

## Summary and Additional Comment

Silver Spring Networks is grateful for the opportunity to respond to Ofcom's consultation centered on LE use of spectrum and is pleased to provide feedback on several aspects of the strategy. In addition to LE categorization of spectrum, we also encourage a "light-" or "right-licensed" approach to allocation, particularly where market based approaches have not led to innovation--particularly in the general M2M sector, where low ARPU applications attract scant attention from major market players. Ofcom has proved itself to be a constructive and forward-looking regulator that has consistently administered the management of radio spectrum in the UK in a way that maximizes its utility for the country. Silver Spring Networks applauds Ofcom's thoughtful output and warmly welcomes the extension of the proposed strategy for utility/infrastructure/M2M use at 870 - 876 MHz. On points of detail, Silver Spring Networks has the following comments.

### *Thoughts on secondary trading/rights of transfer*

We applaud trends towards spectrum trading, as we applaud the trend towards other liberalised forms of spectrum use, which is in evidence across the whole of Europe. In ETSI's ERM TG 28, Short Range Device (SRD) group, the concept of 'light' or 'right' licensing is under consideration. This allows users unlicensed access to the band, but with restrictions to protect groups of applications types that share the band. We believe that this is an excellent means to gain both spectral efficiency and extract societal benefits while serving multiple user constituencies and applications. We note that ECC / CEPT WGFM has as of May 2011 approved a roadmap that includes strong consideration of utility use of 870 - 876 MHz for Smart Grid and Smart Meter applications. We encourage Ofcom to take an accelerated, proactive approach to allocating this spectrum given societally critical mandates for Smart Metering and the imminent need for capable communications networks for grid reliability. We refer Ofcom to our consultation response regarding 872 / 917 MHz in November 2009.

### *Thoughts on enabling technologies*

Silver Spring Networks generally applauds Ofcom's proposals to explore advanced techniques for sharing spectrum and believe that, in this way, the efficiency with which spectrum can be utilized is further maximized. We believe that Ofcom should consider the use of Frequency Hopping Spread Spectrum (FHSS) as a further technique for increasing spectral efficiency in suitable bands.

### *Thoughts on Licence-exempt SRDs*

Silver Spring Networks agrees that spectrum should only be made available to SRD applications on the condition that there is a clear and demonstrable need, but that such a need clearly exists today for Smart Metering and Smart Grid, and so Ofcom should support work being carried out in CEPT (WGFM) and ETSI to release spectrum from 870-876 MHz for use in Smart Grids as a minimum.

### *Thoughts on Machine to Machine Communications and the Use of Spectrum for Critical Infrastructure*

Multiple networking technologies will be required to support the Smart Grid. Smart Grid architectures have distinct networks for backhaul (WAN), meters and other distribution grid devices (NAN, or neighborhood area network), and the home (HAN, or home area network). While they may well play an important role, none of the currently available technologies such as powerline carrier (PLC), cellular (e.g., GPRS, 3G), or fixed consumer broadband can fully meet the requirements described above. The combined requirements of ubiquitous reliable coverage and very low operating cost make the NAN particularly challenging for current technologies.

Powerline carrier (PLC) is an acceptable technology for basic meter reading, but very low throughput and slow, unpredictable response times lead many to question its suitability for the broader set of smart grid requirements. Its broadband cousin, BPL, offers higher throughput and better responsiveness, but at a very high capital cost and with variable performance in the field. Perhaps next generation technologies will overcome these hurdles, but this remains to be seen. Should these technologies prove useful, many vendors will consider “hybrid” technologies that employ both mesh and PLC

Consumer broadband connectivity (e.g., cable modem, DSL), or fibre to the curb or home, has been experimented with by some small utilities in other countries. However, most utilities are very reluctant to share a mission-critical grid management connection with a consumer who has PCs, routers and other devices connected over the same link. The main concerns are security, performance degradation from other uses such as movie downloading, and fear of disconnection if the consumer’s service is discontinued for any reason. Lack of ubiquity is the biggest challenge of all.

