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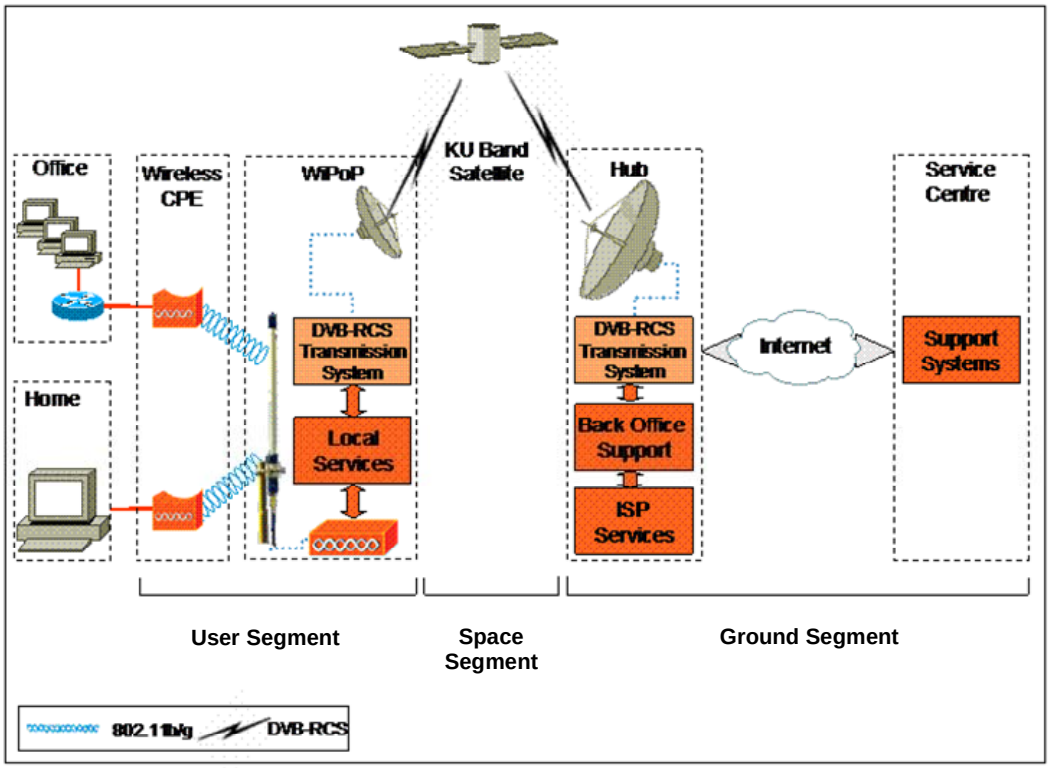
Consultation for Higher Power Limits for Licence Exempt Device (Understanding the scope for a power increase at 2.4 and 5 GHz).

Avanti Broadband Background

Avanti Broadband Ltd is a Wireless ISP providing rural broadband solutions for both the residential and business market through the use of 802.11 a/b/g and satellite backhaul.

By combining the low cost customer premises equipment (CPE) based on the 802.11 standards and using highly efficient satellite access technology based on the DVB-RCS standard Avanti can provide cost-effective residential broadband services for isolated rural communities with as few as just 10 users in a service area of 3 km diameter (see comments on range below). Avanti own and operate the satellite hub and install the Wireless Points of Presence (WiPoPs) consisting of the two-way satellite terminal (typically 75 cm dish) and a Wireless Access Point using in-house installers. The CPE is an external wireless router that interfaces with the customer's own equipment at Ethernet, this hardware is also installed by Avanti engineers (see diagram).



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We have just completed a contract with the West Midlands Regional Development Agency to provide infill to areas with no terrestrial broadband service.

In earlier deployments Avanti used 2.4 GHz equipment for the end-user access (CPEs) simply because the cost of the hardware was much lower. The use of 5 GHz was restricted to local point-to-point links (backhaul) to link adjacent cells. However, from the beginning of this year the supplier of the CPE announced that with the new generation of chipsets that the WAP would be multi-band (802.11 a and b/g) as standard and there would be no price difference any longer between a 2.4 GHz 802.11 b/g CPE and a 5.4/5.8 GHz 802.11a CPE - this is different information from the reported Industry Interviews (paragraph 2.4 of consultation document). Given some experience with increasing interference in exiting 2.4 GHz deployments we have been deploying 5.8 GHz CPEs since March 2006.

However, practical results show, that even with the higher power levels allowed (up to 2 watts) the 5.8 GHz band is more difficult to deploy and has lower range and is particularly sensitive to any obstruction to line-of-sight. For these reasons we are now returning to 2.4 GHz in any areas where interference will not be an issue. Increase in power is therefore interesting in both bands, but mainly to improve range and simplify installations by reducing sensitivity to obstructions – i.e. reducing cost of deployment.

From this experience there are some issues not captured in the initial study:

i) Cost of 5 GHz equipment is falling fast and most is now dual standard
ii) Most 5 GHz equipment covers all the sub-bands A, B and C, many users are not aware of the regulations pertaining to the use of these bands and it is not unusual to find networks operating for example in the lower bands which are technically reserved for mobile use.

Responses to Consultation Questions:

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

A1: This is question is beyond the competence of Avanti Broadband, but from a practical point of view we do believe that the use of 5 GHz 802.11a compatible equipment is often not in accordance with the current licensing regime.

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

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A2: Avanti are not able to comment about the assessment of costs of interference, however if there are benefits to be gained from increases in power then the resulting increase in interference must be adequately controlled. The main economic benefit we see of increase power is greater range and the ability to overcome non-line of site, particularly trees in rural areas. This would bring down the cost of deployment significantly.

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?

A3: To minimise interference and maximise the benefit of higher power and to provide some protection for existing ad-hoc networks it is wise to limit the use of higher power devices by some from of light licensing regime. This will ensure that the location of higher devices is at least recorded. The cost to have location aware devices is too high and does not mitigate the need for a central database to co-ordinate interference.

The question of enforcement is the main issue here, but responsible operators will register in order to gain protection, if the date of registration (not operation) is deemed to grant some priority then there is additional incentive to register. These registered operators will report interference and if there is an unacceptably high level of interference from unregistered devices Ofcom will have to take some action (wider publicity, enforcing licensing when non-registered operation is reported)) to encourage compliancy.

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

A4: Since Avanti generally use omi-directional antennas we are not affected by this question, however we have a slight preference for conducted power as long as this does not cause additional delays to implementing the changes.

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

A5: To benefit as quickly as possible from the proposed power increases it is important not to enforce changes to the hardware, for that reason we do not support location aware devices (also increases costs). We support option 3 which allows rapid deployment of higher power devices (for example our existing 2.4 GHz equipment can operate up to 1W EIRP today) while providing a sensible mechanism for interference co-ordination through mandatory registration scheme.

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

A6: Yes we agree that the power should be increased to 4W as proposed. Regarding the opening the database for public access we suggest the following compromise:

i) Location of WAPs is commercially sensitive information; indiscriminate public access may result in operators resisting licensing altogether.
ii) Access for co-ordination is essential, the quicker the better (i.e. online).
iii) Access should be granted on the basis of a notification of interference is being experienced to Ofcom by a licensed operator in a given location and a search is then authorised (automatically) of all possible sources of interference in that area. This could easily be an online process with no manual intervention from Ofcom.
iv) This avoids indiscriminate use of the database by individuals or companies simply trying to discover information relating to competitors networks and not based on co-ordination for interference. It would generate automatic interference notifications that Ofcom can monitor and intervene as necessary.