Utilities Technology Council™

2550 South Clark Street | Arlington, VA 22202

202.872.0030 Phone | 202.872.1331 Fax

utc.org | networks.utc.org

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Ms. Marlene H. Dortch Secretary
Federal Communications Commission
445 - 12th Street, S.W.
Washington, D.C. 20554

Re: Unlicensed Use of the 6 GHz Band, ET Docket No. 18-295; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, GN Docket No. 17-183

Dear Ms. Dortch:

The Utilities Technology Council (UTC) hereby submits this letter in support of the Petition for Reconsideration by the Fixed Wireless Communication Coalition (FWCC) in the above-referenced proceeding.[1] As more fully described herein, the Commission should grant reconsideration because the FWCC has shown that the failure of the Commission to adopt a 0.4% duty factor in the rules for RLAN devices constitutes a material error or omission in the original *Order* and the preliminary results of new tests showing the potential for interference from RLAN operations raises additional facts not known or not existing until after the petitioner's last opportunity to respond on the merits. Moreover, the public interest would be served by considering these test results, before RLAN devices are commercially deployed and cause harmful interference to mission critical communications of utilities and public safety agencies.

Introduction and Background

The members of UTC rely on licensed 6 GHz microwave systems for high-capacity point-to-point communications to support their core electric services. These systems provide voice and data communications with utility personnel and help remotely monitor and control electric generation, transmission and distribution infrastructure, ensuring the delivery of safe, efficient and reliable electric service, as well as the safety of electric operations and personnel. These systems are located across the country and cover vast distances, including rural, urban and suburban areas. Owing to the critical nature of the communications that they provide, these systems are designed, built and operated to provide extremely high levels of reliability.

[1] Fixed Wireless Communications Coalition Petition for Reconsideration in ET Docket No. 18-295 (Jun. 25, 2020)(hereinafter "*Petition for Reconsideration*"). *See also Unlicensed Use of the 6 GHz Band*, Report and Order and Further Notice of Proposed Rulemaking, ET Docket No. 18-295, 35 FCC Rcd 3852 (2020) (rel. Apr. 24, 2020)(hereinafter, "*Order*").

It is imperative that these systems be protected from harmful interference, otherwise the risk to utilities, the public and national security could be catastrophic. These systems support protective relaying systems that immediately isolate faults on the electric transmission and distribution systems before they cause widespread outages. They also provide substation monitoring and control so that control centers can balance the load of electricity on the grid, which is critical and must always be maintained to ensure electric reliability. They also support voice communications with crews working in extremely hazardous environments. Finally, they backhaul communications from a variety of systems all over a utility service territory; if one of these links fails due to interference, all the other microwave links carrying all kinds of communications traffic for utilities are impacted as well.

Electric system communications must be protected against interference from unlicensed operations. Interference must be prevented before it occurs, not after the fact because it will be far too late to undo the damage that could result from interference. The latency requirements for these microwave systems are measured in milliseconds and even intermittent interference can have longer effects on these microwave systems, which may prevent protective relaying systems from isolating faults or lead to imbalances in electric loads which may cause an outage. It cannot be emphasized enough that these mission-critical communications systems are essential to utility operations and must be protected.

As these microwave systems are licensed, they are entitled to interference protection under the Communications Act and the Commission's rules and policies. Sections 301 and 302 of the Communications Act together require the Commission to license any transmitter and prohibit harmful interference to any licensed operation. Although the Commission has authorized unlicensed operations, the Commission's rules require that these systems must not cause harmful interference to licensed operations and they must accept interference from licensed and other unlicensed operations. If they cause harmful interference to other licensed operations, they must immediately correct the interference, or alternatively, shut down the unlicensed operations altogether.[2] Harmful interference is defined under the FCC rules as "any emission, radiation or induction that endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunications service [authorized by the Commission]."[3] Accordingly, the Commission may not authorize unlicensed operations that pose a significant potential of causing harmful interference to licensed operations.[4]

The Commission may grant a petition for reconsideration if the petitioner either (1) shows material error or omission in the original order or (2) raises additional facts not known or

[2] 47 CFR §15.5.

[3] 47 CFR §15.3.

[4] *American Radio Relay League, Inc. v. FCC*, 524 F.3d 227, 234-35 (D.C. Cir. 2008)).

not existing until after the petitioner's last opportunity to respond.[5] UTC supports the FWCC Petition for Reconsideration because the failure of the Commission to adopt a 0.4% duty factor in the rules for RLAN devices constitutes a material error or omission in the original Order, and the preliminary results of new tests showing the potential for interference from RLAN operations raises additional facts not known or not existing until after the petitioner's last opportunity to respond on the merits.

## I. The Failure of the Commission to Adopt a 0.4% Activity Factor in the Rules for RLAN Devices Constitutes Material Error.

