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Q2

For input power 45mW;

efficiency = P_radiated/P_input

0.9 = P_radiated/45

P_radiated = (0.9*45)

Directivity = 4π (Max. radiation intensity)/Total radiated power

= 4π*100/(0.9*45)

= 9.87π

Antenna Gain = Antenna efficiency * Antenna Directivity

= 0.9*9.87π

= 8.88π

When radiated power is 45mW

Directivity = 4π (Max. radiation intensity)/Total radiated power

= 4π * 100/45

= 8.89π

Antenna Gain = Antenna efficiency * Antenna Directivity

= 0.9 * 8.89π

= 8π