

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

In the Matter of)	
)	
Unlicensed Use of the 6 GHz Band)	ET Docket No. 18-295
)	
Expanding Flexible Use in Mid-Band Spectrum)	GN Docket No. 17-183
Between 3.7 and 24 GHz)	
)	

PETITION FOR RULEMAKING

UTILITIES TECHNOLOGY COUNCIL

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

EDISON ELECTRIC INSTITUTE

Aryeh B. Fishman
Associate General Counsel, Regulatory Legal
Affairs
Edison Electric Institute
Washington, D.C. 20004
(202) 508-5023

**AMERICAN PUBLIC POWER
ASSOCIATION**

Corry Marshall
Senior Government Relations Director
American Public Power Association
2451 Crystal Dr., Suite 1000
Arlington, VA 22202
202-467-2959

**NATIONAL RURAL ELECTRIC
COOPERATIVE ASSOCIATION**

Brian O'Hara
Senior Director Regulatory Issues – Telecom &
Broadband
National Rural Electric Cooperative Association
4301 Wilson Blvd.
Arlington, VA 22203
703-907-5798

AMERICAN GAS ASSOCIATION

Matthew J. Agen
Assistant General Counsel
American Gas Association
400 North Capitol Street, NW
Washington, DC 20001
202-824-7090

AMERICAN PETROLEUM INSTITUTE

Suzanne Lemieux
Manager Operations Security &
Emergency Response Policy,
Corporate Policy
American Petroleum Institute
200 Massachusetts Ave. NW
Washington, D.C. 20001-5571
(202) 682-8000

**AMERICAN WATER WORKS
ASSOCIATION**

G. Tracy Mehan, III
Executive Director, Government Affairs
American Water Works Association
1300 Eye Street, NW Suite 701W
Washington, DC 20005
202-326-6124

**INTERNATIONAL ASSOCIATION OF
FIRE CHIEFS**

Ryan Woodward
Government Relations Manager
International Association of Fire Chiefs
4795 Meadow Wood Lane, Suite 100W
Chantilly, VA 20151

APCO INTERNATIONAL

Jeffrey S. Cohen
Chief Counsel and Director of Government
Relations
APCO International
1426 Prince Street
Alexandria, VA 22314
571-312-4400 ext. 7005

**NATIONAL PUBLIC SAFETY
TELECOMMUNICATIONS
COUNCIL**

Ralph A. Haller, Chairman
National Public Safety
Telecommunications Council
9615 East County Line Road, Suite B-246
Centennial, Colorado 80112

**THE ASSOCIATION OF AMERICAN
RAILROADS**

Kathryn D. Kirmayer
Senior Vice President – Law & General
Counsel
Timothy J. Strafford
Associate General Counsel & Corporate
Secretary
The Association of American Railroads
425 Third Street, S.W. Suite 1000
Washington, DC 20024

NUCLEAR ENERGY INSTITUTE

Ellen C. Ginsberg
Sr. Vice President, General Counsel and
Secretary
Nuclear Energy Institute
1201 F Street NW, Suite 1100
Washington, DC 20004

December 7, 2021

TABLE OF CONTENTS

I. THE COMMISSION’S EXISTING 6 GHZ LPI RULES ARE FLAWED AND MUST BE MODIFIED TO PROTECT INCUMBENTS FROM HARMFUL INTERFERENCE.	2
A. Real-world Testing Demonstrates Defects in Simulation Assumptions and Shows Significant Potential for Harmful Interference to Licensed 6 GHz Microwave Systems.....	3
B. The Commission’s Current Rules are Fundamentally Flawed and Must Be Revised.	7
C. Updated Protection Rules Should Be Based on Open and Transparent Real-World Testing by the Commission.	9
D. 6 GHz LPI Devices Should Be Controlled by AFC Systems, or Utilize Other Necessary Mitigation Techniques, to Prevent Interference to Licensed Systems.	10
II. THE COMMISSION SHOULD ADOPT RULES TO ESTABLISH A MECHANISM FOR LICENSEES TO RECOVER THEIR COSTS TO MONITOR AND MITIGATE AGAINST POTENTIAL INTERFERENCE FROM UNLICENSED 6 GHZ SYSTEMS.	11
III. THE COMMISSION SHOULD CONDUCT INDEPENDENT TESTING TO CONSIDER THE EXTENT TO WHICH NEW RULES FOR STANDARD POWER ACCESS DEVICES SHOULD BE DEVELOPED.	13
IV. CONCLUSION	17

SUMMARY

Petitioners request the Commission adopt a rulemaking to develop new rules for 6 GHz low-power indoor (“LPI”) devices that are proven to prevent interference to licensed microwave incumbents in the band. In addition, Petitioners request that the Commission develop a mechanism for incumbents to recover the cost of mitigating and resolving interference from unlicensed 6 GHz operations. Finally, Petitioners request that the Commission conduct independent tests of standard power access devices to determine the extent to which it should adopt new rules to prevent these devices from causing harmful interference to licensed microwave systems in the band.

Recent real-world tests have determined that 6 GHz LPI devices will cause harmful interference to licensed microwave systems in the band, due in part to beacon signals that will transmit constantly and thus endanger the functioning of services to public safety and critical infrastructure industries and seriously degrade, obstruct, or repeatedly interrupt their radio communications services. These tests also demonstrate that the data and the assumptions for the Commission’s rules for 6 GHz LPI devices are fundamentally flawed. Accordingly, the Commission should exercise its rulemaking authority to revise the rules and conduct open and transparent testing to prove these rules effectively prevent interference to licensed microwave systems. In that regard, the Commission should require 6 GHz LPI devices to be controlled by AFC or use some other interference protection mechanism.

