Meeting Notes on LTE-U Project

Attendees: Rajesh, Len, Chien-Chung, Seyedmohammad, Steve, Bohan and Li

Date: Sept. 30, 2014

1. Steve presented slides about the coexistence of LTE and Wi-Fi in the unlicensed band:
   1) Huawei's viewpoint: i) non-standalone LTE-U is preferred, since it will not lose the advantages of LTE with the help of licensed LTE; ii) LTE+LTE-U eNB is better than LTE eNB + WiFi AP; and iii) the coexistence issues not only includes the coexistence of LTE-U and WiFi, but also the coexistence of LTE-U and LTE-U from different operators.
   2) Qualcomm's viewpoint: dynamic channel selection can be employed, i.e., small cell chooses LTE-U channel based on unlicensed channel RSSI.
   3) Intel's viewpoint: i) WLAN's CCA sensing cannot detect the presence of LTE eNB; and ii) LTE's continuous DL transmission degrades WLAN performance.
      - Rajesh: WLAN's CCA sensing cannot detect the presence of LTE eNB; this is caused by hidden nodes and it will exist unless LTE-U implements ways to decode RTS/CTS.
   4) Nokia's viewpoint: i) coexistence has a negative impact on WLAN system performance; ii) a muting pattern scheme is proposed to mitigate the impact of the interference by restricting LTE activity; and iii) future research is needed to find sophisticated coexistence scheduling algorithms.
      - Rajesh: Muting is not sufficient. This muting pattern does not take user traffic into account, and we could study this.
      - Rajesh: Can muting-based algorithm be fair? We can also study channel sensing algorithms.

2. Chien-Chung: What directions should we take from the viewpoint of industry and standardization?

Rajesh: we need to solve some hard problems about the coexistence issues so that we can get a better understanding of how the existing schemes work. For example,

- LTE does not have a channel sensing mechanism and it is exclusively available. Then, how do we make LTE-U more friendly?
- What's the limit of the muting schemes?
- How do we solve the hidden node problem caused by LTE-U eNBs?
- What would it take to do standalone LTE?

3. Rajesh, Len and Chien-Chung: a potential starting point is to study the muting algorithms and get some insights.

4. Meeting schedule:

- The UD people will meet on Oct. 8 (Wednesday) at 1:00 pm (about 1 hour), and Seyedmohammad will give a presentation about the channel assignment algorithms in LTE.
- The next meeting with Rajesh will be on Oct. 14 (Tuesday) at 11:00 am (about 30 minutes).