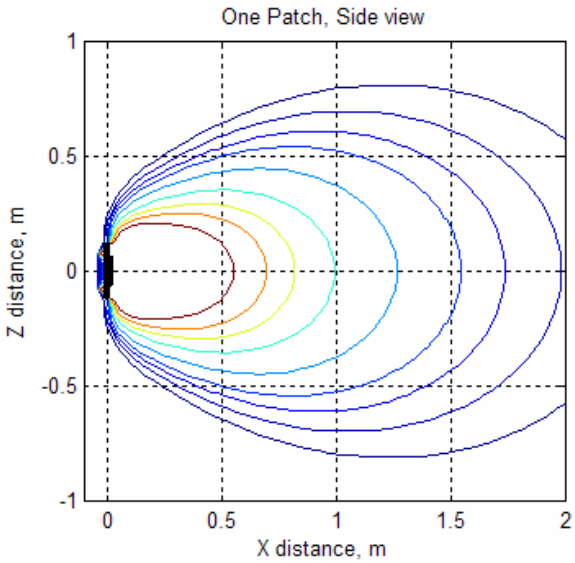
Power adjustment

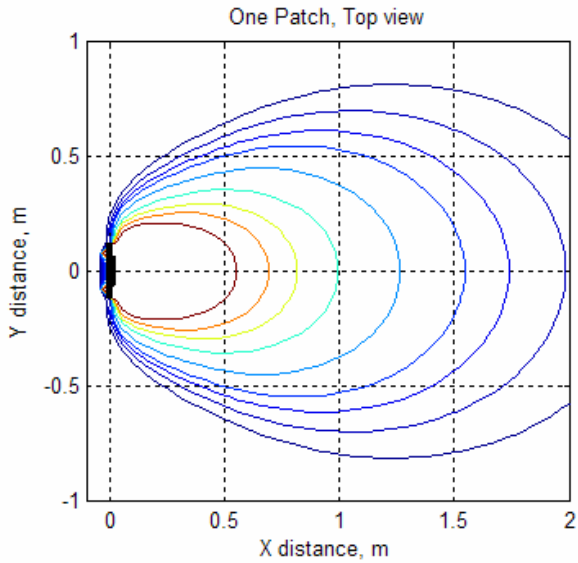
These graphs show field strength contours. The reader power has been adjusted to give the same ERP in all cases, so the fields are legislation-limited.

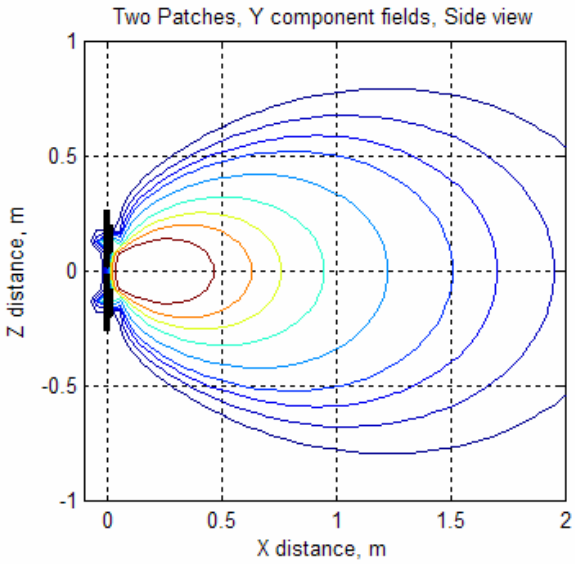
Field Contours

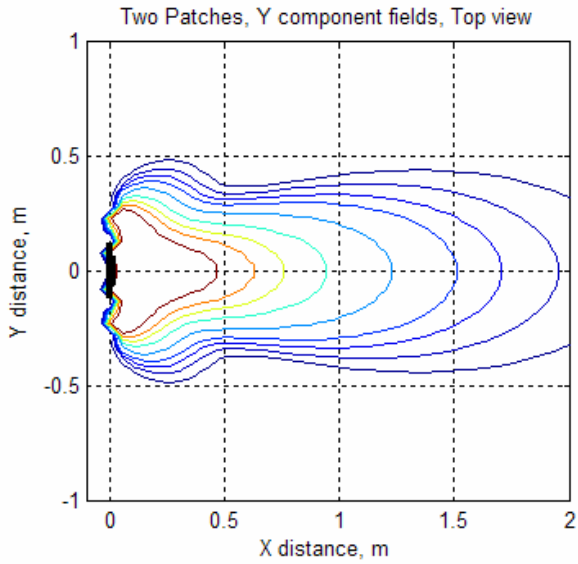
The graphs show several field contours, depending on tag and reader type, and power setting, any of these could be the range limit. They are not intended to quantify exact range limits, but indicate the shape of the range limit. You can pick any colour contour, for a given choice of tag, reader and power, and follow it through all the graphs.

Four graphs are shown. The top two are a single patch, the bottom two are the array of two patches. On the left are shown side views, looking through the portal, on the right are shown top views, plans of the portal.