The Commission should also establish a mechanism for cost recovery by incumbents to reimburse them for mitigating and resolving interference from unlicensed 6 GHz operations. This is consistent with the Commission’s *Emerging Technologies* framework and Commission precedent. Also, due to the flawed data and assumptions upon which the Commission relied, the

Commission should conduct independent tests of standard power access devices to determine if new rules need to be developed that will prevent interference from these devices to licensed microwave systems in the band.

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

In the Matter of)	
)	
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
)	

PETITION FOR RULEMAKING

The Utilities Technology Council (“UTC”), the Edison Electric Institute (“EEI”), the American Public Power Association (“APPA”), the National Rural Electric Cooperative Association (“NRECA”), the American Gas Association (“AGA”), the American Water Works Association (“AWWA”), the American Petroleum Institute (“API”), the Nuclear Energy Institute (“NEI”), the Association of American Railroads (“AAR”), the Association of Public-Safety Communications Officials-International (“APCO”), the International Association of Fire Chiefs (“IAFC”) and the National Public Safety Telecommunications Council (“NPSTC”) (collectively the “Petitioners”) hereby submit this Petition for Rulemaking (“Petition”) pursuant to 47 C.F.R. § 1.401.

Petitioners respectfully request that the Commission (1) adopt rules that effectively prevent harmful interference to licensed microwave systems from low power indoor (“LPI”) unlicensed devices in the 6 GHz band (5925-7125 MHz); (2) mandate a cost reimbursement mechanism that will allow licensees to recover their costs to monitor and mitigate interference from use of the 6 GHz band by unlicensed operations; and (3) conduct independent testing to determine the extent to which new rules should also be developed for standard power access unlicensed operations in the 6 GHz band, due to flawed data and false assumptions in the models used by the Commission to develop the rules for standard power access devices.

In addition to this Petition for Rulemaking, Petitioners have also filed a Request for Stay of all

equipment certification of unlicensed 6 GHz LPI devices, including such devices that have already been certified and must be removed from the market immediately. A stay of equipment certification of 6 GHz LPI devices is necessary because such devices pose an imminent risk of interference to licensed microwave systems in the band, which would cause irreparable harm to public safety and critical infrastructure industries. Conversely, unlicensed proponents will not be substantially harmed by a temporary stay of equipment certification of 6 GHz LPI devices. Thus, public interest favors granting the stay.

I. THE COMMISSION’S EXISTING 6 GHz LPI RULES ARE FLAWED AND MUST BE MODIFIED TO PROTECT INCUMBENTS FROM HARMFUL INTERFERENCE.

The fundamental tenet for unlicensed operations under Part 15 of the Commission’s rules is that “operation of an intentional, unintentional, or incidental radiator is subject to the conditions that no harmful interference is caused” to another authorized radio station.¹ In reaching its decision to allow unlicensed 6 GHz LPI devices, the Commission found, based purely on statistical modeling, that fixed microwave links would have an “insignificant chance of experiencing harmful interference from indoor low-power unlicensed operations” and based this partly on the “non-continuous nature of the transmissions” expected by 6 GHz LPI operations.²

Due to the failure of unlicensed proponents and the Commission to perform any actual testing of unlicensed 6 GHz LPI devices, incumbent licensees worked with the Commission to develop a plan to test commercial off-the-shelf unlicensed 6 GHz LPI devices and ascertain if the limitations set forth by the rules adopted in the Commission’s *6 GHz Order* would fully protect incumbent systems. This

¹ See 47 C.F.R. § 15.5.

² *Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Report and Order and Further Notice of Proposed Rulemaking, FCC 20-51, ET Docket No. 18-295, GN Docket No. 17-183, 35 FCC Rcd 3852, 3894-95 at ¶141 (2020) (hereinafter, “*Report and Order*” or “*6 GHz Order*”).

testing demonstrates that the simulation data provided to the Commission by unlicensed proponents was flawed and misleading—beacon transmissions from unlicensed 6 GHz LPI devices are periodically transmitted on a constant basis in the 6 GHz band and realistic locations and operations by an unlicensed 6 GHz LPI device would harmfully interfere with authorized fixed microwave systems. Based on this new data, Petitioners ask the Commission to: (1) independently test unlicensed 6 GHz LPI devices to determine the appropriate limitations to ensure incumbents do not receive harmful interference, and (2) promulgate modified 6 GHz rules to implement those protections.

A. Real-world Testing Demonstrates Defects in Simulation Assumptions and Shows Significant Potential for Harmful Interference to Licensed 6 GHz Microwave Systems.

While the Commission did not affirmatively require testing prior to certifying unlicensed 6 GHz LPI devices, it did suggest that a multi-stakeholder group (“MSG”) could “work cooperatively to develop and test devices to aid in the goal of developing processes for introducing and operating devices across the 6 GHz band.”³ Based on this direction by the Commission, incumbent 6 GHz licensees attempted to work collaboratively with the MSG to establish interference testing but all these efforts were blocked by unlicensed proponents.⁴ This failure of the MSG process forced incumbent licensees to move forward with testing efforts outside the Commission-sanctioned MSG process. To ensure the Commission and unlicensed proponents had the opportunity to comment and participate in this testing, a detailed summary of the testing to be conducted was provided to the public record over a month before actual testing occurred.⁵ Any party with concerns or suggestions could have provided them to

³*Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Report and Order and Further Notice of Proposed Rulemaking, FCC 20-51, ET Docket No. 18-295, GN Docket No. 17-183, 35 FCC Rcd 3852, 3894-95 at ¶117 (2020) (hereinafter, “*Report and Order*” or “*6 GHz Order*”).

