

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

Office of Engineering and Technology and)
Wireless Telecommunications Bureau Seek) ET Docket No. 15-105
Information on Current Trends in LTE-U and)
LAA Technology)

REPLY COMMENTS OF COMPETITIVE CARRIERS ASSOCIATION

Competitive Carriers Association (“CCA”) hereby submits the following reply comments in connection with the Federal Communications Commission’s (“FCC’s” or “Commission’s”) *Public Notice* seeking comment on certain issues raised in the above-captioned proceeding regarding the development and deployment of LTE-Unlicensed (“LTE-U”) and Licensed Assisted Access (“LAA”) technologies (“*Public Notice*”).¹ CCA agrees with the majority of the commenters in this proceeding that the successful coexistence of LTE with other unlicensed technologies is technically feasible and urges the Commission to continue to maintain technology neutral rules in unlicensed bands, while encouraging standards-setting groups to foster successful coexistence among unlicensed technologies.

INTRODUCTION

Many of the commenters in this proceeding recognize the spectrum crunch for mobile wireless operations, and while no panacea to the need for licensed spectrum, these commenters acknowledge that unlicensed LTE presents a method of relief from this crunch. Spectrum is a scarce resource, and wireless providers must have all available tools at their disposal, particularly

¹ *Engineering and Technology and Wireless Telecommunications Bureau Seek Information on Current Trends in LTE-U and LAA Technology*, ET Docket No. 15-105, Public Notice, DA 15-516 (rel. May 5, 2015) (“*Public Notice*”).

with no additional spectrum on the horizon after the incentive auction next year. Like CCA, several commenters agree that LTE-U and LAA will allow wireless carriers the ability to expand their capacity to provide high quality, high speed services to their customers.

In particular, several prominent technology developers have submitted data on the record demonstrating that successful coexistence is technically feasible. Further, wireless carriers also have acknowledged their commitment to cooperate and achieve coexistence. The majority of the commenters agree that coexistence mechanisms incorporated into LTE-U and LAA are important components of any unlicensed LTE deployment and will help prevent interference issues with Wi-Fi and other unlicensed technologies. Furthermore, the record indicates that substantial incentives exist for wireless providers and Wi-Fi operators alike to promote successful coexistence in unlicensed bands.

Accordingly, CCA joins the majority of commenters in this proceeding in urging the Commission to ensure that spectrum policies remain flexible in order to accommodate a wide range of technologies and services on unlicensed spectrum. The FCC should maintain its traditional approach of applying technology neutral policies to the unlicensed bands and allow industry-setting bodies to establish coexistence mechanisms for LTE-U/LAA and other unlicensed technologies.

DISCUSSION

I. THE MAJORITY OF COMMENTERS SUPPORT USING INNOVATIVE UNLICENSED TECHNOLOGIES TO HELP ALLEVIATE MOBILE SPECTRUM CAPACITY CONSTRAINTS

As CCA explains in its initial comments, the wireless industry, and especially competitive carriers, are in need of more spectrum to meet consumers' constantly growing

demand for wireless data services.² The record in this proceeding confirms that parties are deeply concerned about the spectrum crunch and recognize the necessity of making additional spectrum opportunities available for mobile wireless services. Wireless providers such as T-Mobile, AT&T, and Verizon strongly advocate in their comments for the rapid deployment of LTE-U and LAA in order to expand their capacity resources.³ Their comments reflect agreement that the deployment of LTE-U/LAA technology would result in significant benefits for consumers and wireless providers alike, including enhanced network capacity and performance and spectral flexibility.⁴

In addition, other entities, such as those representing consumers and technology platform developers, recognize the immediate need for additional spectrum resources and the opportunity that developing technology for commercial wireless operations in unlicensed spectrum could present for alleviating current constraints. Ericsson expresses concern that the “skyrocketing demand” of mobile data requires “multiple, evolving aspects of licensed and unlicensed technologies to deliver the best mobile experience possible in any given environment”⁵ and

² See Comments of Competitive Carriers Association, ET Docket No. 15-105 at 6-8 (filed June 11, 2015) (“CCA Comments”).

³ Comments of T-Mobile USA, Inc., ET Docket No. 15-105 at 6 (filed June 11, 2015) (“T-Mobile Comments”) (noting that LTE-U and LAA are “designed to expand capacity while sharing unlicensed spectrum with others.”); Comments of AT&T, ET Docket No. 15-105 at 5-6 (filed June 11, 2015) (“AT&T Comments”) (recognizing that deploying LTE in unlicensed bands will allow mobile operators to “expand their network capacity in a cost-effective and simple manner.”); Comments of Verizon, ET Docket No. 15-105 at 1 (filed June 11, 2015) (“Verizon Comments”) (explaining that LTE-U will “efficiently use unlicensed spectrum for data-intensive needs such as downloading mobile apps and streaming video.”).

