

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matters of)	
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Current Trends In LTE-U And LAA)	ET Docket No. 15-105
Technology)	
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Comments of the Alliance for Telecommunications Industry Solutions

The Alliance for Telecommunications Industry Solutions (ATIS) is pleased to provide comments on the Federal Communications Commission's (Commission) *Public Notice*, released May 5, 2015, seeking information on LTE-Unlicensed (LTE-U) and Licensed Assisted Access (LAA) technology. ATIS, through its role as the North American Organizational Partner in the 3rd Generation Partnership Project (3GPP) and its Wireless Technologies and Systems Committee (WTSC), is actively engaged in the development of next generation wireless technologies, including LTE. ATIS member companies are working to implement LTE in unlicensed spectrum and are collaborating with other companies and industry organizations to ensure successful spectrum sharing with Wi-Fi and other unlicensed operations. ATIS supports the innovative use of LTE in unlicensed spectrum, which provides improved performance while respecting other unlicensed users' access to the spectrum, as explained more fully below.

I. Background

ATIS is a global standards development and technical planning organization that leads, develops and promotes worldwide technical and operations standards for information and communications technologies (ICT). ATIS' diverse membership includes key stakeholders from the ICT industry – wireless and wireline service providers, equipment manufacturers, broadband providers, software developers, consumer electronics companies, public safety agencies, and internet service providers. Nearly 600 industry subject matter experts work collaboratively in ATIS' open industry committees, which focus on a broad range of issues from ordering and billing to numbering to next generation wireless and wireline systems.

ATIS WTSC coordinates, develops and recommends standards and technical reports relating to wireless/mobile telecommunications networks. With active participation from key wireless service providers and manufacturers, WTSC is the primary industry committee within ATIS that focuses on next generation wireless issues, including those wireless issues related to the implementations of LTE in the U.S. WTSC is also the lead on multiple joint industry standards projects, including work on SMS/MMS to 9-1-1, coexistence and interference issues, Wireless Emergency Alerts, and public safety mission critical Push to Talk (PTT) voice interoperation between Land Mobile Radio (LMR) and LTE systems.

ATIS also is the North American Organizational Partner of 3GPP, the global collaborative effort that has developed the LTE and LTE-Advanced wireless specifications. 3GPP unites seven telecommunications standard development organizations from around the world to provide their members with a stable environment to produce the reports and specifications that define 3GPP technologies. The project provides complete system specifications covering cellular telecommunications network technologies, including radio

access, the core transport network, and service capabilities. The specifications include work on codecs, security, and quality of service and also provide means for non-radio access to the core network, and for interworking with Wi-Fi networks.

II. Comments

ATIS appreciates the opportunity to provide input on the significant industry efforts to develop and deploy LTE-U. ATIS believes that LTE-U will improve mobile broadband consumers' experience, while also improving wireless downlink spectrum efficiency and capacity.

A. Versions of LTE-U

In the *Public Notice*, the Commission seeks input on a number of topics, including the different variations of LTE-U under active development and their associated technical characteristics.¹ ATIS notes that there are two versions of LTE-U under development. Both versions use an anchor channel in a licensed spectrum band and carrier aggregation, which uses the unlicensed band to supplement LTE operations in licensed spectrum.

The initial version of LTE-U uses 3GPP LTE Release 10/11/12.² This version uses frequency selection and a co-existence mechanism known as Carrier Sense Adaptive Transmission (CSAT) to avoid causing interference to Wi-Fi operations in the unlicensed band (5 GHz). Through CSAT, LTE-U users would take turns with Wi-Fi users, allowing users of the two technologies to harmoniously co-exist. Small cells using this version of LTE-U will look for a vacant channel in the unlicensed band to use as a secondary channel with the primary licensed

¹ *Public Notice* at p. 2.

² For 3GPP Release 10 V0.2.1 (2014-06) please see [Rel-10_description_20140630.zip](#). For 3GPP Release 11 V0.2.0 (2014-09) please see [Rel-11_description_20140924.zip](#). For 3GPP Release 12 V0.1.4 (2014-09) please see [Rel-12_description_20140924.zip](#).

channel. If there is no vacant channel, LTE-U small cells will use the least-crowded unlicensed channel. The LTE-U small cells also will include an “on-off switch” so the unlicensed spectrum is used only when needed and quickly vacated when it is not needed.³

LAA is another version of LTE-U that is being standardized in 3GPP Release 13. This version requires more extensive changes to the LTE air interface to include a specific, standardized Listen-before-Talk (LBT) protocol that is required in Europe and Japan. LAA also will implement frequency selection to identify open frequencies to use and it will vacate the spectrum when it is not needed.