⁴ For example, in the initial meetings of Workstream 1 of the MSG, Southern requested support from unlicensed device vendors to supply equipment and work on testing parameters. Unlicensed proponents asserted that any such testing was outside the scope of the MSG and was merely an attempt to relitigate the Commission’s decision. *See e.g.*, meeting discussion points of Workstream 1 from November 5, 2020, available at <https://groups.wirelessinnovation.org/wg/6GHz-MSG-WS1/document/8355>

⁵ Letter from Larry F. Butts, Southern Company Services, Inc. to Marlene H. Dortch, Secretary, Federal Communications

the Commission record prior to any testing—but no unlicensed parties commented. This invitation was also extended on the record and privately to unlicensed proponents to participate in the April 2021 testing—again no parties provided any help, guidance, or participation.⁶ Following input from the Commission’s Office of Engineering and Technology (“OET”) staff, testing was conducted in April 2021.

The results from this testing of commercially available, off-the-shelf unlicensed 6 GHz LPI devices were extremely disturbing.⁷ Significantly, this testing revealed that beacons—signals sent by a Wi-Fi router to allow devices to find and associate with the access point—operating alone, without any content payload data, produce interfering signals in excess of the Commission adopted -6 dB I/N interference protection threshold in five out of the thirteen different configurations tested. These beacon signals begin transmitting the moment the LPI devices are powered on and were measured as transmitting constantly every 20 milliseconds, otherwise there would be no way for a new device to scan and find the router to connect.⁸ The likelihood of harmful interference from these beacon signals is new information that unlicensed stakeholders never disclosed, nor did they ever model the effect of beacon transmissions at any point in the multi-year proceeding, and thus the *6 GHz Order* did not address this significant factor.

Commission, ET Docket No. 18-295, GN Docket No. 17-183 (filed March 26, 2021).

⁶ *See e.g.*, Letter from Coy Trosclair, Southern Company Services, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, ET Docket No. 18-295, GN Docket No. 17-183 (filed March 22, 2021) (“Southern again expressed its long-standing and continued readiness to host and participate in cooperative testing with all stakeholders, including device manufacturers, proponents of unlicensed operations, other 6 GHz incumbents, and the Commission itself.”).

⁷ The report documenting the results of these interference tests was previously provided to the staff of the FCC’s Office of Engineering and Technology. *See* Letter from Larry Butts, Manager, Telecom Engineering, Southern Company Services, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission in ET Docket No. 18-295 and GN Docket No. 17-183 (filed June 23, 2021); *and see* Attachment A: Test Report on the Effects of 6 GHz Unlicensed RLAN Units on Fortson to Columbus Microwave Link June 21, 2021, available at <https://www.fcc.gov/ecfs/filing/106231367519302> (“6 GHz Interference Testing Report”).

⁸ 6 GHz Interference Testing Report at 6.

Additionally, the real-world tests demonstrated that lower bandwidth data sessions (10-100 Mbps) also caused harmful interference in eleven out of thirteen configurations tested, including from an LPI access point that was more than 4.5 kilometers from the 6 GHz point-to-point receiver. Moreover, the activity factors modeled by unlicensed device manufacturers and relied on in the *6 GHz Order* to find a low probability of harmful interference proved extremely inaccurate. In the real world, the activity factor for commercial off-the-shelf LPI access points transmitting a single content stream (100 Mbps or less) proved to be over 50%, whereas the *6 GHz Order* referenced a 0.4% duty cycle.⁹ For beacon transmissions alone, the activity factor measured 2.2% (more than five times greater than what was simulated in the unlicensed proponents modeling).¹⁰ Even with the modification suggested below by the Wi-Fi Alliance, beacons would be transmitting every 100 milliseconds (or a duty cycle of 0.7%) that is still nearly double the duty cycle assumed in unlicensed proponents' modelling.

Rather than providing their own testing data and information, 6 GHz unlicensed proponents have characterized the tests as “advocacy-driven” and specifically designed to create “unrealistic situations where ... interference could occur.”¹¹ Such rhetoric evinces a complete disregard for the interference problem, including the potential impact to the public. Unlicensed proponents apparently refuse to recognize the results of real-world tests and continue to cling to modeling—even when the real-world testing demonstrates that their models have been rebutted by actual operational evidence. In an apparent attempt to rehabilitate the interference environment, the Wi-Fi Alliance suggests that multi-band Wi-Fi devices would default to use bands other than the 6 GHz band to purportedly reduce

⁹ See, e.g., *6 GHz Order*, 35 FCC Rcd at 3901 ¶ 131.

¹⁰ 6 GHz Interference Testing Report at 2, 19-20. Note that the changes noted in the WFA filing (footnote 5) reduce this duty cycle to 0.7% for Beacons (24 hours per day, 7 days per week) which is still far above the 0.4% previously used.

