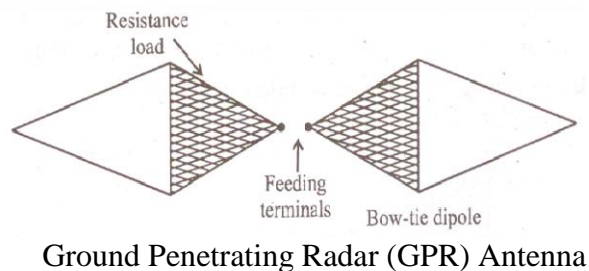


ANTENNAS FOR GROUND PENETRATING RADAR (GPR)

- Like Earth Surface Radars, the radars can be used to detect underground anomalies both natural and Human Made.
- The anomalies include buried metallic or nonmetallic objects, earth abnormalities etc.,
- Pulse and its echo pulse are used for processing.
- Far field radar equation to be modified as distance travelled by wave is less.
- Power required is more since ground is lossy medium.
- Mismatch at air-ground interface.
- Pulse width should be less.



Antennas for Mobile Handsets

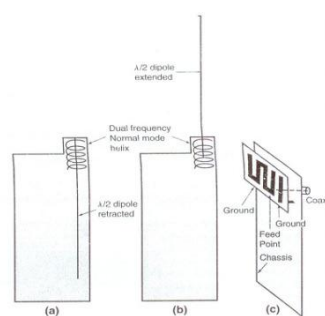
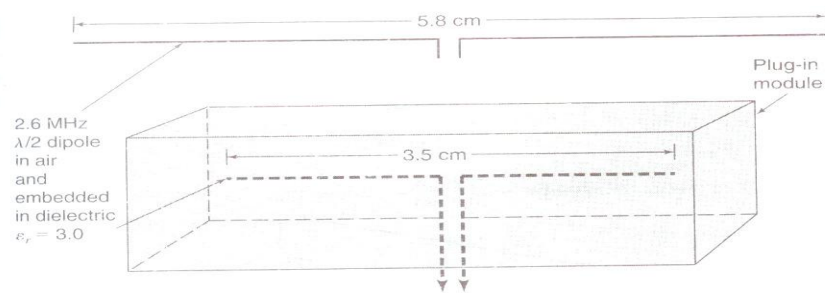


Figure (a) Handset with dual frequency normal-mode helix and $\lambda/2$ dipole retracted, (b) Handset with $\lambda/2$ dipole extended, (c) Planar internal multiband antenna.

Embedded Antennas

- If dipole is embedded in a dielectric medium of relative permittivity ϵ_r (>1), then its length can be reduced.
- A $\lambda/2$ dipole resonates at the same frequency when embedded in a dielectric medium having a length $0.5\lambda/\text{sq root of } \epsilon_r$
- If $\epsilon_r = 4$, length required is half.
- Used in Bluetooth technology, interfacing RF Networks.

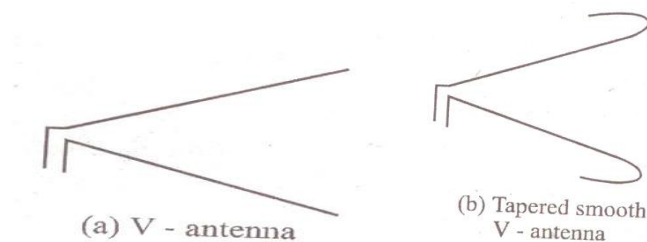


Half-wavelength dipole embedded in a dielectric for Bluetooth Application

Ultra Wide Band Antenna

- Used for digital Applications
- Pulse Transmission which results in Large bandwidth.
- Phase dispersion of pulse (transmitted at different instant of time)
- Degrading of signals

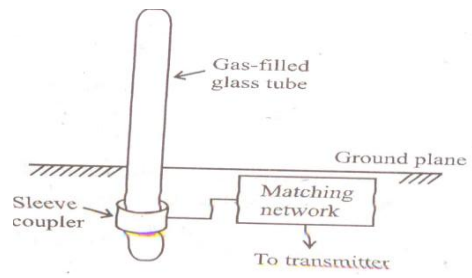
V Antenna used for Communication



Ultra Wide Band Antenna

Plasma antenna

- A plasma surface wave can be excited along a column of low-pressure gas by adequate RF power coupled to the column in a glass tube.
- It is a system in which the radar cross section is only the thin wall glass tube when not transmitting.
- With a laser beam producing the plasma the radar cross section becomes zero when laser is off.



Plasma antenna

Source : <http://elearningatria.files.wordpress.com/2013/10/ece-vi-antennas-and-propagation-10ec64-notes.pdf>