Response to OFCOM consultation on"Higher power limits for licence exempt devices" - Submitted by Open Spectrum UK and the OPLAN Foundation

20 September 2006

Dear sirs:

We always value the opportunity to contribute to Ofcom's policy consultations, but in this instance we must preface our remarks with a general observation.

Recent Ofcom actions, such as the commissioning of a series of technical studies aimed at enhancing license-free access to the radio spectrum[1], expanding the UK's implementation of the European Commission's Authorisation Directive[2], and launching consultations aimed at the de-licensing of existing services and the authorisation of new license exempt services[3], show a clear pattern of development which – in our view – is headed in the right direction. *Long may this trend continue!*

Below we answer the individual questions posed in Ofcom's Consultation Document. However, there are a few other significant issues not touched by Ofcom's questions which we want to address first:

In paragraphs 1.10 – 1.12 of the Consultation Document, Ofcom state that

> "The MoD makes significant use of the majority of the 2.4GHz band... MoD has further indicated a willingness to examine whether higher power could be allowed in the bands where it has significant usage but has no resources to devote to this work for the foreseeable future... As a result of the restrictions on the bands where there is significant MoD use, for the moment we can only consider the recommendations on the use of significantly higher powers in bands not used by the MoD, namely in the top 33MHz of the 2.4GHz band..." [4]

We believe there is still insufficient evidence in the public record to conclude that MoD's need for the frequencies below 2.450 GHz is so pervasive – and so easily harmed – that no part of the UK can be opened to sharing by MoD and WLANs operating at powers higher

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[1] *Licence Exempt Application Specific Bands* (end date December 2006); *Economic Assessment of the value of LE Bands* (end date October 2006); *An Investigation of the Use of Wireless for Last Mile Communications* (end date December 2006); *Permitted Interference and EMC Limits Above 1 GHz* end date August 2006); *Higher Frequency bands for Licence Exempt Applications* (end date December 2006); and the study on which the current consultation is based - *Understanding the Scope for a Power Increase for Wireless Broadband Access at 2.4GHz & 5.xGHz* (end date May 2006).

[2] "Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on theauthorisation of electronic communications networks and services" [the Authorisation Directive] Brussels, Belgium: *Official Journal* L108, 24 April 2002.

[3] In addition to the consultation to which are responding, we note the "Wireless Telegraphy Licence Exemption - Amending the Wireless Telegraphy (Exemption) Regulations 2003" consultation which closes 22 September 2006, *Consultation on a proposal to reform ship radio licensing* (closed May 2005), etc.

[4] Consultation Document, page 2 and 3. MoD's use of the 2.400 – 2.450 GHz band is discussed in more detail in paragraphs 3.4 – and 3.5.

than are presently allowed in that part of the spectrum. Indeed, there is evidence leading to another conclusion.

To justify their proposal, Ofcom selectively cite the Cave Audit of Public Spectrum Holdings. It would have been better to cite Professor Cave's comments on current and future uses and his *recommended actions* for the 2.310 – 2.450 GHz band:

> "MoD information on detailed assignments in this band show that the MoD has a multiplicity of uses here and that the band is widely used... However, the current use of the band is a result of an historical build up of assignments. There should therefore be scope for rationalisation of MoD use.
>
> "In addition, WRC-07 is considering international spectrum needs for airborne telemetry and UAVs). This discussion will affect potential future uses for this band and therefore influence the review of use of this band.
>
> "There may also be scope for the other uses in this band (e.g. fixed links) to be rationalised, which would also need to be taken forward by the MoD as the primary user of this band... New sharing technologies may provide new sharing opportunities in this band in the future."[5]

An earlier study by Aegis Systems Ltd. (commissioned by the Spectrum Management Advisory Group) lends further support to the option rejected by Ofcom, to let higher-power WLANs share the band with MoD. Aegis noted that there is some sharing already, some use of geographically limited exclusion zones, and methods for resolving interference problems as they arise:

> "...other users of the bottom half of the ISM band are required to take account of military operations either on a proactive basis (e.g. some ENG / OB channels are not made available in certain parts of the country) or on a reactive basis (e.g. for licence exempt devices continuing to operate until interference occurs and an instruction to cease transmission results). Historically, consultation with the MoD has enabled additional services to be introduced to the band (e.g. Automatic Vehicle Identification, AVI, for trains in the band 2446 - 2454 MHz, the bottom 4 MHz of which falls within the military band)..." [6]

Why not allow unlicensed WLANs to operate at higher powers in the 2.400 – 2.2450 GHz band – at least in some parts of the UK – "until an instruction to cease transmission" is issued by MoD? Even if this requires the registration of higher-power WLANs, or the use of

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[5] *Independent Audit of Spectrum Holdings by Professor Martin Cave for Her Majesty's Treasury – Final Report* (December 2005), page 103

[6] Spectrum Management Advisory Group, *Demand for use of the 2.4GHz ISM Band - Final Report* (31 July 2000), pages 4 – 5. This report was actually written by Aegis Systems Ltd.