¹¹ Letter from Paul Margie, counsel for Apple Inc., Broadcom Inc., Cisco Systems, Inc., Facebook, Inc., Google LLC, Hewlett Packard Enterprise, Intel Corporation, Microsoft Corporation, and Qualcomm Incorporated to Marlene H. Dortch, Secretary, FCC in ET Docket No. 18-295 (filed July 22, 2021), available at [https://ecfsapi.fcc.gov/file/107220774218703/Southern%20Testing%20Response%20\(July%2022%202021\).pdf](https://ecfsapi.fcc.gov/file/107220774218703/Southern%20Testing%20Response%20(July%2022%202021).pdf).

the possibility of harmful interference to primary incumbents uses of the 6 GHz band.¹² While this serves as a tacit admission by unlicensed proponents that beacon operations present a previously undocumented interference threat to licensed systems, it does not remedy the underlying issue. As Southern noted in a follow up filing, this new software update would still present fixed microwave equipment with Wi-Fi interference for every fixed microwave packet.¹³

Similarly, Apple, Broadcom, Cisco, and others submitted a technical report purporting to respond to the 6 GHz Interference Testing Report.¹⁴ However, this technical report generally reiterates the FCC's *6 GHz Order* and makes unsupported and general assertions about certain flaws in the testing methodology, which are substantively unresponsive to the findings in the 6 GHz Interference Testing Report and lack any independent testing in support. Southern responded to this filing, stating that it "mischaracterizes the test process, focuses on cherry-picked data points, and fundamentally misunderstands the testing and protection criteria associated with fixed microwave systems."¹⁵

In sum, the only real-world testing data provided to the Commission reveal that the record evidence upon which the Commission relied in developing its rules was fundamentally flawed. Moreover, the consequences of the interference and the risks it poses to licensed microwave systems are substantial. Public safety agencies, utilities, and wireless providers all rely on 6 GHz point-to-point

¹² See Letter from Alex Roytblat, Wi-Fi Alliance to Marlene H. Dortch, Secretary, Federal Communications Commission, ET Docket No. 18-295, GN Docket No. 17-183 (filed Sept. 1, 2021).

¹³ See Letter from Larry Butts, Southern Company Services, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, ET Docket No. 18-295, GN Docket No. 17-183 (filed Sept. 24, 2021). Additionally, it is unclear how multi-band Wi-Fi devices intended for indoor use would "know" whether they are located outdoors and thus would be prohibited from operating in the 6 GHz band – another issue that needs to be addressed with new rules.

¹⁴ See Letter from Paul Margie, Counsel to Apple, Inc., Broadcom Inc., Cisco Systems, Inc., Facebook, Inc., Google LLC, Hewlett Packard Enterprise, and Microsoft Corporation to Marlene H. Dortch, Secretary, Federal Communications Commission in ET Docket No. 18-295 (filed Oct. 14, 2021).

¹⁵ See Letter from Larry Butts, Manager, Telecom Engineering, Southern Company Services, Inc. to Marlene H. Dortch, Federal Communications Commission in ET Docket No. 18-295 (filed Nov. 4, 2021).

microwave links for critical communications, and broadcasters rely on 6 GHz spectrum for mobile video transmissions at various events. The Commission therefore must revise its 6 GHz rules in light of this new evidence, before hundreds of millions of unlicensed devices are deployed and generate widespread harmful interference to essential communications channels.

B. The Commission’s Current Rules are Fundamentally Flawed and Must Be Revised.

These tests demonstrate the urgent necessity for the Commission to conduct a rulemaking proceeding to develop rules that will effectively prevent harmful interference from 6 GHz LPI devices to licensed microwave systems in the band. The Commission’s rules adopted from its *Report and Order* clearly fail to protect incumbent microwave links. This is not a minor discrepancy or some isolated issue with the Commission’s current rules. The testing demonstrates that the record evidence presented by the unlicensed proponents to the Commission and upon which the Commission based its rules was fundamentally flawed.

Worse, unlicensed proponents were in a unique position to know that the evidence they presented to the Commission was inaccurate. They knew or should have known that normal, standards-based operation of unlicensed 6 GHz LPI devices transmit beacon signals periodically on a constant basis and in all unlicensed frequency bands, because they manufactured the devices and had prototypes that could have or should have been tested. Yet, beacons are not discussed in the Commission’s rulemaking record (including as part of the simulations provided by unlicensed device manufacturers and unlicensed proponents).

Based on this new evidence, the Commission must initiate a rulemaking proceeding consistent with its statutory authority to license spectrum and protect against harmful interference to primary licensees. Sections 301 and 302 of the Communications Act together require the Commission to

license any transmitter and prohibit harmful interference to any licensed operation.¹⁶ Although the Commission allows unlicensed operations, these operations must not cause harmful interference to licensed systems, and they must accept interference from licensed and other unlicensed operations. If unlicensed operations cause harmful interference to licensed systems, the unlicensed operator must immediately correct the interference, or, alternatively, shut down the unlicensed operations altogether.¹⁷ Harmful interference is defined under Commission 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].”¹⁸ Accordingly, the Commission may not authorize unlicensed operations that pose a significant potential of causing harmful interference to licensed operations.¹⁹

The most recent interference testing—conducted with FCC-certified, commercial off-the-shelf devices operating under real-world conditions—proves that the current rules allow unlicensed LPI devices to “endanger[] ... safety services” or “seriously degrade[], obstruct[] or repeatedly interrupt[]” licensed microwave systems in the 6 GHz band. Further, this harmful interference will be widespread and nearly constant, potentially occurring anytime, anyplace and by anyone.²⁰ The harmful interference will be impractical to trace and mitigate against, and it will interrupt mission critical communications, threatening the safety of life, health, and property, as well as the delivery of essential services to the public.

