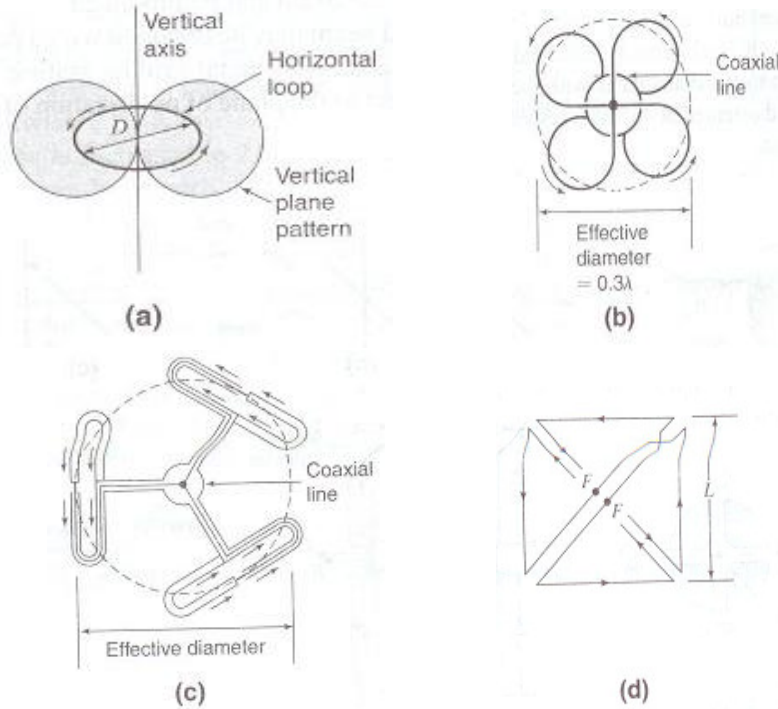


**Omni-directional antennas**

Slotted cylinder, and turnstile are almost omni-directional in horizontal plane. Clover-leaf is one more type of omni-directional whose directivity is much higher than that of turnstile. The system basically contains horizontal dipole which is bidirectional in vertical plane. A

circular loop antenna as shown in fig can be used to obtain omni directional radiation pattern.

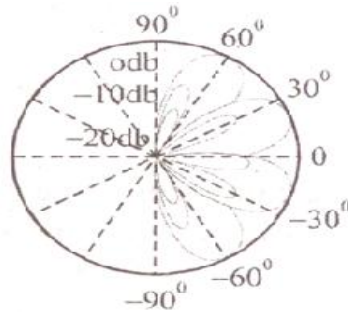


a) Circular Loop Antenna    b) Approximately equivalent arrangements of “clover-leaf” type c) “triangular-loop” type Antenna    d) Square or Alford loop

## Antenna for Mobile Application

### Switched Beam Antenna:

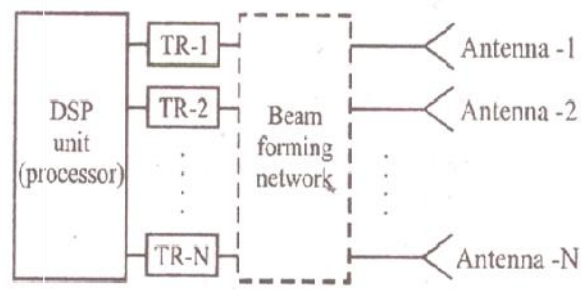
The base station antenna has several selectable beams of which each covers a part of the cell area as shown in the figure 6.24. The switched beam antenna is constructed based on Butler matrix, which provides one beam per antenna element. The system operation is very simple but has limited adaptability.



Switched Beam Pattern

### Adaptive Antenna:

Adaptive array is the most comprehensive and complex configuration. The system consists of several antennas where each antenna is connected to separate trans-receiver and Digital Signal Processor as shown in fig. DSP controls the signal level to each element depending upon the requirements. Butler matrix can be adapted for the improvement of SNR during reception. Direction of arrival finding and optimization algorithms are used to select the complex weights for each mobile users. For frequency domain duplexing the transmission weights are estimated based on Direction of arrival information.



Adaptive Antenna

Antenna for satellite

- High Frequency Transmitting Antenna
- Parabolic Reflector