1. Width of the patch,

$$\text{w} = \frac{c}{2 * fr}\sqrt{\frac{2}{\varepsilon+1}}$$

2. Effective dielectric constant,

$$\varepsilon \text{ eff} = \frac{\varepsilon+1}{2} + [\frac{\varepsilon+1}{2} * (1+\frac{12*h}{w})^{1/2} \quad]$$

3. Effective length of the patch,

$$\text{L eff} = \frac{c}{2 * fr}\sqrt{\frac{1}{\varepsilon\, eff}}$$

4. Actual length of the patch,

$$L = L\, eff - 2 * \Delta L$$

5. Due to the fringing fields there is a length ΔL need to be reduced,

$$\Delta L = 0.412 * h * \frac{(\varepsilon\, eff+0.3)}{(\varepsilon\, eff- 0.264)} + \frac{(\frac{w}{h}+0.258)}{(\frac{w}{h}+ 0.8)}$$

6. Feeder length is,

$$\text{FL} = \frac{c}{4 * fr}\sqrt{\frac{1}{\varepsilon\, eff}}$$

7. Characteristics impedance of a micro strip patch

$$Z0 = \frac{120}{\sqrt{\varepsilon\, eff} * [\frac{w}{h} + 1.393 + 0.667 * \ln[\frac{w}{h} + 1.44\,]}$$

8. Ground plane length and width,

$$LG = L + 6\text{h}$$

$$WG = W + 6h$$

9. Width of the patch at feeder side

$$W1 = W2 = \frac{2*W}{5}$$

10. Slot lengths in the inset feed,

$$S1 + S2 = W - (FW + W1 + W2) \qquad [\, here\ S1 = S2]$$

11. Wavelength of the resonant frequency

$$WL = \frac{C}{Fr} \qquad [\, C = SPEED\ OF\ EM\ WAVE\ ]$$

12. Electrical length of the feeder line,

$$EL = \frac{360 * FL}{WL}$$