¹⁶ 47 U.S.C. §§301 and 302.

¹⁷ 47 CFR §15.5.

¹⁸ 47 CFR §15.3.

¹⁹ *American Radio Relay League, Inc. v. FCC*, 524 F.3d 227, 234-35 (D.C. Cir. 2008).

²⁰ See Letter from Donald J. Evans, Counsel for the Fixed Wireless Communications Coalition to Marlene H. Dortch, Secretary, Federal Communications Commission in ET Docket No. 18-295, Attachment A at 3 (filed Dec. 19, 2019)(stating the uncontrolled RLAN “devices could transmit anywhere, anytime, - regardless of FS receivers nearby.”)

If the Commission does not revise its current rules, the consequences would be potentially disastrous and life-threatening due to the near-certain probability of harmful interference coupled with the risk that harmful interference from unlicensed 6 GHz LPI operations poses to licensed microwave systems and ultimately to the public that depends on them. The recent real-world interference testing contradicts the fundamental basis for the Commission’s current rules, and the Commission can no longer reasonably conclude that unlicensed 6 GHz LPI operations pose an insignificant potential of causing harmful interference to licensed operations in the 6 GHz band.²¹ For all these reasons and consistent with its statutory authority, the Commission must immediately adopt a rulemaking proceeding to address the threat of harmful interference from unlicensed LPI and standard power devices in the 6 GHz band.

C. Updated Protection Rules Should Be Based on Open and Transparent Real-World Testing by the Commission.

To establish updated unlicensed 6 GHz LPI rules, there must be substantial evidence on the record to support whatever is adopted based upon rigorous real-world testing and empirical data that proves that unlicensed 6 GHz LPI operations would not cause harmful interference to licensed operations. Particularly with public safety at stake, the Commission should not rely solely on models and Monte Carlo simulations, which are inherently probabilistic and less reliable than real-world testing. Accordingly, Petitioners recommend that the Commission exercise its authority under Section 2.945 of the Commission’s rules to require equipment manufacturers to provide sample devices for interference testing and use the test results to provide data for developing the rules and certifying equipment authorization.²² This is consistent with Commission precedent, and will ensure that the

²¹ *Report and Order*, 35 FCC Rcd at 3890, 3892 ¶¶104 and 110 (stating that “the technical filings in this proceeding support our conclusion that the potential for harmful interference to incumbent services operating in the 6 GHz band is insignificant,” and concluding that “the risk of harmful interference to incumbent operations to be insignificant from LPI devices operating at 5 dBm PSD and otherwise in compliance with the FCC’s rules.”)

²² *See e.g.* Letter from Brett Kilbourne, Vice President & General Counsel, Utilities Technology Council to Marlene H.

interference potential of unlicensed 6 GHz LPI devices and standard power devices is accurately determined and reduce regulatory uncertainty associated with modeling or having to otherwise estimate potential harmful interference based on a multiplicity of factors that may not reflect real-world interference environments.

D. 6 GHz LPI Devices Should Be Controlled by AFC Systems, or Utilize Other Necessary Mitigation Techniques, to Prevent Interference to Licensed Systems.

Petitioners request that the Commission develop rules that would require 6 GHz LPI devices to be controlled by AFC systems or other mitigation techniques to prevent interference to licensed microwave systems. The 6 GHz Interference Testing Report has proven that uncontrolled 6 GHz LPI devices will cause widespread and significant harmful interference to licensed microwave systems. That is a fact, and it is uncontroverted on the record. In addition, the process and the parameters for AFC system authorization need to be clarified to ensure that AFC systems (or any other mitigation techniques) are effective at preventing interference to licensed microwave systems, as described in more detail herein.

In its *Report and Order*, the Commission concluded that the interference potential from uncontrolled 6 GHz LPI devices was insignificant, and the Commission relied on flawed data and false assumptions from unlicensed proponents in reaching this conclusion.²³ Instead of requiring AFC, the Commission relied on lower power limits, indoor operations and contention-based protocols to protect

Dortch, Secretary, Federal Communications Commission in ET Docket No. 18-295 (filed Mar. 3-4, 2021), *available at* [https://ecfsapi.fcc.gov/file/103031238409377/Ex%20parte%203-2021%20\(Rosenworcel\)\(final\).pdf](https://ecfsapi.fcc.gov/file/103031238409377/Ex%20parte%203-2021%20(Rosenworcel)(final).pdf) (requesting that the Commission require equipment manufacturers to provide 6 GHz LPI devices for testing, pursuant to section 2.945 of the rules and consistent with Commission precedent).

