

7 Murray Rose Avenue  
Sydney Olympic Park, NSW 2127  
PO Box 7510  
Silverwater, NSW 2128  
Australia  
Tel: +61 (0)2 8037 6000  
Fax: +61 (0)2 8037 6466  
www.thalesgroup.com.au

16 February 2021

The Manager  
Economics Advisory  
Australian Communications and Media Authority  
PO Box 13112 Law Courts  
Melbourne Victoria 8010

**Subject: Thales response to ACMA Spectrum Pricing Review.**

**Reference: IFC-39-2020-Response-to-implementation-of-SPR-paper.docx, Dec 2020.**

Thales Australia is a leading system engineering organisation and supplier of mission critical systems for Australian Defence and civilian market sectors such as transportation and air traffic management. Thales has a track record of developing enduring Australian Industry Capability, and is currently in the process of establishing activities in the Space sector. A key segment of that Space sector is Satellite based communications, within which there is an emerging trend towards ever higher RF frequencies and ultimately the use of Free Space Optical (FSO) techniques such as laser-based communications.

The Australian Space Agency has recently released its "Communications Services and Technologies-Roadmap". This identifies satellite optical communications and associated ground stations as a focus segment for Australian industry and research investment.

Thales is currently participating in an Australian SmartSat CRC project to develop satellite optical communication technologies suitable for the transmission of high data rates through turbulent atmospheric conditions. A typical laser wavelength relevant to this technology is 1550nm (194 terahertz). We note that the Australian Radiocommunications Act 1992 defines a radio emission as "*any emission of electromagnetic energy of frequencies less than 420 terahertz without continuous artificial guide*". As such it appears that free space laser-based communications using optical wavelengths such as 1550nm, are included in the licensing regime expressed in the Division 8A, Table 26, >51.4 GHz category. This is problematic for the following reasons:

1. The annual license tax is expressed in dollars per kHz of bandwidth, and although these amounts trend downwards for increasing RF frequency bands, the top band (from 51.4 GHz to 420 THz) covers almost 4 decades of frequency. We note that carrier frequency spread due to source stability, atmospheric variability, turbulence, and Doppler shifts due to Satellite motion all manifest as a percentage of carrier frequency. For a practical optical communication link, it is therefore necessary to consider signal bandwidths of 100's of GHz. At the "Medium Density Geographic" rate of 0.0003 \$/kHz this translates to an annual license tax of \$30,000.00. This

OPEN

fee will render many envisaged applications commercially unviable in Australia. For example, the use of large constellations of small low-cost satellites, optically communicating with multiple ground stations, each with its own transmitter, will presumably incur this fee for each transmitter.

2. A communications laser of modest total power level (e.g. 0.1 Watt) by virtue of its very narrow divergence (e.g. 100  $\mu$ Rad) has a very large EIRP (e.g. 120 M Watt), and therefore will not qualify as a low-power device (defined by ACMA to have a radiated power level of 8.3 watts EIRP or less, and designed for operation within a radius of 2 kilometres). Thus, even a very low power satellite communications laser will not qualify for a low-power discount under the current pricing framework.
3. Thales is not aware of any other countries with licensing requirements extending into the optical spectrum. In fact, most other countries only regulate to 3 THz, and the International Telecommunication Union (ITU) also only regulates to 3 THz. This disparity makes Australia uncompetitive, both regarding development activities, and also regarding the establishment of the required ground stations.

Thales believes that the best strategy is to change the legislation to align with the global practise of only regulating to 3 THz. Failing that, and acknowledging that there may be merit in some level of management and coordination of optical signals, we would ask that the applicable fee be substantially reduced (for example by a factor of 100) for frequencies above 3 THz. This can be justified by acknowledging that the very small wavelengths enable very narrow beam widths, and thus support what are essentially point to point links, rather than the "broadcast" nature of many lower frequency RF transmitters. The narrow beam point-to-point optical links are much less likely to cause interference or spectral denial and therefore offer opportunity for much greater frequency reuse.

We note that this issue of regulating frequencies above 3 THz has not been addressed in the referenced Spectrum Pricing Review, however Thales believes that without change the current regime will make Australia uncompetitive for satellite optical communications, both regarding development activities, and also regarding the establishment of the required ground stations, when compared with other jurisdictions.

Please do not hesitate to contact me should you have any questions or require further clarification.

Yours sincerely



**Michael Clark**  
Director Technical Strategy  
M: 0413 980 086  
michael.clark@thalesgroup.com.au

OPEN