

## **ETNO Expert Contribution on emission masks for generic Ultra-Wide Band (UWB) applications**

### **Executive Summary:**

As already stated in earlier position papers, ETNO considers the adequate protection of radio services of prior importance concerning the introduction of generic UWB applications. In order to allow suitable UWB emission limits, ETNO suggests to distinguish between the kinds of UWB applications, the data rates and also to take into account mitigation techniques (e.g. indoor usage, duty cycle, etc.).

ETNO proposes a possible set of emission masks for UWB communication applications in the frequency range 3.1-10.6 GHz.

### **Introduction**

ETNO follows with high interest the discussions within Task Group 3 of the European Communications Committee (ECC TG3) that is responsible for developing adequate regulatory provisions for the introduction of UWB devices in response to a Commission Mandate.

While being aware of the potential advantages of UWB applications, ETNO members consider - as already stated in earlier position papers (ETNO EC061) by recommending the introduction of UWB communication devices above 6 GHz - that the protection of existing radio services (mobile, fixed and broadcasting) is of prior importance. Special care for protection criteria has also to be taken not to undue hinder the introduction of future mobile radio systems in frequency bands below 6 GHz.

Consequently, ETNO supports the conclusion in ECC Report 64 that the FCC mask does not ensure sufficient protection of existing radio systems from generic UWB applications.

## ETNO position

ETNO members consider UWB technologies as potentially suitable to deliver communication applications. Low data rate UWB should be of great benefit for M2M and localisation applications while high data rate capacity should be suitable for WPAN and domestic applications. ETNO members also recognise that UWB applications need sufficient emission levels and frequency resources to operate.

With regard to technical implementation measures, ETNO

- supports the adoption of specific emission masks for UWB for the frequency range 3.1-10.6 GHz and their inclusion in an ECC Decision. These emission masks should allow UWB operation while ensuring adequate protection of existing and planned radio services.
- proposes to make a distinction between low data rate and high data rate UWB applications.
- proposes additionally to distinguish between the kind of application, e.g. imaging applications may be performed with more relaxed UWB PSD limits than communication applications (number of devices, time and location probability) within specific regulation.
- strongly supports the implementation of mitigation techniques that should ease the coexistence of UWB and radio systems. These mitigation techniques should include for example indoor limitations, frequency avoidance, duty cycle limitations, dynamic frequency control and power control. Within HDR (high data rate) UWB applications, the reduction of data rates have similar effects, e.g. less power will be required to span the same distance. Some other applications (Imaging application) may be implemented with specific mitigations depending on their utilisation.

Indoor only limitations have a great impact on the coexistence between UWB and outdoor radio systems such as Fixed systems. Activity limitations will ease cooperation in those scenarios where aggregate effects are predominant which is likely to occur outdoor and will particularly fit for low data rate UWB applications.

Where those mitigation techniques are not sufficient, frequency avoidance should be favoured. Other mitigation techniques at a system level could be implemented if suitable for regulatory measures. In conclusion, ETNO suggests an application based approach in order to explore as many as possible mitigation techniques.

- further suggests to explore alternative frequency ranges above 10.6 GHz. For example, the MAGNET IST project is exploring WPAN/WLAN multi-band applications also using the 17 GHz and 60 GHz frequency ranges.

## **ETNO proposal for a possible set of UWB emission masks**

Based on the consideration above, ETNO proposes a possible set of emission masks for UWB communication applications in the frequency range 3.1-10.6 GHz.

### **Low data rate applications (data rate < 2 Mb/s)**

**3100 < f < 5000 MHz:**

**Limit -55 dBm/MHz and duty cycle below 2%  
(as defined in ERC/REC 70-03)**

This value might be revised in the light of compatibility studies taking into account the limitation of duty cycle and forecast market.

*Rationale: Fixed Service including P-P links and FWA, Fixed satellite service are operating in this frequency range. Furthermore, this frequency range will play a major role when identifying bands for future mobile or nomadic radio services which may have similarities with "IMT-2000 and systems beyond", or Wireless access systems in general. Therefore, the limits should be in the same range in order not to hamper those developments. This limit allows localisation and some M2M applications, with a request of autonomy and therefore a very low activity.*

**5000 < f < 6000 MHz:**

**-70 dBm/MHz (limit based on ECC Report 64)**

*Rationale: UWB operating in this frequency range should experience cross interference with WLAN.*

**6000 < f < 10600 MHz:**

**Limit -40 dBm/MHz and duty cycle up to 10%  
(as defined in ERC/REC 70-03)**

*Rationale: Fixed Service including P-P links, Fixed satellite service are operating in this frequency range. Similar as in the range 3100-5000 MHz, duty cycle will allow low data rate WPAN applications as coexistence is eased by higher propagation loss.*

### **High data rate indoor applications (indoor only)**

**3100 < f < 5000 MHz:**

**-70 dBm/MHz (limit based on ECC Report 64)**

*Rationale: Future mobile systems request consideration of single entry scenario in this frequency range, which is not impacted by any mitigation technique listed above. Consequently, UWB will not be able to operate at emission limits requested to protect existing and envisaged future services.*

**5000 < f < 6000 MHz: -70 dBm/MHz (limit based on ECC Report 64)**

*Rationale: UWB operating in this frequency range should experience cross interference with WLAN.*

**6000 < f < 10600 MHz: Limit -55 dBm/MHz**

*Rationale: indoor limitation mitigation technique allow consideration of lower limit than those in ECC Report 64.*

**Note 1: Guard band consideration needs to be studied.**

**Note 2: Further mitigation techniques can allow consideration of further emission masks for those UWB applications that can support them.**