²³ *Report and Order* at ¶110 (stating that “[b]ased on our experience with unlicensed operations and interference analyses as well as our engineering judgment, we find that 5 dBm/MHz PSD will both adequately protect all incumbents in the band from harmful interference as well as offer enough power to unlicensed devices, commensurate with the levels in the other U-NII bands, to sustain meaningful applications especially when using wider bandwidths. At this power limit and with the other constraints imposed on these operations, we find the risk of harmful interference to incumbent operations to be insignificant.”)

licensed microwave systems from harmful interference by 6 GHz LPI devices.²⁴ The Commission may have also refrained from requiring AFC for 6 GHz LPI devices based on claims by unlicensed proponents that AFC would be an undue burden or technically infeasible to implement. Petitioners continue to believe that indoor restrictions and contention-based protocols will be ineffective. Moreover, the results of the 6 GHz Interference Testing Report have shown that 6 GHz LPI devices will cause harmful interference to licensed microwave systems even with these limitations. It is also unclear how equipment manufacturers of multiband devices would ensure that such devices do not operate in the 6 GHz band when the device is not indoors. Accordingly, the Commission should propose requiring 6 GHz LPI devices to be controlled by AFC (or some other mitigation technique) to protect licensed microwave systems in the 6 GHz band, consistent with the Commission's rules for standard power access devices.

II. THE COMMISSION SHOULD ADOPT RULES TO ESTABLISH A MECHANISM FOR LICENSEES TO RECOVER THEIR COSTS TO MONITOR AND MITIGATE AGAINST POTENTIAL INTERFERENCE FROM UNLICENSED 6 GHZ SYSTEMS.

Petitioners respectfully request that the Commission immediately conduct a rulemaking to adopt rules that will allow licensees to recover their costs to monitor and mitigate against potential interference. Incumbent licensees faced with interference or costs associated with new use of the spectrum have consistently been reimbursed by the new user of the spectrum band. As there are and continue to be significant costs incurred by incumbent licensees to evaluate the current spectrum environment, monitor, detect, identify, and report interference in the 6 GHz band (such as to the Commission and AFC operators), these costs must be reimbursed. Accordingly, the Commission should adopt a rulemaking to develop a mechanism by which incumbent licensees will be able to

²⁴ *Id.*

recover the costs of monitoring and reporting on interference resulting from unlicensed use of the 6 GHz band.

The Commission-sponsored MSG has identified significant costs that will be incurred by incumbent 6 GHz licensees to monitor and mitigate any interference from unlicensed use of the 6 GHz band.²⁵ First, licensed incumbents will need to measure and document the baseline performance metrics of their fixed links before widespread adoption and use of the 6 GHz band by unlicensed devices.²⁶ Based on information provided to the MSG by Aviat and Nokia, fixed microwave incumbents will also be required to purchase additional software or upgraded equipment functionality to monitor the performance of their fixed microwave links.²⁷ Fixed microwave incumbents will need to provide reports of interference as well as constantly monitor the performance of their systems based on new unlicensed use of the 6 GHz band. Additionally, the recently adopted process for AFC approval will require field testing and public trials in which incumbent licensees will need to participate and otherwise monitor to ensure that their critical 6 GHz systems are protected.²⁸ Each of these efforts are ongoing and have significant costs associated with them that would not have occurred but for the use of the 6 GHz band by new unlicensed devices.

In similar situations, the Commission has consistently found that incumbent licensees should be reimbursed for any costs associated with a new entrant's use of the spectrum as provided within the

²⁵ See e.g., <https://groups.wirelessinnovation.org/wg/6GHz-MSG-WS1/document/15930> (last visited Aug. 2, 2021). While the MSG did find that incumbents should take these measures that have significant costs, unlicensed proponents asserted that costs were an issue outside the scope of the MSG and should be raised at the Commission.

²⁶ *Id.*

²⁷ *Id.* See also <https://groups.wirelessinnovation.org/wg/6GHz-MSG-WS1/document/16060> (Aviat submission to the MSG) and <https://groups.wirelessinnovation.org/wg/6GHz-MSG-WS1/document/16057> (Nokia submission to the MSG) (last visited Aug. 2, 2021).

²⁸ See AFC Public Notice at ¶8.

Commission's *Emerging Technologies* framework.²⁹ Indeed, in the exact same circumstances (*i.e.*, fixed microwave incumbents faced with new use by unlicensed devices), the Commission approved a proposal from the Unlicensed PCS Ad Hoc Committee for 2 GHz Microwave Transition and Management ("UTAM") to establish a temporary open industry entity that would assume spectrum management functions for the unlicensed use of the band pursuant to Section 332(b) of the Communications Act.³⁰ Unlicensed device manufacturers were required to contribute to a fund from which UTAM reimbursed incumbent licensees but also to support spectrum management activities that allowed unlicensed use of the 1910-1930 MHz band prior to relocation.³¹ Based on this precedent, the Commission should mandate the establishment of a similar fund and process to reimburse incumbent licensees for costs associated with, but not limited to: (1) baseline performance measurements of existing fixed links; (2) software and equipment upgrades needed to monitor system performance; and (3) reporting and monitoring of interference from unlicensed 6 GHz devices.³²

III. THE COMMISSION SHOULD CONDUCT INDEPENDENT TESTING TO CONSIDER THE EXTENT TO WHICH NEW RULES FOR STANDARD POWER ACCESS DEVICES SHOULD BE DEVELOPED.

The findings from the 6 GHz Interference Testing Report and the failure of unlicensed proponents to provide accurate data and to cooperate on interference testing also raise significant

²⁹ See *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, FCC 92-437, ET Docket No. 92-9, First Report and Order and Third Notice of Proposed Rulemaking, 7 FCC Rcd. 6886 (1992), clarified by Third Report and Order, FCC 93-351, 8 FCC Rcd. 6589 (1993) ("Emerging Technologies Third Order"), modified on reconsideration, Memorandum Report and Order, 9 FCC Rcd. 1843 (1994).

