When sectoring is employed, the channels used in a particular cell are broken down into sectored groups and are used only within a particular sector, as illustrated in Figure 3.10(a) and (b). Assuming seven-cell reuse, for the case of 120° sectors, the number of interferers in the first tier is reduced from six to two. This is because only two of the six co-channel cells receive interference with a particular sectored channel group. Referring to Figure 3.11, consider the interference experienced by a mobile located in the right-most sector in the center cell labeled "5". There are three co-channel cell sectors labeled "5" to the right of the center cell, and three to the left of the center cell. Out of these six co-channel cells, only two cells have sectors with antenna patterns which radiate into the center cell, and hence a mobile in the center cell will experience interference on the forward link from only these two sectors. The resulting *S/I* for this case can be found using Equation (3.8) to be 24.2 dB, which is a significant improvement over the omnidirectional case in Section 3.5, where the worst case *S/I* was shown to be 17 dB. This *S/I* improvement allows the wireless engineer to then decrease the cluster size *N* in order to improve the frequency reuse, and thus the system capacity (see Problem 3.28). In practical systems, further improvement in *S/I* is achieved by downtilting the sector antennas such that the radiation pattern in the vertical (elevation) plane has a notch at the nearest co-channel cell distance.

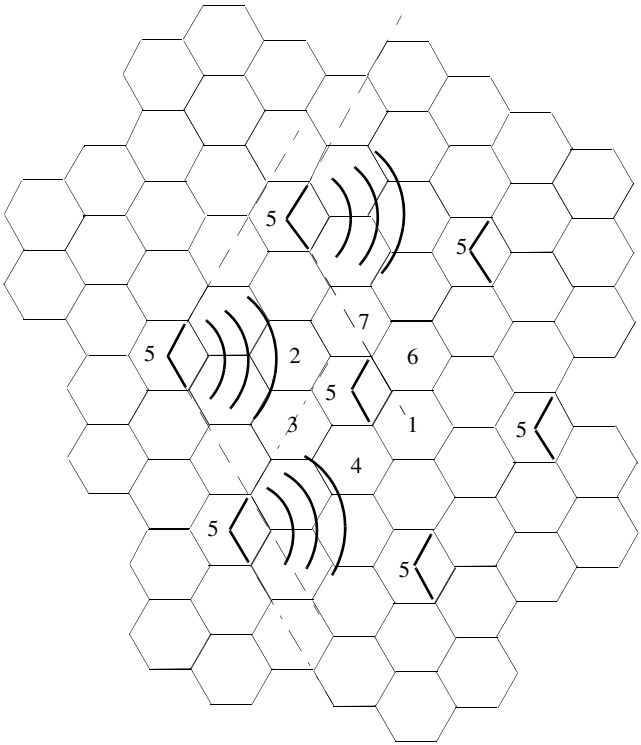

Figure 3.11 Illustration of how 120° sectoring reduces interference from co-channel cells. Out of the 6 co-channel cells in the first tier, only two of them interfere with the center cell. If omnidirectional antennas were used at each base station, all six co-channel cells would interfere with the center cell.