

This letter is in reply to Ofcom's Consultation on Ultra Wideband dated January 13<sup>th</sup>, 2005 (hereafter, the Consultation). Alereon Inc. is a leading UWB chipset company providing and currently demonstrating complete WiMedia UWB solutions including the MAC, PHY, antennas and software and is uniquely qualified to offer technical perspectives and insights on both the Ultra Wideband Consultation and the Mason Communications and DotEcon Ltd. report (subsequently referred to as the M&D report). After careful review of both the Consultation document and the Final Report for Ofcom authored by M&D we are in agreement with the conclusion that UWB's potential societal benefits to the UK greatly outweigh the potential costs. We believe Ofcom should issue an opinion permitting the use of UWB enabled devices that comply with the recommended PSD mask. Alereon also agrees with the recommendation in section 4.2.8 page 21, item #2 of the Consultation that UWB be permitted in both the upper and lower frequency bands. In particular, based upon our unique insight into the development of UWB chipsets, we agree that it will take substantially more time for the market to develop, and therefore the societal benefits to be realized, if only the upper band were authorized. The M&D report itself is very well thought out, very thorough, balanced and very complete given the current state of development of UWB. Alereon agrees that benefits of UWB to the UK are impressive but also believes that the benefits have been undercounted by a substantial degree. In particular, as discussed later in this response, UWB provides substantial benefits to wireless network operators and to end customers of future UWB enabled cell phones that have not been taken into consideration in the M&D report.

Alereon Inc. is the first company in the world to demonstrate a UWB chipset following the specifications of the WiMedia Alliance that operates from speeds of 55 to 480Mbps at transmits power levels of minus 41.3dBm/MHz at a minimum bandwidth of 528MHz. We are in agreement with the Consultation's proposed PSD mask on page 35, figure 6.1. In particular, we are in agreement with the M&D report's recommendation #2 on page 117 that -85dBm/MHz is achievable and a more restrictive PSD mask than that of the FCC be adopted below 3.1Ghz. To that end, we have demonstrated achieving -85dB rolloff at 2.1Ghz with a preproduction version of our first chipset implemented in cost effective 0.13micron CMOS. Though this comes at a cost, we believe the extra cost will not negatively impact the price of UWB chipsets sufficiently to reduce the market adoption rate. Alternatively, Alereon would be reluctant to endorse a specification much more aggressive than -85dB as the extra cost penalty may in fact impact the market adoption rate and market penetration and therefore the societal benefit of UWB.

Critical to the analysis made on the potential for harmful interference by UWB devices are the usage models, applications scenarios and activity factors assumed in the M&D report. Alereon regards some of the assumptions made in the M&D report with respect to various applications scenarios as being at odds with discussions Alereon has had with companies interested in implementing UWB systems. In particular, there are two applications discussed in the Consultation we would like to focus on (a) streaming video from set top boxes (STBs) to TVs and (b) uncompressed video links between PCs to LCD monitors or CRTs.

Streaming video from a set top box (STB) to a TV is a high activity factor application cited in the M&D report. From discussions with a wide cross section of manufacturers it appears that the new 802.11-n WiFi standard extension and various forms of power line networking are more likely to be the dominate solution to the problem of connecting streaming video from an STB to a remote TV (which is not otherwise close by the STB or in the entertainment cabinet). In the early days of discussions regarding prospective UWB applications in 1999 and 2000,

802.11-N and 100Mbps powerline networking technologies were not available. Therefore UWB looked to be an ideal solution for connecting remote TVs to sources of HD video content. In 2005, both of these technologies look like excellent candidates for this application, thus reducing the likelihood of high UWB penetration for this application. Further, for those companies that choose to introduce UWB for this application, they are not considering uncompressed video delivery, but rather delivering a 24 to 30Mbps compressed HD video stream. (An uncompressed video stream would require from 1.6Gbps to over 5Gbps, which is outside the capability of UWB for distances of more than a few meters.) Therefore on a 100 to 160 Mbps link, delivering one HD stream would be an activity factor of less than 30% during the time that a program was being transmitted. Over a 24 hour timeframe, this would be less than 4%. From a regulatory perspective, perhaps the best way to manage the potential concerns for these unlikely forms of uncompressed streaming video applications would be by applying a duty cycle of 20% measured over a 24 hour period.

Another interesting application outlined in the M&D report was essentially a wireless LCD monitor for a PC. This has particular appeal for use in a wireless docking station application for a laptop. Again, the uncompressed data-rate of such a link is too high to be cost effectively delivered with UWB. Today's chipsets for a DVI link are very cost effective and are much lower cost than projections for UWB chipsets. The PC to LCD monitor link in time may convert to a wireless link using UWB, however it is highly likely to be a compressed link. This in turn will be an as yet undefined new standard, much like DVI is today, which includes both compression and auto-refresh. The majority of the time, the raster being displayed on a PC LCD monitor isn't changing. Therefore, it is highly probable that whatever new standard emerges to enable a PC UWB link to an LCD panel will involve both compression and non-transmission of screen data when there are no screen changes. The LCD monitor is typically within 1 to 2 meters of the source PC laptop or desktop. At these shorter distances the UWB PAN is likely operating at 320 to 480Mbps (*to as high as 3,840 Mbps*). The peak compressed data-rate is likely to be less than 60Mbps, with an average below 10Mbps when the user is active or a DVD is being played. At all other times the link will be quiescent. Therefore, the peak activity factor is likely to be 25%, with an average activity factor over a normal work day of less than 4%. As mentioned before, from a regulatory perspective, perhaps a better way to manage the potential concerns for this form of video application would be by applying a duty cycle of 20% measured over a 24 hour period.

In addition to the foregoing applications comments, Alereon believes that UWB will become a standard feature in future cell phones because of both its value to end users as well as the additional revenue opportunities enabled by UWB that will make UWB attractive to cellular operators. This societal benefit does not appear to be taken into account in the analysis included in the M&D report. By way of just one simple example, with wireless USB utilizing UWB as part of a future cell phone, an end user could use their future cell phone as a highly portable wireless data modem. Though this is technically feasible today using Bluetooth with a GPRS cell phone, generally this is too difficult and the speeds are unattractive not to mention the need of purchasing and installing a new Bluetooth adapter into the PC. Conversely, wireless USB is anticipated to become standard in laptop PCs. Therefore, using the simplicity of familiar USB connections, users will be able to click on a desktop icon on their PC laptop and connect to their cell phone to use it as a wireless modem. The simplicity of wireless USB UWB links coupled with future cell phones that offer sufficient data bandwidth will make this service a major source of data revenue for wireless carriers and deliver high benefit to consumers. In conclusion, Alereon believes that UWB is a very large net benefit to the wireless cell phone industry which

thereby greatly increases the total benefit of UWB to the UK over and above that already discussed in the M&D report.

In summary, Alereon agrees with the conclusion of the M&D report that UWB offers substantial societal benefits to the UK and believes that the benefits are under represented because of the substantial benefits to wireless carriers and the cell phone users for UWB applications that have not been taken into consideration. Furthermore, Alereon believes that potential concerns for streaming video application scenarios can be best managed by applying a duty cycle to UWB transmitters.

Thank you for the opportunity to share our perspectives on the Ultra Wideband Consultation. As a premiere UWB chipset manufacturer with significant expertise in this promising technology we look forward to cooperating with Ofcom to help the UK realize the full benefit of UWB to society while simultaneously responsibly deploying this exciting spectrum underlay technology. Please let us know if there is anything we can do to assist Ofcom in its deliberations on UWB.