⁴ See e.g., T-Mobile Comments at 6; Comments of CTIA – The Wireless Association, ET Docket No. 15-105 at 3 (filed June 11, 2015) (“CTIA Comments”).

⁵ Comments of Ericsson, ET Docket No. 15-105 at 3 (filed June 11, 2015) (“Ericsson Comments”).

concludes that LTE-U and LAA are the next step in the “Networked Society.”⁶ Consumer Electronics Association (“CEA”) characterizes unlicensed spectrum as “integral in addressing the spectrum crunch.”⁷ Qualcomm highlights that LTE Unlicensed will aid the wireless industry in using “each sliver of spectrum in the most efficient manner possible to enhance the user experience for consumers.”⁸ Even Cablevision, an opponent of deployment of LTE-U, recognizes the “limited availability and high price of licensed [mobile] spectrum” and notes the important role that unlicensed spectrum has played in this landscape.⁹ CCA shares these significant capacity concerns and echoes the need for a near-term solution involving the deployment of LTE-U, LAA and other technologies.

II. THE MAJORITY OF COMMENTERS AGREE THAT COEXISTENCE IS FEASIBLE AND SUPPORT MAINTAINING THE FCC’S LIGHT-TOUCH APPROACH

A. The Record Demonstrates That LTE-U and LAA Will Harmoniously Coexist With Other Unlicensed Technologies

The majority of commenters in this proceeding agree that LTE-U and LAA may successfully coexist with other unlicensed technologies, such as Wi-Fi.¹⁰ While certain

⁶ *Id.* at 2.

⁷ Comments of Consumer Electronic Association, ET Docket No. 15-105 at 2 (filed June 11, 2015) (“CEA Comments”).

⁸ Comments of Qualcomm Incorporated, ET Docket No. 15-105 at ii, v (filed June 11, 2015) (“Qualcomm Comments”).

⁹ Comments of Cablevision Systems Corporation, ET Docket No. 15-105 at 8, 9 (filed June 11, 2015) (“Cablevision Comments”).

¹⁰ *See e.g.*, Comments of Alcatel-Lucent, ET Docket No. 15-105 at 4 (filed June 11, 2015) (“Alcatel-Lucent Comments”); Comments of Alliance for Telecommunications Industry Solutions, ET Docket No. 15-105 at 4 (filed June 11, 2015) (“ATIS Comments”); AT&T Comments at 5; Comments of Broadcom Corporation, ET Docket No. 15-105 at 1 (filed June 11, 2015) (“Broadcom Corporation Comments”); CEA Comments at 2; Comments of Cisco Systems, Inc., ET Docket No. 15-105 at 6 (filed June 11, 2015) (“Cisco Systems Comments”); Ericsson Comments at 2; Comments of Huawei Technologies, Inc., ET Docket No. 15-105 at 6, 8 (filed June 11, 2015) (“Huawei Comments”); Comments of

commenters are skeptical of the technical feasibility of incorporating a successful coexistence mechanism and a wireless operator's willingness to utilize such a mechanism,¹¹ CCA agrees with the substantial support in the record finding that harmonious coexistence between LTE and other unlicensed operations is feasible through coexistence mechanisms, and that the proper incentives exist for operators of both unlicensed and wireless technologies to ensure that effective sharing techniques are developed and implemented.

For instance, T-Mobile, along with several other commenters, discusses LTE-U's adaptive duty cycle, which uses a technique called Carrier-Sensing Adaptive Transmission ("CSAT") to "schedule" LTE traffic based on a transmitter's ability to sense and measure traffic on a particular channel.¹² This technique permits LTE to share a channel equitably with other traffic, such as that carried over Wi-Fi.¹³ Verizon likewise mentions an etiquette protocol that the LTE-U Forum has developed to ensure that LTE-U transmissions "do not disrupt others' latency-sensitive signals."¹⁴ Ericsson echoes these discussions, explaining that the "smart scheduling mechanism" of CSAT also "optimize[s] spectrum efficiency and avoid[s] further

Nokia, ET Docket No. 15-105 at 9 (filed June 11, 2015) ("Nokia Comments"); Qualcomm Comments at i; T-Mobile Comments at 7-8; Verizon Comments at 3, 5.

