submission to the Productivity Commission
'Review of the Radiocommunications Acts and of the Market-based Reforms and Activities Undertaken by the Australian Communications Authority'.

CSIRO Telecommunications and Industrial Physics
12 October, 2001

Support for research and development

Section 2.11 - Looking to the Future

- *What changes may be necessary to provide an appropriate regulatory framework for managing the radiofrequency spectrum in the future?*

- *What pressures does technological convergence exert on the RCA?*

Both the growing demand for radiofrequency spectrum for existing and new services and technological convergence of services place considerable technical pressures on the development of such systems and on the regulation of the spectrum. For example, frequency bands are increasingly shared by a number of services, and the framework for such sharing arrangements requires considerable technical expertise. Also, the demand for high data rates is leading to the use of ever higher frequencies, which creates new challenges for the design and planning of these systems.

The ACA has responsibility for spectrum allocations, including technical conditions placed on licences, and therefore needs expert advice on the technical issues involved. Such expertise is available from Australian and international research bodies, including universities, CSIRO, DSTO and many industry bodies, but the costs of research and development must be met by those who require it. As the ACA increasingly needs radio research advice to meet its obligations to manage the radiofrequency spectrum, it must find resources to obtain this advice.

As an example of the required technical advice, some frequency coordination and spectrum sharing studies require detailed knowledge of the expected rain attenuation as a function of time percentage of a year and of climatic area in order to set interference limits. This in turn requires a detailed long-term study of rain rate characteristics for a variety of Australian locations. Such research must be started well before the information is required by the ACA due to the long-term nature of climatic studies. Industry in Australia generally has not been willing to undertake such extensive research but it is essential for spectrum management.

It is therefore suggested that a proportion of the revenue from apparatus and spectrum licences be made available to the ACA in order to fund relevant radiocommunication research within organisations such as universities, CSIRO and DSTO, to prepare for the future requirements of spectrum management.

Protection of sensitive sites

Section 2.1 - What problems does the legislation seek to address?

Do the Objectives of the Radiocommunications Act adequately describe the social, environmental and economic problems which radiocommunications legislation should address?

The Telecommunications Act 1997 and associated Codes of Conduct do mandate certain actions by telecommunications carriers when their activities cause damage to actual property where a telecommunications facility is installed. They must also consider the visual impact of their facilities. However, it would appear to be a major oversight that the legislation and codes do not force any obligation to consider the impact on the operation of any business activity engaged in by the owners of the land or by nearby land owners.

CSIRO has major facilities on lands close to population centres. Accordingly, CSIRO has a record of cooperation with carriers in providing access to CSIRO land for telecommunications facilities such as cellular base-stations. CSIRO also works with and supports many commercial users of the spectrum. However there are several CSIRO sites where the research activities carried out could be seriously impeded by the presence of a close transmitter. Some examples in NSW are:

- **The National Measurement Laboratory at Lindfield.** At this National facility where the physical standards for Australia are maintained, radio measurements and extremely accurate measurements of time, voltage, current and magnetic field are performed. To enable small errors such as voltage differences of microvolts to be measured, external influences such as temperature and interference are highly controlled. Interference from a close transmitter has been shown to reduce our ability to make accurate measurements.

- **Antenna measurement Facility at Marsfield.** This facility is the only major facility for testing antennas from 0.1 to 100GHz remaining in Australia and represents a major investment. Antenna measurement is important for both local equipment manufacturers and users since it is fundamental for specifying the performance of any wireless system. Sensitive measurements must often be made at frequencies near to interference and this already requires elaborate phase tracking receivers. This site also develops and tests ultra-low noise receivers for radio-telescopes. Increased interference will mean a restriction in the frequency range over which measurements can be made and an inability to provide an adequate service to some of our customers.

- **The Australia Telescope National Facility** which operates extremely sensitive radio-telescopes in bands from 1 to 100GHz at Narrabri, Parkes and Coonabarabran. These large antennas use cryogenically-cooled receivers to receive extremely weak radio signals from the extreme depths of space. These systems already use substantial interference mitigation techniques and further interference can reduce the ability of these major investments to perform their function. For more information please refer to the separate submission on this topic.

There are likely several other sites operated by CSIRO or others that may need protection. CSIRO therefore proposes that the legislation provide for a 'compulsory alert mechanism'. Certain sites would be listed as 'sensitive sites' ie. Sites where interference from transmitters can be shown to impact on business operations. Telecommunications carriers or other spectrum users wishing to install transmitters within a defined radius (defined for each site) of these sites would then be required to consult early in the network planning stage and to take the needs of these facilities into account. There is no intention to prevent the use of the areas around these sites but merely a requirement to search for a solution that is workable for all.

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