B. LTE-U Technology Co-Exists Very Well with Other Unlicensed Technologies

The *Public Notice* also asks for information about the impact of LTE-U on existing unlicensed users, including particularly Wi-Fi.⁴

As described above, both versions of LTE-U can successfully share unlicensed spectrum bands with Wi-Fi operations and other unlicensed users. Moreover, given the broad reliance on both licensed and unlicensed bands for mobile broadband and the ubiquity of smartphones that use both LTE and Wi-Fi, mobile operators and technology companies in the U.S. have a strong incentive to ensure that Wi-Fi device users do not suffer interference. ATIS expects that the successful co-existence of LTE-U and Wi-Fi will improve further as both Wi-Fi and LTE-U technologies continue to evolve and notes that ATIS member companies plan to support both LTE-U and Wi-Fi for many years.

³ LTE-U was developed within the LTE-U Forum comprised of Verizon, Alcatel-Lucent, Ericsson, LG Electronics, Qualcomm Technologies, and Samsung as the key participating members. The LTE-U Forum collaboratively developed and released a detailed Technical Report (available at <http://www.lteforum.org/>) demonstrating that LTE-U will coexist successfully with Wi-Fi and not have an adverse impact on Wi-Fi.

⁴ *Public Notice* at p. 2.

C. ATIS and Its Member Companies Are Working with Other Industry Organizations To Ensure Successful Spectrum Sharing Among All Unlicensed Users

The *Public Notice* also asks about coordination between the industry organizations working on unlicensed technologies, including particularly 3GPP and Institute of Electrical and Electronics Engineers (IEEE).⁵

ATIS notes that there have been communications among the key organizations working on unlicensed technologies. For example, there are ongoing communications on LTE-U between LTE-U Forum members and the Wi-Fi Alliance (WFA) and its members, and between 3GPP and IEEE 802 on LAA.⁶ Moreover, many of the same companies are members of 3GPP, IEEE and the WFA, and the LAA standardization effort in 3GPP also involves many member companies that have both cellular and Wi-Fi products. Nearly all of the key LTE-U Forum participants develop and/or deploy Wi-Fi products and services, and LTE-U Forum members are participants in the WFA coexistence evaluation group. Furthermore, there have been, and will continue to be, many bilateral and multilateral technical discussions among companies that developed LTE-U and are developing LAA. ATIS fully expects these discussions to progress to a successful conclusion.

⁵ *Public Notice* at p. 2.

⁶ Among the communications between the relevant organizations over the past 6-8 months are: “Coexistence Lessons Learned”, liaison from IEEE 802 LAN/MAN Standards Committee to 3GPP TSG RAN, 8 November 2014; “3GPP & unlicensed spectrum”, presentation by Dino Flore, Chairman of 3GPP TSG-RAN, to IEEE 802 Interim Session, Atlanta, USA, 11-16 Jan, 2015; “Liaison Statement Regarding Clarification of LBT Categories”, liaison from IEEE 802 LAN/MAN Standards Committee to 3GPP RAN, 11 March 2015; “Liaison to 3GPP related to LAA”, liaison from IEEE 802 LAN/MAN Standards Committee to 3GPP RAN, 12 March 2015; “Response LS on Clarification of LBT Categories”, liaison from 3GPP RAN1 to IEEE 802 LAN/MAN Standards Committee, 20-24 April 2015; “Response LS on LAA-802.11 Coexistence”, liaison from 3GPP RAN1 to IEEE 802 LAN/MAN Standards Committee, 20-24 April 2015; “Study on Licensed-Assisted Access to Unlicensed Spectrum”, presentation by Havish Koorapaty, 3GPP Study Item Rapporteur, to IEEE 802 Interim Session, Vancouver, Canada, 10-15 May 2015; “Proposed follow-up liaison to 3GPP related to LAA”, liaison from IEEE 802 LAN/MAN Standards Committee to 3GPP RAN, 18 May 2015; and “Response LS related to LAA-802.11 Coexistence”, liaison from 3GPP RAN1 to IEEE 802 LAN/MAN Standards Committee, 25-29 May 2015.

III. Conclusion

ATIS supports the Commission's policy of technology neutrality in the unlicensed spectrum bands and believes that this policy has worked well to foster innovation and competition. ATIS further believes that LTE-U technology represents the latest step on the path toward improved spectrum utilization and enhanced consumer experience. ATIS encourages the Commission to continue to refrain from choosing technology winners and losers and remain technology neutral.

Respectfully submitted,



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