

## TETRA RADIO SYSTEM: HEALTH ISSUES

### INTRODUCTION

The TETRA (Terrestrial Trunked Radio) scheme is a communication system primarily intended for the Police and Emergency Services. The system is currently being planned and installed throughout the UK. It offers considerable operational advantages to the users over existing two way mobile radio schemes. It is secure and cannot be easily eavesdropped upon. It also offers considerable flexibility in that the handsets can operate in different modes, either as conventional two way radios or they can be configured to operate as cellular handsets, which offer the functionality of a conventional mobile telephone. It can also give full national coverage of the UK.

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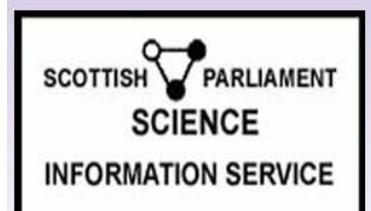
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## THE TETRA RADIO SYSTEM

Questions have been raised about the nature of the radio signals used by the TETRA system and the possible health effects of the signals. Recently the National Radiological Protection Board's Advisory Group on Non-ionising Radiation (NRPBAGNIP) has reported on the TETRA system as a consequence of the recommendation of the Independent Group on Mobile Phones (IEGMP) that amplitude modulation at frequencies of around 16 Hz should be avoided if possible in signal coding schemes. This recommendation arose from studies carried out in the late 1970s which suggested that the rate of calcium ion loss increased, when isolated tissues were exposed to radio frequency signals which were amplitude modulated at frequencies of 16 Hz, or 16 pulses per second.

In the UK, TETRA operates on two frequency bands 380-395MHz and 410-425MHz which are in the VHF (Very High Frequency) region of the radio spectrum. Base stations serve a number of mobile terminals installed into vehicles and portable handsets. Usually the base station transmitters are located on hill-top sites or the transmitting antennas are placed on masts to optimise coverage. The signal powers from the base stations are around 10 Watts and use a form of phase modulation to carry the information on the radio carrier signal. In this form of modulation it is notable that the signal is continuous, not pulsed. The base stations are very similar in terms of power level and frequency, to the ones that have been in use by the police and emergency services since the 1950s. The NRPBAGNIP report concludes that in general the signals from the base stations do not pose a risk.

A greater area of concern was the signals from the hand sets and mobile terminals. These transmit information using a form of pulse modulation whereby the amplitude of the signal is pulsed at a frequency of 17.5 Hz, close to the 16Hz frequency which the IEGMP had suggested be avoided. The NRPBAGNIP report concluded that it is unlikely that the signals from TETRA mobiles and handsets posed any threat to health. Their conclusions were based on the following:

1. The findings of the original study on calcium ion loss are much disputed. Later studies on living tissues which were much better designed failed to show the calcium loss effects.
2. The mobile sets and handsets in the TETRA system are designed to use automatic power control whereby the signal power from the transmitter is reduced to the minimum to establish communication. (This helps to increase battery life and makes more efficient use of the radio spectrum possible.) It also means that in a typical situation a TETRA radio will only be radiating powers of around 0.5 Watt, which is less than the powers used by the existing analogue hand portable sets in use by the Police and Emergency Services, where typically 1.5 – 3.0 Watts are used.
3. Research on the effects of low-level radio frequency radiation has not provided any persuasive evidence that there are any harmful effects to people.

Overall the report concluded that research on low-level radio frequency radiation including modulated signals indicated that signals from TETRA mobile handsets and terminals were unlikely to pose a hazard to health.

## FURTHER INFORMATION

Report on the Possible Health Effects from Terrestrial Trunked Radio (TETRA): Report of an Advisory Group on Non-ionising Radiation. Doc NRPB, 12, 2 (2001). Available at [http://www.nrbp.org/publications/documents\\_of\\_nrbp/abstracts/absd12-2.htm](http://www.nrbp.org/publications/documents_of_nrbp/abstracts/absd12-2.htm)