

Higher power limits for licence exempt devices – Understanding the Scope for a Power increase at 2.4 and 5 GHz

Executive summary

T-Mobile welcomes the opportunity to comment on Ofcom's Consultation on "Higher power limits for licence exempt devices".

T-Mobile is strongly opposed to the proposal to increase the power levels at 2.4GHz.

T-Mobile has made a substantial investment in Wireless LAN deployment at 2.4 GHz. T-Mobile has deployed 15,000 WLAN hotspots world wide and 1,100 in the UK. T-Mobile is concerned that some of the proposals made in this consultation will impact on this investment, as well as having significant impact on consumers who use devices in the 2.4GHz band. In the light of this investment and consumer detriment T-Mobile believes implementation of Ofcom's proposals would be contrary to its statutory duties.

T-Mobile accepts that there may be clear benefits to increasing power levels in the 5.8GHz band, but this is not the case in the 2.4 GHz band.

2.4 GHz

T-Mobile does not believe that the mechanisms proposed to restrict devices to geographical areas can be enforced within the 2.4 GHz band. We are therefore concerned that higher power devices would be deployed in urban areas resulting in a general increase in the noise floor and specific interference into both WLAN hotspots and to self provided equipment in residential homes. The costs to operators and consumers have not been fully considered in the impact assessment (see Annex 1).

T-Mobile does have concerns that by moving to conducted power there is further scope for increased interference. Noting the international dimension to the 2.4GHz band, we would support further analysis within a CEPT forum on the impact to moving to conducted power. T-Mobile believes that a restriction on the maximum gain or EIRP will still be needed in addition to a power limit.

T-Mobile would propose that the regulations are left unchanged. The 2.4 GHz band is a unique band, heavily used for a variety of purposes. The number of WLAN hotspots is increasing in the UK: Ofcom's annual Communications Market Report for 2005/6 states that "the UK is second only to the US in the league table of public hotspot numbers, with over 14,000. Nearly all urban areas in the UK are covered by numerous hotspots – in cafes, bars, stations, shops and public spaces".

T-Mobile believes that higher power systems should only operate in licensed bands where the interference can be managed.

5.8 GHz

T-Mobile supports the proposal to increase the power to 4W EIRP at 5.8 GHz in accordance with ECC Recommendation (06) 04. We also agree that the database should be opened for public access to facilitate coordination.

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

T-Mobile notes that there have been sufficient studies to justify the increase in power at 5.8 GHz to 4W.

We do not believe that the full costs of increasing power in the 2.4GHz band have been included.

We are concerned by the statement in paragraph 3.58 “for the bands where we are currently considering increased power, the only significant area of interference is expected to be business WLAN users”. T-Mobile has deployed 1,100 WLAN hotspots in the UK. Consumers use WLANs in hotspots as well as in their homes, the effect on consumers and operators does not seem to have been fully considered.

A recent survey showed that around 20% of broadband users use WLAN in their homes¹, this is a substantial number which would be expected to continue to grow over time.

We are also concerned that there would be more interference between Bluetooth devices and WLANs if the power levels were increased. Interference would be expected between Bluetooth and 802.11b devices, particularly when Bluetooth is used in a call and has the 802.11b client device in close proximity (which is the main usage scenario of these technologies). The interference would extend to both voice over Bluetooth services and Bluetooth data services using only single access points and single devices. BT’s use of Bluetooth in its Fusion phone is one example of where the problem may occur.

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

T-Mobile notes that Scientific Generics have estimated costs of interference from high power WBA into WLAN, ranging between £600,000 at current power levels to £18m at 80W EIRP. This is the cost of business users changing equipment to 5.2 GHz to avoid interference. T-Mobile believes that these costs are underestimated. T-Mobile believes that there are a number of assumptions that are not correct and that the benefits will not outweigh the costs.

Scientific Generics have assumed that WBA systems in the 2.4GHz band would be Wi-Fi or modified Wi-Fi. This may not necessarily be the case and no account has been taken of other technologies which will cause greater interference into WLAN networks. We are particularly concerned that technologies such as High powered Video Senders and cordless phones could be deployed across the UK resulting in unacceptable interference into WLAN networks.

No account seems to have been taken of the increasing number of Bluetooth devices in use or to other applications such as Zigbee (802.15.4).

¹ http://www.theregister.co.uk/2006/05/11/wireless_wifi/

We do not see any consideration of the cost associated with interference to WLANs operating in Hot spot locations such as coffee shops, airport lounges, railways, hotels and University campuses.

An option for operators would be to move to dual mode WLAN networks. However many consumers do not have dual mode equipment, so this would require consumers to purchase additional equipment, as well as requiring operators to swap out equipment for dual-mode equipment. Confidential Annex 1 provides information on the minimum additional costs that operators would expect to incur. These costs have not been factored into the impact assessment.