Tower-based, star-topology (non-meshing) systems have also been proposed. These, too, might be well suited for basic meter reading. However, potentially low upstream throughput and long round-trip times may make it difficult to meet the latency requirements for full Smart Grid -- for example, hundreds or thousands of electric vehicles simultaneously presenting security credentials upstream prior to charging. The lack of operating history for these new networks also creates additional risk that many utilities find unappealing. Existing networks offer the ability to leverage past investment in a shared infrastructure. However, these too may have difficulty in fully meeting the requirements:

Given the perceived shortcomings of the other currently available solutions, GPRS or 3G are often seen as the “default” choice for smart metering. Given the wide deployment and market power of mobile operators, cellular undoubtedly has a role to play in Smart Grid. Indeed, the coverage to mobile handsets is to be applauded. However, once again, this option will only partially meet requirements at scale, for a number of reasons. By most estimates, GPRS coverage of indoor electric meters is only 80 - 85% owing to the fact that you cannot move your electric meter or other grid devices. The cost of building out the cellular network to provide 100% coverage is likely to be cost-prohibitive, especially given the other requirements to be met: very low capital and operating cost; flat rate “all-you-can eat” pricing independent of time of day and data volume; 15 year service longevity (and no SIM card change-outs) in an industry where planned obsolescence is acceptable and, in fact, occurs every few years.

Network capacity to handle millions of additional smart grid devices at neighborhood level is also a potential concern. For instance, the ability for star-topology, base stations to field tens

of thousands of asynchronous “last gasps” during large-scale outages renders is questionable. Even if one makes the generous assumption that ubiquitous coverage can be achieved, operating cost is still likely to be a major deterrent to full Smart Grid use of cellular networks. By comparison, US utilities using wireless mesh in the 900 MHz band communicate with the meter, and devices beyond the meter, multiple times per day for US\$0.24 or less per year.

In Ireland, CER recently published a Smart Metering trials report (Electricity Smart Metering Technology Trials Findings Report, CER, 16 May 2011) which highlighted this lack of viable options to provide ubiquitous coverage across the entire Irish landmass and recommending that spectrum be made available in Ireland to allow the introduction of sub-GHz mesh technologies.

### *Thoughts on the Use of White Spaces*

We strongly applaud Ofcom's output regarding the expedited use of White Spaces. The nascent technologies are promising for a broad set of applications, but will require considerable effort to reach broad market adoption, de jure standardization, and sound coexistence. Just as we encourage accelerated outcomes for the 872 / 917 consultation, we encourage Ofcom to move quickly in accelerating viable use market-use of spectrum for technologies that exploit white spaces.

---

With respect to the specific questions, a brief summary of our (*poorly formatted*) responses. (we would like to re-submit in PDF format):

Question 1) Do you agree with our proposal to exempt the land use of 406 MHz PLBs from the need to hold a Wireless Telegraphy Act licence?

We're ambivalent wrt this particular application, though we do laud Ofcom's general trend towards liberalization of spectrum use through LE and "light licencing". We believe that in many cases the result is more spectral efficiency and more value delivered to UK citizens.

Question 2) Do you agree with our proposal to exempt the use equipment for safety related ITS infrastructure from the need to hold a Wireless Telegraphy Act licence?

We agree. In this case, the result is more spectral efficiency and more value delivered to UK citizens.

Question 3) Do you agree with our proposal to exempt the use of terminals operating in the 3400 to 3800 MHz band from the need to hold a Wireless Telegraphy Act licence?

We strongly agree for the reasons cited in the previous question. We have seen this scheme successfully deployed in many other jurisdictions.

Question 4) Do you agree with our proposals for the authorisation of 2 GHz MSS user terminals from licensing?

We agree.

Question 5) Do you agree with our proposal to exempt the use of terminals forming part of the Apollo network by a network station user exemption?

We are ambivalent regarding this particular application, particularly given its transitory nature. We do laud Ofcom's general trend towards liberalization of spectrum use through LE and "light licencing". We believe that in many cases the result is more spectral efficiency and more value delivered to UK citizens.

Question 6) Do you agree with our proposed changes to the current exemption regulations to permit use of non-specific SRDs at 138.2 to 138.45 MHz?

We agree.