"geographically aware" or GPS-enabled equipment, or the restriction of operating rights to equipment installed at fixed locations, such limitations would be far better than a complete nationwide ban on the use of this spectrum by higher power WLANs.

It is true that Scientific Generics did not recommend the authorisation of higher power WLANs below 2.450 GHz in their report on the topic of this Consultation: "Between 2.4GHz and 2.45GHz MoD applications may suffer interference because there is no mitigation..." [7]

But what if mitigation measures were required, as they are in the 5.8 GHz band? Would that not provide an additional basis for allowing unlicensed WLANs to operate at higher powers in the 2.400 – 2.485 GHz spectrum, at least in some areas of the UK? Adaptive Frequency Hopping (AFH) is already implemented by some unlicensed devices in the 2.4 GHz band, and Dynamic Frequency Selection (DFS) - required for WLANs to operate at 5.8 GHz - might meet the needs of lower bands, too.

We strongly support the option of authorising the unlicensed operation of WLANs at higher powers than presently allowed in the 2.400 – 2.450 GHz band, but recognise that some conditions or limitations may need to be imposed to protect MoD: These conditions might include:

> Operation only at fixed locations
> Operation only outside geographic exclusion zones.
> Registration or required use of location-aware equipment
> Use of appropriate mitigation techniques
> Channels for issuing and enforcing "cease and desist" orders to interferers
> etc.

Not *all* of these measures should be required simultaneously. Our list is only meant to suggest how many options are actually available. *We urge Ofcom to make a further study of practical options enabling WLANs to operate at higher power in the 2.400 – 2.450 GHz band without undue interference to MoD, rather than make a quick decision not supported byall the facts, and not balanced with Ofcom's other duties:*

> "Ofcom has a duty to ensure that a wide range of electronic communications services – including high speed data services – is available throughout the UK. Ofcom has indicated that by the end of 2007/8, its 'aim is to have encouraged the development of an environment in which there is much more competition and innovation in broadband networks and services'." [8]

The policy option proposed in this Consultation – a complete nationwide exclusion of higher-power WLANs from most of the ISM band – is clearly excessive and would harm the public by unnecessarily depriving them of more affordable and more widespread broadband wireless access throughout the UK.

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[7] Scientific Generics, *Understanding the Scope for a Power Increase for Wireless Broadband Access at 2.4GHz & 5.xGHz - Final Report*: *V1.0* (10 May 2006), page 7.

[8] Prime Minister's Strategy Unit and the Department of Trade and Industry, *Connecting the UK: The Digital Strategy*, March 2005, page 47.

Now, onto the questions:

Q1: Have all the possible victims of interference been correctly identified and quantified as far as possible?

Scientific Generics admit they were unable to quantify the cost to MoD of dealing with increased interference, and Prof. Cave points out that WRC-07 will soon change MoD frequency options. Further study of these issues by independent (i.e., non-MoD) experts might show MoD's costs to accommodate higher power WLANs are actually rather limited under specific conditions, or far less than the benefits accruing to society from additional Internet access. The limits on operating conditions suggested above may provide a framework for further study of these questions.

Q2: Have the costs and benefits been correctly captured? In particular, are the costs of interference to WLANs appropriately assessed?

See previous answer.

In addition, we believe that the benefits of higher power allowances for 2.4 GHz WLANs are seriously underestimated in the consultants' report.

Many municipalities in the UK have announced plans to create urban "hot zones" using 2.4 GHz to cover central business districts or even the entire municipality. The most ambitious project announced so far is The Cloud's:

> "The Cloud today announces a major initiative to deploy widespread wireless broadband networks in city centres throughout the UK. The plan to have 'clouds' of wireless broadband internet access over the UK's major centres of population, will begin with nine city centre areas. This is the first major initiative to bring coverage to multiple cities simultaneously since mobile phone networks were built in the early 90s and will allow more than 4m people to connect to the Internet without wires.... Hundreds of WiFi hotzones will be rolled out in the city centres of Edinburgh, Leeds, Manchester, Birmingham, Nottingham, Oxford, Cambridge, Liverpool and the three London Boroughs of Kensington and Chelsea, Camden and Islington. It is expected that more cities will also be announced throughout 2006..."[9]

Current limits on power output make comprehensive coverage very expensive, because large numbers of closely-spaced based stations must be deployed and provided with backhaul links. Raising the power allowance would increase the coverage area of each

[9] "Major new initiative to bring wireless internet access to Britain's city centres announced," The Cloud (press release), 1 March 2006

base station and greatly simplify the support network of backhaul links. The cost reductions for projects announced thus far should be included as benefits, in addition to the social benefits provided by the coverage itself. In addition, the availability of wireless coverage at lower cost will cause a reduction in the prices for other means of Internet access, such as DSL and cable. These are benefits to consumers that should also be included in the benefits estimate.