The study states that “operators will aim to operate where there is the least interference with other WLAN users since this will minimise their operating costs. Where interference does occur they will take steps to reduce the interference, e.g. using directional antennas or relocating base stations. These two factors are expected to help to reduce the occurrence of interference.” T-Mobile does not believe that these two factors are true. There is nothing to stop high powered systems operating close to other WLAN users and there is certainly no obligation on the operators to take steps to reduce the interference. Whilst business WLAN users may be able to take steps to reduce interference it is unreasonable to expect that consumers will have the resources or technical ability to do so.

Scientific Generics have made a number of assumptions regarding business WLAN use which T-Mobile believes need further justification and analysis. For example it is assumed that on average 10% of staff in businesses that use WLAN are actually using the WLAN for all their connectivity. The study does not explain how this figure is derived.

As acknowledged there are a number of costs which have not been quantified within the report such as the loss of functionality before migration and the charges of IT professionals to diagnose, implement and test a changeover.

We are also unclear that the full impact on consumers who self provide has been taken into account. It seems likely that if equipment becomes available at higher power levels then this will be used in both rural and urban areas. This could mean that consumers will need to upgrade their WLAN equipment in the home. Further the increased numbers of devices that are becoming available in the 2.4GHz band means that the noise level is increasing in any case. Consumers will have an expectation that equipment they have purchased whether it is for wireless networks or video senders etc will continue to work in the future. There will not be an expectation that the regulatory framework will change in a way that means that some of their equipment may no longer work or no longer work as well.

A recent survey showed that around 20% of broadband users use WLAN in their homes², this is a substantial number which would be expected to continue to grow over time.

As the benefits outlined in the Ofcom report can be realised in the 5.8GHz band, T-Mobile believes that there would need to be an impact assessment showing that the further benefits

² http://www.theregister.co.uk/2006/05/11/wireless_wifi/

from increasing power at the 2.4GHz band outweighed the costs. T-Mobile does not believe that this is the case.

In summary, T-Mobile is not convinced that the costs and benefits have been correctly captured.

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?

Section 5 to the consultation proposes two mechanisms to restrict devices to geographical areas. We are not aware of other mechanisms that could be used within this band. T-Mobile agrees with the disadvantages and problems with the two mechanisms presented. In particular we do not believe that either mechanism can be enforced within this band and we are concerned that higher power devices would be deployed in urban areas resulting in interference into WLANs.

Registration scheme to restrict high power service providers to rural areas

We agree with the disadvantages with this approach presented in paragraph 5.8:

- It may be difficult or in the worst case near-impossible to enforce.
- Users may not resolve interference issues sufficiently rapidly, leading to time consuming negotiation and potentially litigation.
- Some users may not be aware of the need to register devices and so may inadvertently transmit illegally.

Location-aware devices

We agree that there are potential problems with this solution presented in paragraph 5.11:

- The customised equipment is expected to be relatively costly.
- There would need to be a mechanism by which the information in the geographical database could be relayed to manufacturers and operators. There should also be a mechanism for updating the database in equipment already deployed.
- The system would have to be secure to prevent the controls being overridden.

In summary, T-Mobile does not believe that this proposal is practical in the 2.4GHz band. Further we are not aware of any technical specifications that would deal with this. It also seems unlikely that manufacturers will want to manufacture equipment that needs to be programmed to just work in the rural areas of the UK. It is also unclear how Ofcom would ensure that such equipment could not be adjusted or masked so that it did work in urban areas.

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

T-Mobile does have concerns that by moving to conducted power then there is further scope for increased interference. Noting the international dimension to the 2.4GHz band, we would support further analysis within a CEPT forum on the impact to moving to conducted power. T-Mobile believes that a restriction on the maximum gain or EIRP will still be needed in addition to a power limit.

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?

T-Mobile proposes that the regulations are left unchanged. The 2.4 GHz band is a unique band, heavily used for a variety of purposes. T-Mobile believes that higher power systems should only operate in licensed bands where the interference can be managed.

Ofcom has already reported cases of interference at 2.4 GHz and we therefore do not believe that increased power levels can be justified: The Spectrum Framework Review, section 4.4 states "In the 2.4GHz band we are now seeing early reports of interference, predominantly between Wi-Fi nodes. These have a typical maximum range of around 200m and hence we believe that this should generally be the upper limit for licence exempt devices in urban areas. Indeed, given that some congestion is now starting to occur, it could be argued that the maximum range should be less than 200m."

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?

T-Mobile notes that technical work has been carried out within CEPT in support of the increase in power at 5.8 GHz. T-Mobile supports the proposal to increase the power to 4W EIRP at 5.8 GHz in accordance with ECC Recommendation (06) 04. We also agree that the database should be opened for public access to facilitate coordination.

T-Mobile (UK) Limited
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ANNEX 1