In its Petition for Reconsideration, the FWCC requests that the Commission codify the weighted 0.4% activity factor as part of its rules.[6] The FWCC explains that the Commission should have established a 0.4% activity factor for RLAN devices, because it relied on that activity factor to conclude that RLAN devices would not cause harmful interference to licensed microwave systems in the 6 GHz. It is inherently inconsistent, arbitrary and capricious for the Commission to evaluate the interference potential of RLANs using a 0.4% activity factor without adopting rules that would limit RLAN activity to the same or lower levels. In short, RLANs can't have it both ways. They can't be authorized based upon low levels of activity and then permitted to operate with high levels of activity. In addition, as the FWCC observes, the rationale for the Commission's reliance upon a 0.4% activity factor is internally inconsistent and underinclusive. That is, even if the Commission could reasonably conclude that Wi-Fi devices will only operate using 0.4% activity factor, there is a whole universe of other unlicensed operations that may operate at far higher activity factors. Moreover, the Commission encouraged and predicted the proliferation of other innovative forms of unlicensed operations in the band. As FWCC explained, "[w]ith a billion 6 GHz unlicensed devices, deployment of one percent non-Wi-Fi devices would still mean ten million devices for which the Order's assumed activity factor is inapplicable, and if the number of non-Wi-Fi devices is ten percent, that number jumps to one hundred million devices."[7] Accordingly, the Commission's rationale that Wi-Fi devices will only use a 0.4% activity factor is internally inconsistent and underinclusive with its own reasoning that many other types of innovative forms of unlicensed operations will proliferate in the 6 GHz band, which may operate using much higher activity factors.

The Commission should adopt a 0.4% activity factor in the rules for RLAN devices. Without such a limitation on RLAN activity, unlicensed devices will be permitted to operate at higher levels of activity that would certainly cause harmful interference, as studies on the record have shown. As FWCC also observed, limiting the activity factor is a

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[5] *In re Commnet Supply, LLC, Crossroads License Holding Sub A, and Their Successors in Interest*, Order, 33 FCC Rcd 8026, 8030 (WTB 2018); *see also In re Petitions for Reconsideration of the Second Report and Order Implementation of Section 207 of the Telecommunications Act of 1996*, 14 FCC Rcd 19924, n.25 (1999)

[6] *Petition for Reconsideration* at 1, 4-7.

[7] *Id*. at 6.

reasonably conservative approach, which will enable the Commission to consider the impact of the activity factor for 6 GHz unlicensed devices going forward.[8] Moreover, as the FWCC explains, there are important questions about the term "weighted average activity factor" that was used in the CableLabs study upon which the Commission relied when it concluded that RLANs operating with a 0.4% activity factor would not cause harmful interference to licensed microwave systems in the band.[9] As this term is better understood and more real world experience is gained, the Commission could revisit and reexamine the appropriate activity factor for RLAN devices based on sound engineering.[10] Meanwhile, adopting a 0.4% activity factor will not delay the deployment of RLAN devices, certainly not Wi-Fi operations which already use a 0.4% weighted average activity factor, according to the CableLabs study.[11]

## II. Preliminary Test Results Indicate Significant Interference Potential from RLAN Operations, Further Underscoring the Need for Reconsideration of the Order.

In its Petition, the FWCC provides the preliminary results of interference testing using 5.8 GHz test devices in a laboratory environment, which finds that WiFi interference can cause severe damage to point-to-point microwave links, especially when operating co-channel with microwave systems.[12] Further, the preliminary results of the tests show that even with significantly low levels of interference, the point-to-point microwave link is forced to use its signal processing resources to compensate for interference, reducing in this way the link capabilities to address actual fading and other naturally occurring impairments. This ultimately is reflected in a reduction of the link availability.[13] The preliminary results of the tests also raise concerns about the TDD nature of WiFi interferers, which creates particularly difficult challenges for the point-to-point microwave link, which can create unexpected bursts of errors or large variations of the SNR levels over a short period of time in some cases. The preliminary test results also raise concerns about the likelihood that interference from multiple sources will aggregate together and have a more harmful

[8] *Id.* at 7.

[9] *Id*., n. 23 (observing that "a weight average activity factor of 0.4%, the CableLabs data indicates that the 95th percentile activity factor for current Wi-Fi devices is 2% or less and the 99th percentile is 7% or less. *See also* Letter from Rob Alderfer, Vice President of Technology Policy, CableLabs to Marlene H. Dortch, Secretary, Federal Communications Commission, ET Docket No. 18-295, Attachment "6 GHz Low Power Indoor (LPI) Wi-Fi / Fixed Service Coexistence Study" at 5 (filed Dec. 20, 2019)(hereinafter "CableLabs study").

[10] *Id.*

[11] CableLabs Study at 5.

[12] *Petition for Reconsideration,* Attachment A, Aviat Networks, "FAS WiFi Testing Summary Laboratory Testing Observations and Conclusions (May 27th, 2020)" at 11.

