

'Greener' Technology for Power Amplifier

Do you know that cellular base stations in the UK produce 600,000 tons CO₂ per year?

WHY DO WE NEED POWER AMPLIFIER (PA)?

- IN WIRELESS link, the farther away the signal has to travel, the weaker it will be. PA is therefore needed to strengthen the signal before it travels. **Analogy: We need to increase our voice volume when speaking to someone at a far distance.**
- TO MAKE the signal much more dominant than the disturbances/'noise' (lightning, tall buildings/mountains, electronic equipments). **Analogy: In a noisy football stadium, we can hardly hear someone next to us talking in a normal tone.**

FACTS: IN THE UK, there are 74 million mobile phone subscriptions - exceeding the population of 60 million.

MYTHS: MOBILE PHONE can cause a fire on the forecourt of a petrol filling station. You can cook popcorn using mobile phones.

RESEARCH OBJECTIVE:

To increase the PA's efficiency



IS IT ONLY THE MOBILE PHONE THAT BENEFITS FROM THIS RESEARCH?

NO. MANY systems from electronic warfare to medical imaging (see the pictures on the right) require PA.

WHY DOES THE EFFICIENCY OF THE PA NEED TO BE IMPROVED?

ENERGY IS expensive nowadays and the PA is the most power-hungry component in the transmitter. **Higher efficiency means:**

- Longer talk time or longer period between recharging mobile phone
- Smaller and lighter mobile phone due to reduced battery size
- Cooler running leading to longer life of equipment
- Better value for money:
 - > For companies: increased profit
 - > For society: cheaper mobile phones
- Saving our planet from global-warming

STRATEGY: 'Don't use a cannon to kill a mosquito' The PA is not run at FULL power all the time but instead it is dynamically adjusted according to the size of the input signal



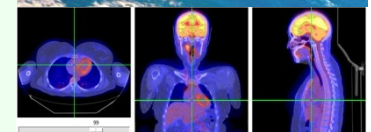
"Spirit" Rover



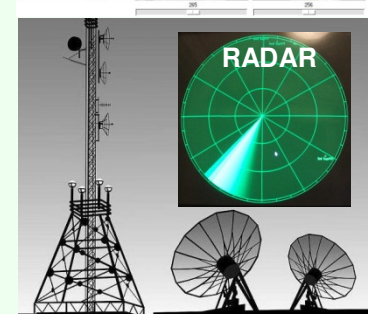
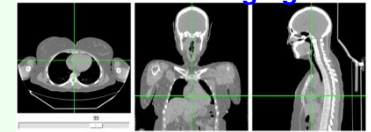
F-22 Raptor jet fighter



Spy satellite



Medical imaging



RADAR