**SpringerBrief Proposal Form**

1. **The proposed Title of your Brief:**

Long-Term Evolution in Unlicensed Bands: Technical Challenges, Existing Solutions and Potential Research Directions

1. **The AUTHOR(s) INFORMATION. Provide your full name as it would appear for publication, and your full contact information (surface, phone, e-mail). If there are two or more authors, provide the full names in the order in which they are to appear:**

Author 1: Quang-Dung Ho *(contact author)*

Affiliation: Department of Electrical and Computer Engineering, McGill University

Mailing address: 3480 University St., Montreal, Quebec, Canada, H3A 0E9

Email: quang.ho[@mcgill.ca](mailto:duy.ngo@mail.mcgill.ca)

Phone: (+1)-514-398-7151

Author 2: Daniel Tweed

Affiliation: Department of Electrical and Computer Engineering, McGill University

Mailing address: 3480 University St., Montreal, Quebec, Canada, H3A 0E9

Email: daniel.tweed@mail.mcgill.ca

Phone: (+1)-514-398-7151

Author 3: Tho Le-Ngoc

Affiliation: Department of Electrical and Computer Engineering, McGill University

Mailing address: 3480 University St., Montreal, Quebec, Canada, H3A 0E9

Email: tho.le-ngoc@mcgill.ca

Phone: (+1)-514-398-5252

1. **CONTENTS- What is your book going to cover (two to three paragraphs)?:**

Global mobile traffic is expected to increase nearly tenfold between 2014 and 2020 due to increasing number of mobile-connected devices and the explosion of data-hungry mobile applications. Pushing traffic towards the network capacity quickly deteriorates the Quality of Services (QoSs) perceived by the users. Acquiring additional licensed spectrum to increase the capacity of Radio Access Networks (RANs) is certainly very expensive. Mobile operators are also challenged by the “revenue gap”, i.e., the exponential increase in mobile traffic does not generate sufficient additional revenues required for upgrading their RANs. This circumstance has fostered the interest in cost-effective solutions to increase the capacity of RANs. Long-Term Evolution (LTE) in unlicensed bands (U-LTE) is among promising solutions. However, since U-LTE is a nascent LTE technology, there are still various associated concerns and challenges to be addressed.

This brief *first* presents a comprehensive survey on U-LTE, focusing on technical issues and the impacts of this technology to other neighboring networks in shared frequency bands. Specifically, concepts, motivations, benefits, obstacles, and coexistence requirements of U-LTE are presented. Three typical types of U-LTE including LTE-U, LAA-LTE, and MuLTEfire are explained. *Next*, regulations specified by standard institutes for radio systems operating in unlicensed spectrum are reviewed. *Third*, due to the fact that technical knowledge on medium access mechanisms of LTE and IEEE 802.11/Wi-Fi technologies is strongly required to understand and analyze the interactions between these two technologies when they operate in the same frequency band, high-level network architectures and technical details of LTE and Wi-Fi are presented. Especially, distinguishing features of CSMA/CA employed by Wi-Fi networks compared to standardized regulations are highlighted. *Forth*, in order to capture the ongoing activities on U-LTE’s coexistence mechanisms, related works are surveyed with insight observations on their limitations and concerns. *Fifth*, this brief presents our network-aware adaptive LBT mechanism (NALT) which is proposed for LTE networks for its coexistence with Wi-Fi networks. It a nutshell, the NALT monitors both channel conditions and usage activity to maximize its transmission opportunities, while maintaining fair sharing of the channel, in a way that is transparent to incumbent Wi-Fi devices. *Finally*, towards future working directions, in the light of the survey, this brief identifies a number of open technical questions as well as related potential research issues in U-LTE.

1. **SHORT ABSTRACT- (one to two paragraphs):**

This brief focuses on the coexistence concerns emerging in LTE networks using unlicensed frequency bands. It first provides a comprehensive review on current LTE networks and their unavoidable need for enhanced capacity yet at low costs to meet the demands for future applications. LTE using unlicensed frequency (U-LTE) is then introduced as the most promising solution to address the mentioned need. U-LTE discussed from various perspectives to unveil its benefits as well as its challenges and requirements on its coexistence with the widely-deployed IEEE 802.11/Wi-Fi technology. Since to meet these coexistence requirements is the deciding factor for the acceptance of U-LTE, the majority of this brief attempts to provide a big picture on concerns and existing solutions related to coexistence-aware medium access protocols for background knowledge. A proposed network-aware adaptive listen-before-talk protocol is then presented and evaluated. Finally, this brief identifies a number of open technical questions as well as related potential research issues in U-LTE. The findings in this brief provide telecom engineers, researchers, and academic professionals with valuable knowledge and potential working or research directions when designing and developing medium access protocols for next generation wireless access networks.

1. **5-10 KEYWORDS (search terms) that best describe your Brief. What terms will be used when searching your topic on Google or Amazon?:**

Long-Term Evolution (LTE), LTE unlicensed (LTE-U), Licensed Assisted Access LTE (LAA-LTE), MuLTEfire, Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA), IEEE 802.11, Wi-Fi, resource allocation, Quality of Service (QoS)

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100 pages

1. **AUTHOR BIOGRAPHY / CV or Link to your website:**

**Quang-Dung Ho** received his B.Eng. in Electrical Engineering and B.Sc. in Computer Science from Hochiminh City University of Technology (Vietnam) in May 2000 and Hochiminh City University of Natural Sciences (Vietnam) in Sep. 2000, respectively. He then obtained his M.Sc. and Ph.D. in Electrical and Computer Engineering from Information and Communications University (South Korea) in Feb. 2003 and Korea Advanced Institute of Science and Technology (South Korea) in Feb. 2007, respectively. From May 2000 to May 2001, he joined the Electrical Engineering Department, Hochiminh City University of Technology (Vietnam) as a Lecturer. From 2007 to present, he has been working as a Post-Doctoral Fellow and then Research Associate in Broadband Communications Lab, Electrical and Computer Engineering Department, McGill University (Canada). His current main research interests include dynamic routing and resource allocation in wireless networks, cloud computing and wireless virtualization. Besides, he has been designing and implementing wireless network simulators, experimental platforms and real-life products for electronic healthcare and smart grid applications.

**Daniel Tweed** received his B.Sc. Computer Engineering (2015) from the University of Manitoba, Winnipeg, Canada. He is currently working toward the M. Eng. working with the Broadband Communications Research Laboratory, Electrical and Computer Engineering Department, McGill University, Montreal, Canada. His current research interests include next generation wireless network architectures, LTE-U technologies, and wireless virtualization, with specific focus resource allocation and management.

**Tho Le-Ngoc** is a Professor with the Department of Electrical and Computer Engineering, McGill University, Montreal, QC, Canada. He received the B.Eng. (with Distinction) degree in electrical engineering in 1976, the M.Eng. degree in microprocessor applications in 1978 from McGill University, Montreal, QC, Canada, and the Ph.D. degree in digital communications in 1983 from the University of Ottawa, ON, Canada. His research interest is in the area of broadband digital communications. Dr. Le-Ngoc is a Fellow of the Royal Society of Canada, the Institute of Electrical and Electronics Engineers, the Engineering Institute of Canada, and the Canadian Academy of Engineering. He is a Senior Member of the Ordre des Ingenieurs du Quebec. He is the recipient of the 2004 Canadian Award in Telecommunications Research, and the 2005 IEEE Canada Fessenden Award. He is the Canada Research Chair (Tier I) on Broadband Access Communications and the Bell Canada/NSERC Industrial Research Chair on Performance & Resource Management in Broadband xDSL Access Networks.

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