[13] *Id.*

effect in the point-to-point microwave link.[14] They also question whether automated frequency coordination (AFC) will be able to contain the amount of interference that the point-to-point microwave links are going to experience from standard power access points.[15]

In addition, the FWCC reports that real-world testing "shows that cochannel interference at +22 dBm, below the maximum allowable EIRP for low-power indoor access points, can cause catastrophically harmful interference to an unfaded fixed service receiver."[16] The testing also suggests that antenna height mismatch between interferer and FS receiver did not protect FS links a distances closer than 1 km, and the testing found that exclusion zones should include the FS antenna sidelobes because harmful interference does occur where an interfering device is located along FS receiver sidelobes.[17] Accordingly, the FWCC concludes that these preliminary results of real-world testing validate the concerns of licensed 6 GHz incumbents and warrant further testing before any unlicensed devices, let alone uncontrolled devices, are deployed in the 6 GHz band.[18]

UTC agrees with the FWCC that these preliminary test results underscore the need for the Commission to reconsider its *Order*. UTC adds that the Electric Power Research Institute (EPRI) has recently published a summary report of the results of its interference testing, and EPRI confirms many of the findings of the preliminary test results in the FWCC *Petition for Reconsideration*.[19] Specifically, EPRI found that harmful interference was caused to utility microwave systems by unlicensed operations when operating co-channel to an incumbent FS link at locations that would presumably be inside an AFC exclusion zone (demonstrating that incumbent FS links will be critically reliant on accurate and reliable AFC operation to provide and maintain protection from harmful interference). The interference levels ranged from severe to very severe and the impact of the interference caused the microwave links to fail completely. Interference from unlicensed devices was found several kilometers from the microwave receivers where line-of-sight (LOS) exists, and at close distances (less than 1 km) antenna mismatch between the interferer 6m above ground level (AGL) and FS (59.4m AGL) did not protect the FS link. Finally, interference occurred when the unlicensed device was located in front of the receiver, as well as when the device was located off-axis in the sidelobes of the microwave receiver. It should also be noted that the EPRI study factored for building entry loss values that were used by the

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[14] *Id.*

[15] *Id.* at 8.

[16] *Petition for Reconsideration* at 11.

[17] *Id.*

[18] *Id.*

[19] Electric Power Research Institute "Unlicensed Use in the 6 GHz Band: Field Interference Test Results", Document No. 3002019712 (Jul. 2020), *available at* https://www.epri.com/research/products/000000003002019712?src=mail.

FCC when it authorized LPI devices to operate without AFC, and the EPRI study did use the activity factor similar to what would occur with video streaming.
UTC agrees with the FWCC that the Commission should reconsider its Order in light of these preliminary results of these tests, particularly given the unreasonable risk of interference to microwave systems and the underlying mission critical communications that are carried over them.[20] Moreover, UTC agrees with the FWCC that the Commission should mandate further testing, whether through the multi-stakeholder group or through various interested parties. UTC also agrees that the brief delay in the rules' effective date would give interested parties time to conduct testing outside the multi-stakeholder group if the group fails to develop a testing process. Finally, UTC agrees with the FWCC that the Commission has expressed its expectation that the multi-stakeholder group should engage in testing, and that if the Commission mandated such testing or temporarily paused the effective date of the rules, it would allow the multi-stakeholder group to accomplish what the Order expects.[21] Accordingly, UTC supports the FWCC *Petition for Reconsideration* and requests that the Commission require interference testing and delay the effectiveness of the rules until these tests have been completed and the results show that unlicensed operations will not cause interference to licensed microwave systems in the band.

[20] *Petition for Reconsideration* at 12 (stating that "it is unnecessarily risky to rush ahead without time for further testing, in no small part because so much of what the Order proposes has never been attempted or tested").

[21] *Id.*

## IV. The Public Interest Would Be Served by Granting FWCC's Petition for Reconsideration.

UTC submits that the public interest in protecting the reliability, safety and security of essential energy and water services and important public safety activities would be served by granting the FWCC *Petition for Reconsideration*. As explained above, utilities rely on 6 GHz licensed microwave systems to ensure operational reliability and personnel safety. The impact of interference to these systems would be widespread and significant. Given the importance of these 6 GHz systems to national security, as well as public welfare, it would be reasonable for the Commission to adopt a 0.4% activity factor under the rules for RLANs and to mandate further testing so that 6 GHz microwave systems are protected against interference from unlicensed operations. Therefore, UTC submits that the public interest would be served by granting the FWCC *Petition for Reconsideration.*

Sincerely,

**Utilities Technology Council**

/s/ Brett Kilbourne

Brett Kilbourne
Vice President Policy and General Counsel
Utilities Technology Council
2550 South Clark Street, Suite 960
Arlington, VA 22202
202-872-0030