³⁰ See Amendment of the Commission's Rules to Establish New Personal Communications Services, GN Docket No. 90-314, 8 FCC Rcd.7700 (1993) ("UTAM Decision").

³¹ UTAM Decision ¶ 91 ("...we are requiring applicants for equipment authorization for unlicensed PCS devices to be participants in UTAM.").

³² Incumbent licensees would not play a role in the management of this fund. Additionally, should unlicensed use of the 6 GHz band be unable to protect licensed incumbent systems from harmful interference, this fund could be increased to allow for incumbent relocation from the 6 GHz band to another spectrum band (if available and comparable) or use different means to fulfill their communications needs.

doubts about the effectiveness of the rules to prevent harmful interference to licensed microwave systems from standard power access devices. The issue is whether the Commission can reasonably rely on the underlying data and the assumptions that AFC will use when determining the appropriate exclusion zones.³³ As explained below, the only way to know if the rules are effective at preventing interference is through real-world testing of standard power access devices.

If the data and assumptions are flawed, then AFC will not effectively protect licensed microwave systems. For example, and of relevance considering the results of the tests of 6 GHz LPI devices, if the AFC system does not correctly account for the presence of beacon signals from the standard power access points, those beacon signals and client devices may continue to transmit regardless of whether AFC has directed the standard power access devices to stop transmitting near a licensed microwave receiver. In addition, if those beacon signals are transmitting constantly, the effect of aggregated interference should be factored into the algorithm that AFC would use to assure that standard power access operations do not exceed the -6 dB I/N interference criteria at the microwave receiver. In that regard, the Commission specifically excluded aggregated interference, because it concluded that “the risk of interference from large numbers of standard power access points would not be due to signal aggregation from multiple unlicensed devices, but from a single standard-power access point in or near the main beam of a microwave link receive antenna with little or no intervening clutter.”³⁴ In short, there are numerous questions that the Commission should raise about the effectiveness of its rules for standard power access devices, given the flawed data and false assumptions about 6 GHz LPI devices from proponents of unlicensed operations.

The only way to be sure if the AFC systems are properly configured so that they effectively

³³ *Id.* at ¶61 (stating that “[t]he propagation model that we adopt will, in turn, be used by the AFC system as one of the factors when determining the exclusion zones”).

³⁴ *Id.* at ¶72.

protect licensed microwave systems is to conduct thorough real-world tests of standard power access devices that prove these devices do not exceed the -6 dB I/N interference threshold at the microwave receiver. Petitioners recognize that the Commission has provided for testing as part of the AFC process.³⁵ In addition, Petitioners understand that the Commission has issued a Public Notice inviting AFC proposals and providing for public comment on these proposals, followed by conditional approval and testing of AFC systems.³⁶ However, the details of the AFC testing have not been provided and additional clarity is needed regarding the parameters and processes of AFC.³⁷ If the data and assumptions that AFC uses are flawed, these tests may indicate that AFC systems operate as designed, but will not necessarily prove that AFC systems will prevent interference from standard power access points and client devices.

Additionally, Petitioners believe that clarification is needed for the parameters and the process for AFC system authorization to ensure that AFC systems are effective at preventing interference to licensed microwave systems. Specifically, there are practically no parameters defined in the Commission's recent Public Notice regarding certain technical requirements, such as security or testing of the AFC systems.³⁸ Moreover, the time frames and processes by which AFC systems and operators will be required to identify and resolve instances of interference are also undefined. The Commission should make clear that the duty and obligation to protect incumbent systems and correct instances of interference rests squarely upon the AFC system operators in the first instance to prevent interference

³⁵ *Id.* at ¶79 (stating “[a]pplicants that receive a conditional approval will then be required to provide a test system that will be subject to a public trial period to provide interested parties an opportunity to check that it provides accurate results.”)

³⁶ *See* The Commission Begins the Process for Authorizing 6 GHz Band Automated Frequency Coordination Systems, Public Notice, ET Docket No. 21-352, FCC 21-100 at ¶8 (rel. Sept. 28, 2021)(“AFC Public Notice”).

³⁷ *See* AFC Public Notice at n. 29 (stating that the “OET will provide additional details on the testing process at a later date.”)

³⁸ *See* AFC Public Notice at ¶8.

to licensed microwave systems and that AFC system operators bear responsibility for any consequences resulting from interference from unlicensed operations they coordinate.

The Commission may not reasonably rely on the data provided in studies by proponents of unlicensed operations based on the new information gleaned from the real-world testing of unlicensed 6 GHz LPI devices. Given that unlicensed proponents have deliberately withheld information about 6 GHz LPI beacon signals, and they have refused to cooperate in any interference testing by incumbents and have blocked the MSG from even addressing interference testing, the Commission must conduct its own independent tests in an open and transparent process using actual devices in a real-world environment. The Commission should test 6 GHz standard power access devices, as well as 6 GHz LPI devices and AFC systems – and they should prove that the rules prevent interference to licensed microwave systems. This would be consistent with the approach taken in evaluating the interference potential of TV White Space devices operating in the broadcast television bands by conducting both laboratory and field tests.³⁹

Based on the results of these tests, the Commission should determine if new rules should be developed for standard power access devices. Petitioners reiterate that the Commission must ensure that licensed microwave systems are protected against interference from unlicensed 6 GHz operations, given the mission critical communications that these microwave systems carry, and the impact interference would have on essential public safety and critical infrastructure industries. In addition, Petitioners submit that it is imperative to get the rules right before these devices become commercially available and commence operations. Therefore, the Commission should examine its rules for standard power access devices, as well as 6 GHz LPI devices to ensure they effectively protect incumbent licensed microwave systems from interference from all unlicensed operations in the band.

