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ACS Response to Federal Government's Consultation Paper: Radiocommunications Bill 2016

29th April 2016

Dear Sir/Madam

The ACS is delighted to have the opportunity to respond to the Federal Government's Consultation Paper on the ***Radiocommunications Bill 2016***. The ACS response is limited to technical considerations, offering recommendations which consider future developments of radio communications.

The ACS is supportive of the government's intention (as announced in August 2015) to implement the three main recommendations of the 2015 Spectrum Review Report, and with those recommendations, is supportive of the government's goals to:

- simplify regulatory structures for planning, licensing and equipment regulation;
- streamline regulatory processes, particularly for allocating licences;
- clarify the role for Government, the Australian Communications and Media Authority (ACMA) and spectrum users;
- bring broadcasting spectrum into the general spectrum framework while also providing certainty for the broadcasting sector; and

The rapidly increasing demand for mobile data and communications services has been a strong motivator for increasingly efficient and flexible use of radio spectrum. The surge in traffic volumes has motivated mobile operators in all countries to invest heavily in new spectrally efficient technology and to acquire new blocks of radio spectrum. It has also spurred research into more sophisticated spectrum sharing techniques, from adaptive beamforming antenna systems to dynamic spectrum sensing to support detect-and-avoid.

A related phenomenon is the rapid increase in machine-to-machine communications (M2M), heralding the anticipated upsurge in demand from a future Internet-of-Things (IoT). The widely varying demands from potentially hundreds of millions of sensors and devices - connecting over timeframes ranging from seconds to weeks, over distances from centimetres to many kilometres - represents very different use cases and design challenges to those of existing mobile networks. It raises new spectrum sharing opportunities and supports new thinking of spectrum as a flexible resource rather than spectrum seen in the sense of real estate.

The ACS is of the strong view that future allocation and use of dedicated spectrum must be considered in light of alternate uses which generate greater economic or social value. Whilst supporting the critical

business operations of operators and primary spectrum users, new regulation must not inadvertently exclude the widely anticipated benefits of an IoT enabled Australia. The widespread uptake of ISM (Industrial, scientific and medical) band applications have shown the diversity, creativity and value created by users of unlicensed spectrum. As future networks become more complex and more able to take advantage of multiple available resources, the boundary between applications using licenced and unlicensed spectrum will continue to blur.

It is acknowledged that guaranteed access to spectrum is vital for operators to deliver services to customers and that access to spectrum is a competitive differentiator for operators. It is also acknowledged that existing commercially available mobile devices are currently only able to span a small number of radio bands. The result is increased commercial pressure to acquire and retain exclusive access to certain parts of the radio spectrum in particular in heavily populated areas.

The scarcity of spectrum coupled with the projected dramatic increase in mobile traffic mean that future mobile systems (5G and beyond) will utilise a much wider range of spectrum bands than used in 4G allowing future mobile services to be more opportunistic in the radio resources utilised. Like many other systems where capacity is designed around peak demand, there is likely to be unused capacity (or underutilised spectrum) in off-peak times. Noting the complex relationship between network capacity, spectrum, transmit power and user spatial separation, it remains technically feasible for primary licensees of spectrum to temporarily release spectrum for other uses. Operators may be willing to sell access to spectrum in off-peak times subject to a range of considerations.

Efforts to realise uncoordinated dynamic use of spectrum (such as dynamic detect and avoid, or overlay systems such as spread spectrum) have been explored by researchers and some industry players, however mainstream technology is not yet at the point where primary spectrum users can be guaranteed the same quality of service as an unshared spectrum environment. A different approach to spectrum sharing could be drawn from companies operating in "sharing economy" industries (such as GoGet, Uber or AirBNB). The spectrum equivalent may be to allow alternate users to reserve blocks of spectrum (as opposed to underutilised network capacity) for defined blocks of "space and time" offered by operators. Similar to companies in the sharing economy, it is feasible to require prospective alternate users of spectrum to be members of a community which pre-qualifies transmit power, bandwidth and other fundamental network parameters. The possibility also exists for operators to consider offering dynamic pricing to the community of users depending on short term demand.

The ACS's detailed responses to the questions posed in the Consultation Paper are in the Attachment to this document. A summary of recommendations is as follows:

1. Licenced spectrum should not be unused: Reflecting the scarcity of radio spectrum and recognising communications as a driver of national productivity, "use it or lose it" regulation should be considered in Australia as is being explored in countries including USA, Canada and South Africa, requiring the licensee to demonstrate use to maintain a licence.

2. Unsold Licenced spectrum should not be unused: Similar to the point above, licenced spectrum which remains unsold for a period of time may be considered for returned to the pool of unlicensed spectrum or made available in discrete blocks of time and space for potential alternate users.