In rural areas, the benefits of broadband access are well-documented and government initiatives have made great strides in bringing DSL to areas where BT said it was "not economically viable".[10] But because rural telephone exchange areas are larger than urban telephone exchange areas, rural customers are more likely to encounter DSL "reach" limitations. Thirteen per cent of the Country Land & Business Association's 40,000 members are reported to be more than 3.7 miles from their local telephone exchange, for example.[11] That means at least 5,200 rural businesses have minimal or no DSL service, because DSL data speeds decrease rapidly with distance from the exchange, even if their exchange is DSL enabled.

Many new agricultural applications utilising WiFi for remote monitoring and control – to improve productivity and reduce farmers' workload - are left out of the consultant's calculations because they are not yet widely deployed in the UK.[12] If the power limit were raised in rural areas, we are sure that they would be used. And by limiting the discussion of benefits to those which are easy to measure in monetary terms, those constituting qualtative improvements are ignored. The "nomadic freedom" offered by WLANs is important but hard to quantify, and in rural areas, stopping young people from migrating to cities to gain better access to information and services is also crucial

Q3: Are there any other mechanisms that could be used to restrict device operation to appropriate areas? Of the schemes set out which should be preferred?

See above.

Q4: Should we move from specifying radiated power to specifying conducted power?

YES!

Q5: For 2.4GHz which of these options do you favour? Are there other viable options that should be considered? Or should regulations be left unchanged?

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[10] BT's chairman, Sir Christopher Bland, told the parliamentary select committee for Culture, Media and Sport that "it simply is not economically viable for BT to roll out ADSL to parts of Britain that are sparsely populated..." reported by Graeme Wearden in "Rural areas face 20-year wait for broadband", ZDNet UK, 5 February 2002 – available online at http://news.zdnet.co.uk/communications/0,39020336,2103764,00.htm

[11] Figures from "Countryside enjoys net gains" by S. A. Mathieson, *The Guardian*, 26 August 2004 – available online at http://technology.guardian.co.uk/online/story/0,3605,1290402,00.html

[12] See, for example, "Agribusiness Telecommunications: High-tech Opportunities in Remote Farming" by Athena Platis, (US) National Telecommunications Cooperative Association, March 2004 – available online at http://www.ntca.org/content_documents/ePaper_Agribusiness.pdf

PROPOSAL: Allow even higher power (over 10 w) with location awareness in hamlets and villages, higher power as proposed in the Consultation Document, with registration in rest of England.

Q6: For 5GHz should Ofcom increase the power to 4W EIRP at 5.8GHz in accordance with ECC Recommendation and as set out in the draft IR2007? Should Ofcom open the database for public access to facilitate coordination?

Yes.

Open Spectrum UK (OSUK) is a coalition of non-profit organisations formed in January 2005 to work for the expansion of license exempt use of the public airwaves. Most of the organizations participating in OSUK are actively engaged either in developing and managing community-based wireless networks, or in policy research and advocacy. Community networks have an interest in radio license exemption because it is a policy that speeds network deployment, increases adaptability and reduces costs. Policy advocates are interested in license exemption because it accelerates economic development, encourages innovation, increases the efficient use of limited resources and expands freedom of communication. OSUK's first collaborative effort was the drafting and submission of a joint statement for Ofcom's "Spectrum Framework Review" consultation in February 2005.[13] Since then, we have organised public and private events to promote awareness of "open spectrum" ideas, most notably at the London Science Museum, where we co-hosted two public workshops with CyberSalon during 2005[14], and at the "Wireless Event" (17-18 May 2006), when we organised a panel on international regulation.

This consultation response is also supported and co-signed by the OPLAN Foundation. An independent, nonpolitical and not-for-profit organisation with headquarters in London, which seeks to build wider awareness and understanding of the social and economic benefits that Open Public Local Access Networks deliver to their communities, the OPLAN Foundation was founded by Malcolm Matson (who also founded COLT Telecom Ltd.).

[13] Online at http://www.ofcom.org.uk/consult/condocs/sfr/responses/openspectrum.pdf

[14] "Wireless Utopias 05: An Open Future for Spectrum?" (26 May 2005) and "Future Wireless" (4 October 2005).