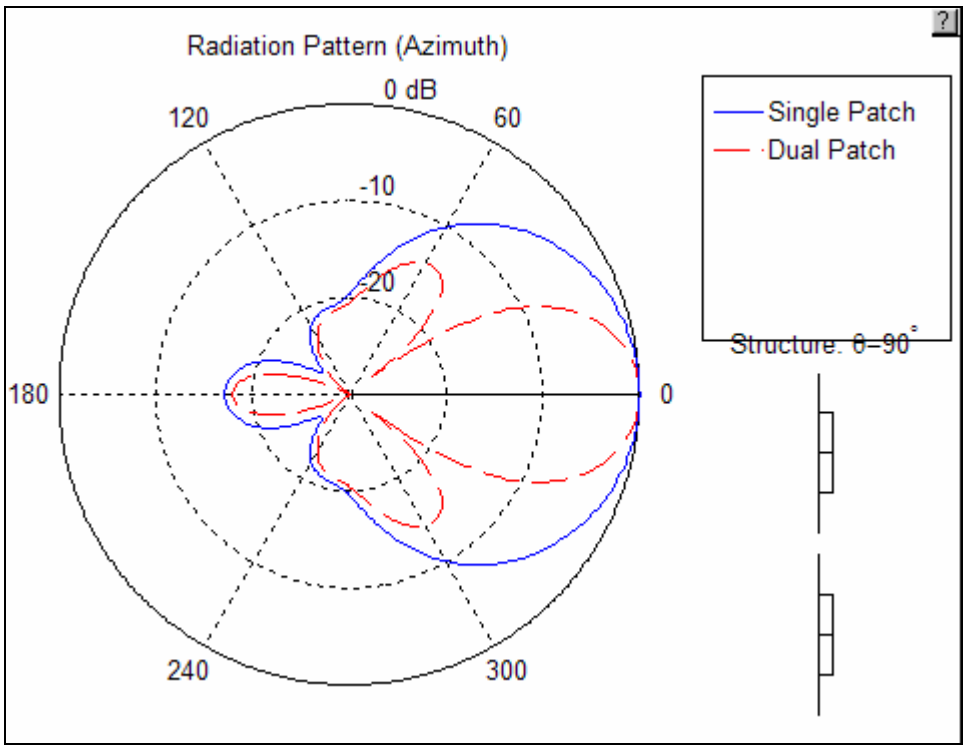




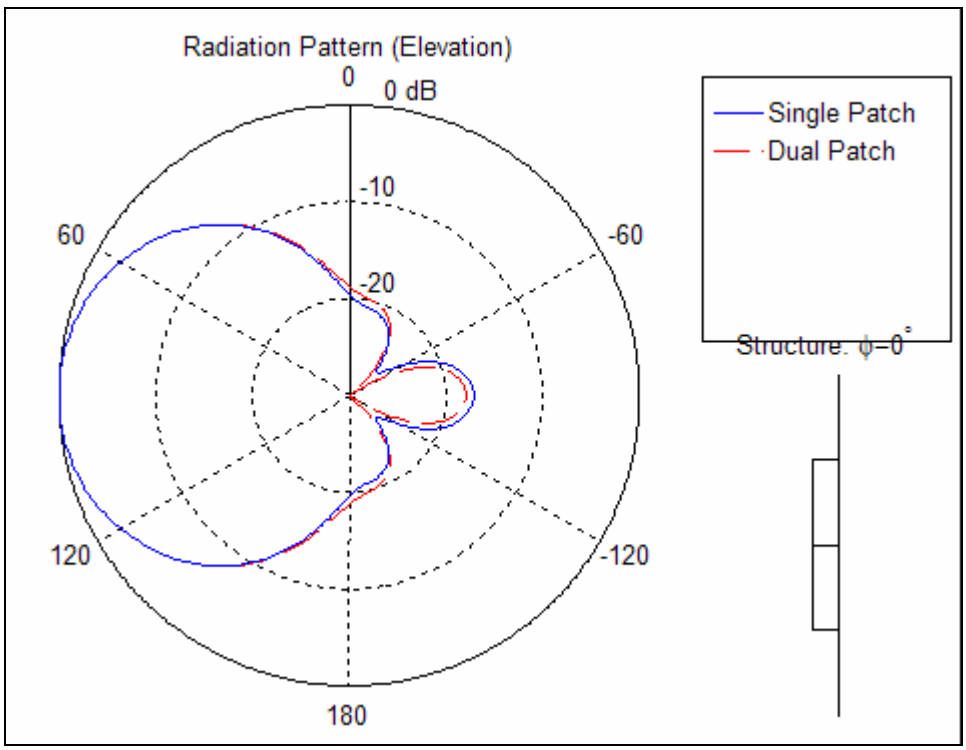


Radiation patterns

Some radiation patterns are shown below, for the single and dual antennas. They are normalised to have the peaks at 0dB.



The reduction in azimuth beamwidth is clearly visible.



The elevation pattern of the antenna is not affected.