¹¹ See e.g., Comments of Google Inc., ET Docket No. 15-105, 4-9 (filed June 11, 2015) ("Google Comments") (arguing that LTE-U fails to coexist effectively with Wi-Fi and that operators of LTE-U/LAA lack incentive "to develop means for fair coexistence with other technologies.").

¹² T-Mobile Comments at 10; see also Verizon Comments at 3-4. A number of other commenters including ATIS, AT&T, CEA, CTIA, Ericsson, Huawei, and Nokia also discuss the benefits of the CSAT coexistence mechanism. See e.g., ATIS Comments at 3; AT&T Comments at 4; CEA Comments at 6; CTIA Comments at 10; Ericsson Comments at 10; Huawei Comments at 8; Nokia Comments at 7.

¹³ Such technologies could alleviate some of Google's concerns that the LTE-U duty-cycle approach causes interruptions to Wi-Fi transmissions. See Google Comments at 2.

¹⁴ Verizon Comments at 4.

aggravating congested traffic conditions.”¹⁵ Ericsson further explains that the coexistence mechanism algorithm is the same whether the issue is LTE-U coexistence with another LTE-U/LAA operator or with a Wi-Fi device.¹⁶ This is an important point as it should alleviate other commenters’ concerns that Wi-Fi-only devices could be unfairly impacted in sharing scenarios.¹⁷ With respect to LAA technology, T-Mobile explains that it “will likely use a ‘Clear Channel Assessment,’ based on channel availability sensing and adapting the transmission duration on a fine timescale, for its listen-before-talk implementation.”¹⁸

Wi-Fi operators, technology developers and wireless carriers all have acknowledged the importance of coexistence mechanisms and agree that these features are fundamental and necessary components of any unlicensed LTE deployment.¹⁹ Cisco Systems hopes “that the record here will enable private industry to discuss and resolve reasonable coexistence mechanisms.”²⁰ CCA shares that hope and that this sort of cross-industry consensus will help promote the development of appropriate coexistence mechanisms.

B. Incentives Exist for Wi-Fi Operators and Wireless Providers Alike to Promote Successful Coexistence In Unlicensed Bands

Some commenters also argue that coexistence is infeasible not because of technical issues, but instead due to the lack of incentive for mobile operators to cooperate. Several of these commenters argue that mobile operators have less incentive to ensure that interference

¹⁵ Ericsson Comments at 9.

¹⁶ *Id.*

¹⁷ *See e.g.*, Comments of Wi-Fi Alliance, ET Docket No. 15-105 at 7 (filed June 11, 2015) (“Wi-Fi Alliance Comments”); Comments of National Cable & Telecommunications Association, ET Docket No. 15-105 at 1 (filed June 11, 2015) (“NCTA Comments”).

¹⁸ T-Mobile Comments at 10.

¹⁹ *See e.g.*, Wi-Fi Alliance Comments at ii; Ericsson Comments at 7; T-Mobile Comments at 4.

²⁰ *See* Cisco Systems Comments at 9.

concerns between LTE-U/LAA and Wi-Fi are mitigated because they do not “face the risk of fatal interference” with their wireless services, such as Wi-Fi services might.²¹ Cablevision went so far as to argue that mobile providers have an incentive to *undermine* Wi-Fi services by using their “licensed spectrum to exploit unlicensed bands while simultaneously polluting those bands for others”²² According to these commenters, mobile providers have no incentive to institute effective sharing and will likely not cooperate. However, the majority of comments in the record, in particular from those that have been testing the viability of LTE-U and LAA technology, demonstrate that providers of LTE-U/LAA also rely on Wi-Fi services, and have significant incentives to ensure that interference does not occur.

“[G]iven the broad reliance on both licensed and unlicensed bands for mobile broadband and the ubiquity of smartphones that use both LTE and Wi-Fi,”²³ mobile operators have strong incentives to ensure that Wi-Fi device users do not suffer interference. As discussed in CCA’s initial comments, and supported by the record, mobile providers often rely on Wi-Fi aggregation, which enables downlink traffic to be carried over Wi-Fi and uplink traffic to be carried over cellular.²⁴ T-Mobile also highlights the many ways in which it uses Wi-Fi technology to complement its cellular services, and notes that T-Mobile customers average more than 9.4 million Wi-Fi calls per day.²⁵ CTIA points out that regardless of the unlicensed LTE technology

²¹ Google Comments at 9; *see also* NCTA Comments at 23-26 (asserting that “purported LTE-U and LAA sharing mechanisms are all optional and carriers have little incentive to employ them in an effective manner.”).