3. Treating spectrum during “off peak” times as a shareable resource: The opportunity exists to take lessons from the sharing economy where potential alternate users can access spectrum in discrete blocks of time and space. Requiring potential alternate users to be members of a registered community will help to reduce transaction costs, help to ensure a level playing field and help with dispute resolution.

The ACS commends the Government’s focus on reform of Radio Telecommunications. If you require any further information regarding this submission, please contact Athol Chalmers, ACS Director, Policy and Public Affairs [redacted]

The ACS stands ready to support the Government’s ongoing reform of Radio Telecommunications.

Yours Sincerely

[redacted]

Andrew Johnson
Chief Executive Officer, ACS

ATTACHMENT

Item 6 – Licensing of Spectrum

Current arrangements:
The current Act provides for the use of market mechanisms, alongside administrative and commons approaches, to manage spectrum. While this model has served Australia well, the proliferation of new digital technologies and communications services exposed the lack of flexibility of existing spectrum management tools.

The rigid boundaries between licence categories (spectrum, apparatus and class licences) and the prescriptive rights that apply under the Act have limited the ACMA's ability to design licences that meet users' needs and opportunities for licence holders to trade and share spectrum.

While the current Act provides for licences (apparatus and spectrum) to be transferred, traded or for third party authorisations to be granted, secondary market activities have been limited by a number of factors including:

- *the specific nature of licences (that is, not sufficiently generic to be tradeable);*
- *lack of interest from industry or emergence of a trading market;*
- *there may be insufficient information available to the market; and*
- *lack of certainty regarding renewal rights.*

The Review recommended reforms that would facilitate greater market-based activity. Conversion and/or reallocation from apparatus to spectrum licences involve complicated and lengthy processes which may serve as a barrier to secondary trading.

ACS Comment on Proposed Approach:
The ACS encourages to the government to go beyond the proposed change to the point of treating spectrum during "off peak" times or in thinly populated areas as a shareable resource.

The ACS is broadly supportive of the currently proposed position whereby the Bill would establish a single licence category and will facilitate and encourage secondary market activities, by allowing assignment, sharing and subdivision (subject to any licence restrictions).

The ACS encourages to the government to go beyond the proposed change to require licences to much more flexibly address parts of the spectrum, geographic information (area/site); and payment of any applicable charges (including taxes). The short time bound use of spectrum should also be considered.

The rapid increase in machine-to-machine communications (M2M), heralding the anticipated upsurge in demand from a future Internet-of-Things (IoT) is driving the need to make most efficient use of all available spectrum. Figure 1 shows one future view of telecommunications need from vendor Nokia highlighting that by 2030 the traffic per subscriber per day will be more than 30 GB and Subscriber density may be as much as 100,000 users/km^2, with "Busy hour" traffic representing only 10% of the daily traffic. Nokia projects that these requirements will necessitate a 5G system that can support ~1 Tbit/s/ km^2 in 2030.

The widely varying demands from potentially hundreds of millions of sensors and devices - connecting over timeframes ranging from seconds to weeks, over distances from centimetres to many kilometres - represents very different use cases and design challenges to those of existing mobile networks. It raises new spectrum sharing opportunities and supports new thinking of spectrum as a flexible resource rather than spectrum seen in the sense of real estate.

Many studies around the world have shown the both licenced and unlicensed are substantially underutilised during off peak periods or in thinly populated areas [1,2]. An occupancy chart taken from [1] is shown in Figure 2.

The opportunity exists to take lessons from the sharing economy where potential alternate users can access spectrum in discrete blocks of time and space. Requiring potential alternate users to be members of a registered community will help to reduce transaction costs, help to ensure a level playing field and help with dispute resolution.

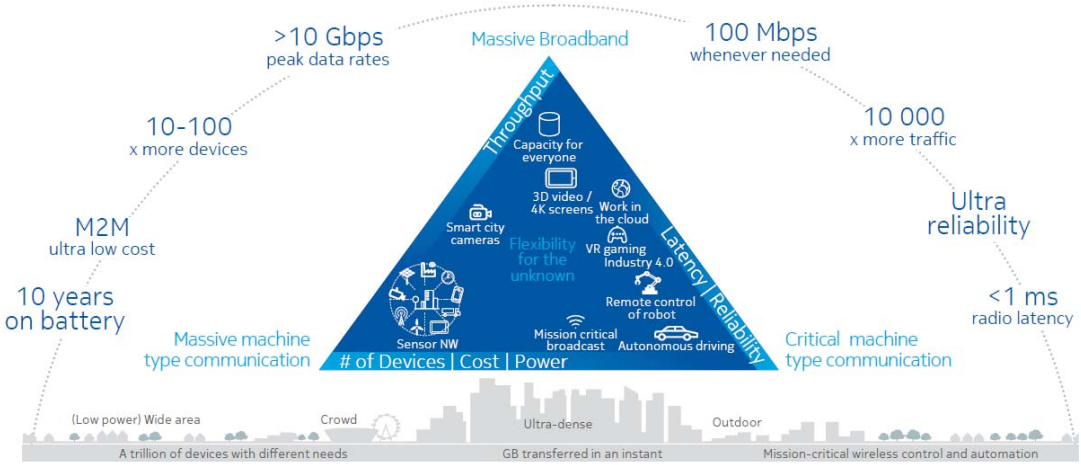

Figure 1. Nokia view of Future telecoms needs [Source: Nokia]

