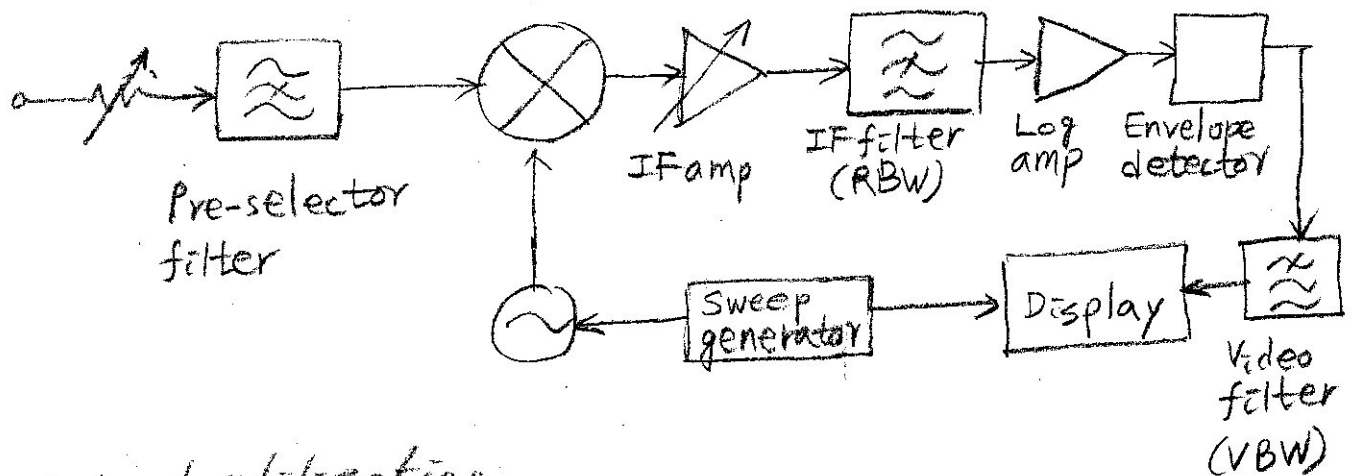


전라관리특론

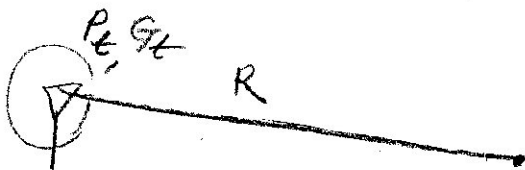
1. Spectrum analyzer, block diagram



2. ISM band utilization

- HF communication: amateur radio
- Short range communication: SRDs, Wi-Fi, ZigBee, BLU
- RFID: 125kHz, 13.56MHz, 433MHz, 915MHz, 2.4GHz
- Heating and drying
- Medical devices

3. Electric field calculation



$$S = \frac{P_t}{4\pi R^2} G_t = \frac{E^2}{2\eta}$$

$$P_t = 10 \text{ mW}$$

$$R = 100 \text{ m}$$

$$G_t = 10 \text{ dB} = 10$$

$$\eta = 377$$

$$E = 24.5 \text{ mV/m (peak)}$$

$$E_{\text{rms}} = \frac{1}{\sqrt{2}} 24.5 \times 10^3 \text{ }\mu\text{V/m}$$

$$E_{\text{rms}} (\text{dB}\mu\text{V}_{\text{rms}}/\text{m}) = 20 \log_{10} \left(\frac{1}{\sqrt{2}} 24.5 \times 10^3 \right) = 84.8$$

$$S = 796 \text{ nW/m}^2$$

4. Received power of an antenna

$$P_r = SA_e = S \frac{\lambda^2}{4\pi} G_r$$

$$\lambda = 125 \text{ mm} = 0.125$$

$$G_r = 10 \text{ dB} = 10$$

$$S = 796 \text{ nW/m}^2$$

$$P_r = 9.9 \text{ nW} = 9.9 \times 10^{-6} \text{ mW} = -50 \text{ dBm}$$