Subject: Industry Canada consultation on the introduction of wireless systems using ultra-wideband technology

Philips welcomes this opportunity to respond to the consultation on the introduction of wireless systems using ultra-wideband technology.

Philips agrees with the favourable opinion that Industry Canada has of UWB. We believe that UWB friendly regulations will be of great benefit to Canadian consumers and businesses, promoting innovation in general and possibly also innovation in spectrum management.

Philips plans to introduce UWB as one of a number of networking technologies. We expect UWB will find its best use in short distance, high throughput wireless connectivity.

The rest of this document lists our responses to the questions raised in the consultation.

About Royal Philips Electronics:
Royal Philips Electronics of the Netherlands (NYSE: PHG, AEX: PHI) is one of the world’s biggest electronics companies and Europe’s largest, with sales of EUR 29 billion in 2003. It is a global leader in colour television sets, lighting, electric shavers, medical diagnostic imaging and patient monitoring, and one-chip TV products. Its 165,300 employees in more than 60 countries are active in the areas of lighting, consumer electronics, domestic appliances, semiconductors, and medical systems.
Consultation questions and responses

In the following, the consultation questions are in italics.

(Q1) Sections 3.1 and 3.2 of this consultation describe potential benefits and concerns relevant to the introduction of wireless devices using ultra-wideband (UWB) technology. Please provide additional interests and/or concerns that you may have.
Response: Innovation will ensure that any list of UWB applications is soon outdated. While our interest in UWB is focussed on various high data rate Wireless Personal Area Network (WPAN) applications, we recognize that UWB technology will also be useful outside that domain. As for the concerns about UWB devices interfering with incumbent services, our opinion is that those concerns are much exaggerated. We think future systems, like current systems, will not suffer noticeably from a system operating around the noise floor. Philips as a company involved in a multitude of wireless technologies and systems is dedicated to resolving questions about potential interference from UWB to other radio services.

(Q2) The Department proposes to use the set of definitions and terminology in Section 4.1 in reference to UWB technology. Is this set adequate and if not, what would be the appropriate alternative(s)?
Response: These definitions are in close agreement with the United States FCC’s first report and order on UWB (02-48), which we consider as helpful, since these definitions have already withstood some scrutiny, and commonality will assist with harmonization of the technology. The definition of Pulse UWB Duty Cycle may need further clarification. This is because certain pulse shapes (such as root raised cosine) may have many side-lobes in the time domain making the determination of the beginning and end of such pulses difficult without clear definitions.

(Q3) The Department is proposing guidelines in Section 4.2.3 for measuring emissions from devices which use UWB technology. Please provide your comments regarding these guidelines.
Response: We recognise and welcome a degree of commonality between the measurement guidelines in Section 4.2.3 and those proposed by the United States FCC first report and order on UWB. Here are our comments on the guidelines.

There is some ambiguity in the phrase, “the lowest frequency generated in the UWB transmitter.” We are not clear how this lowest frequency generated is to be determined, whether by theoretical means or by a measurement.
In general, more elaboration of the proposed methods for average radiated power measurement is recommended. The choice of resolution bandwidth, detector type and video bandwidth should be clarified. For example a “1 MHz resolution bandwidth to be employed with an RMS detector and an averaging time of 1 millisecond or less,” would be a good choice of parameters that has some precedent in existing U.S. legislation. Regarding peak power measurements, there is a strong dependency of the measured result on the choice of resolution bandwidth, and that dependency varies for different types of UWB waveform. The selection of a fixed and practical resolution bandwidth for determining peak, radiated power is therefore recommended, since the customary formula used for scaling the peak limit as a function of bandwidth \((P=20 \log (BW/50))\) is only really applicable to pulse based UWB systems.

(Q4) The Department is of the view that licensing is a valid approach to authorize ground penetrating radar, wall imaging, and through-wall imaging devices that use UWB technology. The Department is considering limiting the use of these devices to specialized user groups (e.g. law enforcement agencies, scientific research institutes, fire and emergency rescue organizations) and of limiting area(s) of operation. Please provide your comments regarding this licensing approach.

Response: No response.

(Q5) UWB will be integrated into various wireless applications including consumer devices (e.g. laptops, home theatre, etc.) and into transportation vehicles (e.g. vehicular radars, road sensors, etc.). These applications will be mass distributed in markets and may be acquired both in Canada and abroad. Consequently the Department is of the view that a licence-exempt approach is a valid regulatory option to authorize these devices. These devices must comply with specific radio standards specifications and be certified. Please provide your comments on the use of an appropriate approach for authorizing UWB consumer devices, UWB communications and measurement devices, UWB vehicular radars, and UWB field disturbance sensors.

Response: We agree with the approach. We believe devices certified to be built to widely accepted standards would not cause harmful interference to other devices. License-exemption combined with certification is the best approach for mass-market devices.

(Q6) Considering the FCC and the proposed CEPT emission masks for UWB systems, what emission masks and what other, if any, measures (operational restrictions, etc.) would protect
authorized radiocommunication services from harmful interference and would not impede the
development of UWB devices?

Response: We believe there are three important aspects to UWB masks:

1. The reliable operation of UWB devices requires a minimum PSD.
2. Adequate protection of current services. The FCC reasoned that since EMC regulated devices don’t usually cause harmful interference to radio communication devices, the EMC limit must be safe. Thus the –41.3 dBm/MHz PSD limit became the basis for standardization and was built into the IEEE UWB specifications. The –41.3 dBm/MHz PSD limit applied between 3.1GHz and 10.6GHz therefore satisfies the UWB application requirements while adequately protecting other services.
3. The adoption of a similar in-band PSD level worldwide.

Considering the mask quoted in Table 4 (“CEPT Draft Emission Masks”), it should be noted that the formulae given have no lower bound, and the measurement levels at high and low frequencies soon become impractical (for example –104dBm/MHz at 1GHz in the outdoors case). Considering a radiated measurement is required with a corresponding path loss between the device under test and the measurement antenna, these power levels imply measurements below the noise floor of an ideal receiver at room temperature (-114dBm/MHz). If a sloped mask is considered, it is our recommendation that a practical measurement noise floor be used to set a lower bound on the required power spectral density at any given frequency. An example of such an approach has been taken by the Ofcom, UK regulator as part of their consultation on UWB regulation.

To summarize, we believe that it is important to preserve a flat spectrum mask at –41.3dBm/MHz between 3.1 and 10.6GHz, since this is a requirement to allow for high data rate UWB communications over distances suitable for a Wireless Personal Area Network (WPAN), and provides for harmonization of equipment designs. Outside this band, the spectrum mask needs to be tailored to the protection of existing sensitive services such as GPS and cellular systems. We believe the spectrum mask proposed as part of the Ofcom, UK consultation strikes an optimum balance between the two objectives of enabling a viable UWB industry and protecting sensitive 3G and other cellular services. It should be noted that the Ofcom, UK mask was derived from the mask quoted in Table 4, but with changes to use a linear frequency scale for the sloped portion of the mask and to define a lower bound for the PSD limit at –85dBm/MHz.