[1] See for example M. Cotton, J. Wepman, J. Kub, S. Engelking, Y. Lo, H. Ottke, R. Kaiser, D. Anderson , M. Souryal, M. Ranganathan "An Overview of the NTIA/NIST Spectrum Monitoring Pilot Program", IEEE Wireless Communications and Networking Conference, New Orleans, LA, March 9-12, 2015.

[2] See for example Vaclav Valenta, Roman Marsalek, Genevi`eve Baudoin, Martine Villegas, Martha Suarez, et al., "Survey on Spectrum Utilization in Europe: Measurements, Analyses and Observations." 5th International ICST Conference on Cognitive Radio Oriented Wireless Networks and Communications, Jun 2010, Cannes, France. pp.ISBN: 978-963-9799-94-3, 2010. <hal-00492021>

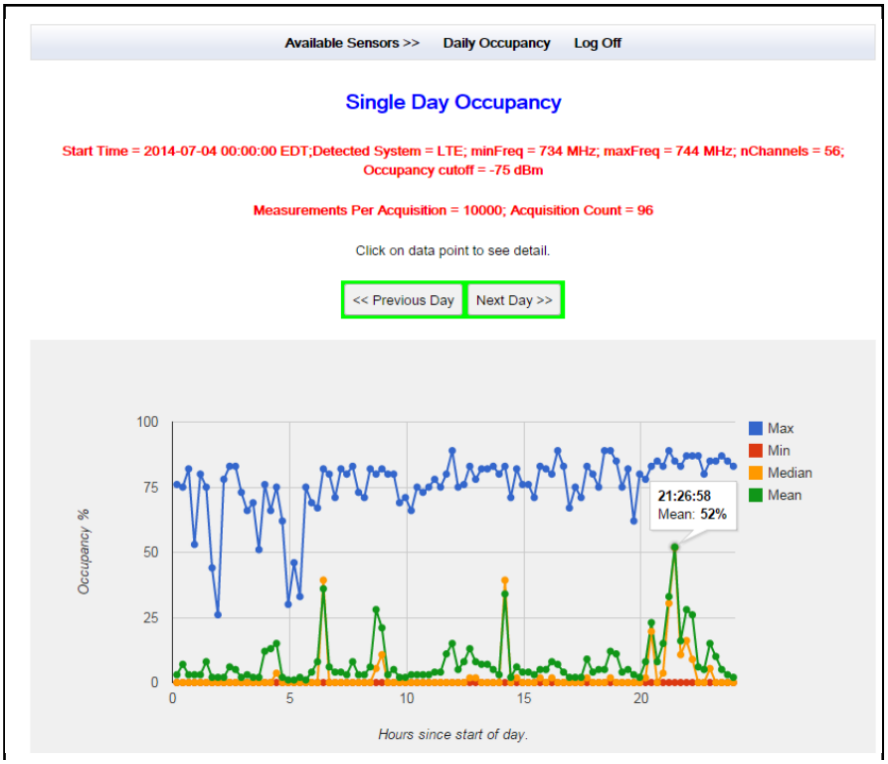

Figure 2. occupancy chart from 1 (Chart 6) displaying a 24-hour period, where each data point corresponds to the band occupancy of a single acquisition.

Item 10 – Resumption

Current arrangements:
The current Act enables the ACMA to resume spectrum licences by agreement or by compulsory process but only with the Minister's approval. Two schedules to the Act set out the detailed process to apply for compulsory resumption as well as the mechanism for determining any compensation payable.

The Review recommended the new Act retain the right to compensation for resumption but noted that it would continue to be a last resort in limited circumstances

ACS Comment on Proposed Approach:
The ACS encourages to the government to consider a model which requires the licensee to demonstrate use to maintain a licence. For example, in the USA, the FCC issues a licence for only 12 months on E-band routes, and requires terminal equipment to be installed on each end before the 12-month period expires. Failure to do so means the right to the spectrum is lost.

Reflecting the scarce nature and spectrum and recognising communications as a driver of national productivity, broader "use it or lose it" regulation is being explored in countries including USA, Canada and South Africa.