10th ECC TG3 MEETING **TG3#10_xxR0**
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Subject: Protection of future mobile systems

Summary

According to the recent discussions in ECC, there are implications that UWB communications devices might be introduced in Europe in the band 3 – 5 GHz with the FCC limits with some mitigation techniques. This would undermine the preparations for the WRC-07 agenda item 1.4 and endanger the possible implementation of future mobile systems in this band.

The latest studies and contributions show that there are no fundamental nor technical reasons, why UWB communications devices could not be implemented above 6 GHz in the near future. Taking into account the time to develop the required mitigation techniques for the band 3 –5 GHz, the use of UWB equipment above 6 GHz could be a competitive alternative.

UMTS Forum suggests that UWB communications devices should be implemented above 6 GHz with a sufficient PSD level. This would solve best the most difficult sharing cases that are under consideration in ECC TG3.

In the light of the discussions on UWB in the last ECC meeting and also in ITU-R WP8F, there seems to be a risk that UWB will be implemented in the whole band 3.1 to 10.6 GHz following existing Regulation in the US creating harmful interference from UWB to other existing and future systems. It is also noted that there are different views within ECC on, whether the protection of the future mobile systems (WRC-07 agenda item 1.4) should be taken into account when developing the regulation for UWB.

ECC PT1 sent a liaison statement (TG3#9_02) to TG3 informing, which bands are under consideration for future mobile systems. TG3 also got a document from WINNER companies (TG3#8_41) estimating the impact of UWB on the future mobile systems. This document showed the impact on UWB on the future mobile network coverage and capacity.

Discussions took place also during last Working Party 8F meeting on possible impact of UWB on future mobile systems. Working Party 8F has previously prepared studies on the impact of UWB emissions on IMT-2000 and this study concluded on a tolerable emission limit of -85dBm/MHz at 2 GHz. Based on the assumption that a typical future mobile handheld terminal operating in the 3.1 to 6 GHz range will have the same interference sensitivity (as is expected) as IMT-2000, and taking into account the slightly higher free space loss at the higher frequencies, the corresponding PSD limits for UWB to protect a typical future mobile handheld indoor receiver would be between -81.6dBm/MHz at 3.1GHz and -75.8dBm/MHz at 6 GHz. It should be noted that these studies are not based on the assumption that UWB cannot cause any interference to IMT-2000 type of networks, but they already allow 0.4 dB degradation in IMT-2000 link budget and that can cause 4 % capacity loss in networks.

A liaison statement to TG1-8 was subsequently prepared, highlighting the fact that Working Party 8F was foreseeing the 3.1 to 6 GHz as possible candidate bands for future mobile systems in answer to WRC-07 agenda item 1.4.

The minutes of the last ECC meeting states that
"...However, it was furthermore understood that adequate detection avoidance mitigation techniques would be generic. A DFS-like mechanism ensuring detection and protection of indoor FWA systems is therefore also expected to be extendable to systems beyond IMT-2000 systems. Therefore TG3 should primarily focus on the protection of existing systems."

UMTS Forum would like to comment that even, if the DFS is clearly specified, it may not prevent all UWB interference; especially in dynamic situations, where new users are appearing or new connections are being established, leading to a "hidden terminal" problem. It should be emphasized that the functionality of this kind of DFS should be clearly verified and there needs to be an agreement of both sides that the DFS works, before it can be accepted as a mitigation technique for the protection of future mobile systems. Also, the complexity of the UWB devices will dramatically increase, when some kind of sensing RF-circuitry (and additional related functions) is needed for mitigation. The implementation of DFS should be a requirement for all UWB equipment operating in the 3- 5 GHz band before UWB equipment can be put on the market. Instead of putting a huge effort on inventing UWB-mitigation techniques, the development effort should be put to higher band (above 6GHz) operation.

Proposal

It is recognized that UWB technologies are potentially suitable to deliver short-range communication applications and UWB applications need sufficient emission levels and frequency resources for a reasonable operation. On the other hand, future mobile systems are foreseen to operate in the 3.1 to 6 GHz frequency range and their deployment will be drastically jeopardized if UWB were to be authorized indoor with a PSD limit of -41.3 dBm/MHz.

Based on some recent discussion and e.g. document TG3#9_23, the suitable technology for UWB operating above 6 GHz exists or is coming available soon. Based on the preliminary analysis (e.g. TG3#9_22), there seems to be better ways (easier to implement) to protect the existing services above 6 GHz. So, if the sufficient PSD level for UWB above 6 GHz could be agreed, the feasible UWB operation seems possible in these higher frequency bands.

Consequently, UWB implementation should be limited to the bands above 6 GHz.