²² Cablevision Comments at 3.

²³ ATIS Comments at 4.

²⁴ *See* CCA Comments at 5.

²⁵ T-Mobile recently released a program called “Wi-Fi Unleashed” which ensures all new smartphones in T-Mobile stores are capable of Wi-Fi calling and texting, and “allows T-Mobile customers to make free Wi-Fi calls, including anywhere outside the country, and

used, “wireless providers expect to continue to rely extensively on Wi-Fi to meet consumer demands.”²⁶ Accordingly, T-Mobile and other wireless providers have “particularly strong incentive[s] . . . to ensure effective co-existence”²⁷ and the Commission should reject arguments to the contrary.

C. FCC Policies Should Continue to Foster Innovation In the Unlicensed Bands By Maintaining A Technology-Neutral, Light-Touch Approach

One aspect of the unlicensed bands that many commenters can agree on, regardless of where their interests fall in this proceeding, is that the FCC’s traditional light-touch approach to the unlicensed bands fosters innovation.²⁸ Maintaining the FCC’s traditional technology neutral approach to unlicensed spectrum will ultimately support continued innovation in the unlicensed bands.

Unlicensed spectrum has been described as “a hotbed for innovation” that has opened the door for new technologies and has brought online devices such as “fitness trackers, locks, and refrigerators.”²⁹ To further ignite this hotbed, CCA agrees that “[t]he most appropriate rules for unlicensed spectrum are those that specify basic technical parameters permitting the use of any technology” and do not “specify the use of particular co-existence mechanisms, as they do not

provides seamless handover between Wi-Fi and VoLTE.” *See* T-Mobile Comments at 2-3.

²⁶ CTIA Comments at 11.

²⁷ T-Mobile Comments at 4.

²⁸ *Compare* T-Mobile Comments at 3 (describing that “[t]he hallmark of spectrum in which the FCC has permitted unlicensed devices has been the innovation that those bands have fostered”), *with* Google Comments at 1 (acknowledging that the “[i]nterest in deploying the [LTE] standard over unlicensed spectrum is further evidence of the success of the Commission’s light-touch approach, and a further demonstration that unlicensed frequencies support innovation.”). *See also* Wi-Fi Alliance Comments at ii (noting that it “welcomes cross-industry cooperation” and “remains hopeful that LTE-U and LAA will ultimately include appropriate sharing mechanisms.”).

²⁹ CEA Comments at 3.

today.”³⁰ As discussed above, coexistence between LTE-U/LAA technologies and Wi-Fi is feasible and participating parties have the proper incentive to ensure that coexistence is maintained, thus eliminating any additional need for FCC intervention with respect to deployment of these developing technologies.

Several commenters in this proceeding argue that there is no need for FCC regulation of LTE-U or LAA and that standards-setting bodies are best positioned for continuing the development of unlicensed LTE.³¹ CCA reiterates that the Commission should use this proceeding to promote flexible uses of unlicensed spectrum, and allow it to act as a forum for information and data to be shared among the standards-setting bodies and participating parties. It has already demonstrated that parties with differing interests agree on the need for coexistence mechanisms and should further allow those mechanisms to develop among the industry. To the extent there is any Commission regulation with regard to unlicensed bands, it should only be to ensure that the standards-setting processes are not dominated by any one or two carriers and that device availability is extended to all potential service providers, not merely the largest wireless providers. As suggested by Microsoft, “[t]he Commission should encourage groups to work cooperatively . . . [but] [i]f these efforts do not prove fruitful . . . the Commission has a role to play as a convener, a facilitator, and a regulatory backstop.”³² Competitive carriers must have the ability to tap into the technology and access the innovative devices necessary to harness the

³⁰ T-Mobile Comments at 3.

³¹ See e.g., AT&T Comments at 2; ATIS Comments at 6; CTIA Comments at 5; Nokia Comments at 4-5; T-Mobile Comments at 3-4; TIA Comments at 2; Qualcomm Comments at 9.

³² Comments of Microsoft Corporation, ET Docket No. 15-105 at 2 (filed June 11, 2015) (“Microsoft Comments”).

potential of unlicensed spectrum, and the Commission should monitor developments in these respects.

CONCLUSION

For the foregoing reasons, CCA requests that the Commission continue to encourage the development of LTE-U and LAA technologies, as well as the use of unlicensed spectrum for mobile services by maintaining its light-touch approach and encouraging cross-industry collaboration on coexistence mechanisms.

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