³⁹ See “FCC moves on to field testing of white space devices,” TV Technologies (Jul. 28, 2021) *available at* <https://www.tvtechnology.com/news/fcc-moves-on-to-field-testing-of-white-space-devices>.

These examples are illustrative and not exhaustive, but they underscore the need for the Commission to address these issues as part of a rulemaking, instead of through piecemeal review of individual AFC proposals. Otherwise, the AFC systems will not effectively protect licensed systems from potential interference from unlicensed operations, and licensees will bear an unreasonable burden of interference mitigation. The basis upon which the Commission has predicated its AFC system authorization process has fundamentally changed, due to the results of the 6 GHz Interference Testing Report. These changed circumstances demand that the Commission better clarify the parameters and the process for AFC system authorization as part of a further rulemaking, rather than proceeding forward under the AFC Public Notice.

IV. CONCLUSION

For the foregoing reasons, the Commission should urgently act to adopt a rulemaking to address the threat of interference from unlicensed 6 GHz LPI devices and develop updated rules that are proven to prevent interference to licensed microwave systems, based on thorough testing that is conducted through an open and transparent process. Licensees in the 6 GHz band have already incurred significant costs to protect themselves against potential interference from unlicensed 6 GHz LPI operations, and these costs will only increase over time if the Commission allows these operations in the band going forward. Consistent with its *Emerging Technologies* framework, the Commission should develop and adopt rules that allow licensees to recover these costs. Finally, the Commission should conduct tests of standard power access devices to determine the extent to which new rules for standard power access devices should be developed, as well.

The need for a rulemaking is clear and urgent. FCC-certified, commercial off-the-shelf 6 GHz LPI devices are already available in the market, and many more are coming to market, and yet the latest real-world interference tests show that these LPI devices are certain to cause interference to licensed microwave systems that support mission critical communications used by utilities, public

safety, broadcasters, telecommunications, and broadband providers for essential services to the public. Consistent with its statutory authority to license spectrum in the public interest and prevent harmful interference from unlicensed operations as well as the Commission’s rules and case precedent, the Commission should urgently act to adopt a rulemaking, consistent with this Petition.

Respectfully,

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

EDISON ELECTRIC INSTITUTE

/s/ Aryeh Fishman

Aryeh Fishman
Associate General Counsel,
Regulatory Legal Affairs
Edison Electric Institute
Washington, D.C. 20004
(202) 508-5000

**AMERICAN PUBLIC POWER
ASSOCIATION**

/s/ Corry Marshall

Corry Marshall
Senior Government Relations Director
American Public Power Association
2451 Crystal Dr., Suite 1000
Arlington, VA 22202
202-467-2939

**NATIONAL RURAL ELECTRIC
COOPERATIVE ASSOCIATION**

/s/ Brian M. O’Hara

Brian M. O’Hara
Senior Director Regulatory Issues –
Telecom & Broadband
National Rural Electric Cooperative
Association
4301 Wilson Blvd.
Arlington, VA 22203
703-907-5798

AMERICAN GAS ASSOCIATION

/s/ Matthew Agen

Matthew J. Agen
Assistant General Counsel
American Gas Association
400 North Capitol Street, NW
Washington, DC 20001
(202) 824-7090

**AMERICAN PETROLEUM
INSTITUTE**

/s/ Suzanne Lemieux

Suzanne Lemieux
Manager Operations Security &
Emergency Response Policy,
Corporate Policy
American Petroleum Institute
200 Massachusetts Avenue NW
Washington, DC 20001-5571
(202) 682-8000

**AMERICAN WATER WORKS
ASSOCIATION**

/s/ G. Tracy Mehan, III

G. Tracy Mehan, III
Executive Director – Government Affairs
American Water Works Association
1300 Eye St. NW Suite 701
Washington, DC 20005-3314
202-628-8303

**INTERNATIONAL ASSOCIATION OF
FIRE CHIEFS**

/s/ Ryan Woodward

Ryan Woodward
Government Relations Manager
International Association of Fire Chiefs
4795 Meadow Wood Lane, Suite 100W
Chantilly, VA 20151

December 7, 2021

**NATIONAL PUBLIC SAFETY
TELECOMMUNICATIONS COUNCIL**

/s/ Ralph Haller

Ralph A. Haller, Chairman
National Public Safety Telecommunications
Council
9615 East County Line Road, Suite B-246
Centennial, Colorado 80112

NUCLEAR ENERGY INSTITUTE

/s/ Ellen C. Ginsberg

Ellen C. Ginsberg
Sr. Vice President, General Counsel and
Secretary
Nuclear Energy Institute
1201 F Street NW, Suite 1100
Washington, DC 20004

APCO INTERNATIONAL

/s/ Jeffrey Cohen

Jeffrey S. Cohen
Chief Counsel and Director of Government
Relations
APCO International
1426 Prince Street
Alexandria, VA 22314
571-312-4400 ext. 7005

**THE ASSOCIATION OF AMERICAN
RAILROADS**

/s/ Kathryn D. Kirmayer

Kathryn D. Kirmayer
Senior Vice President – Law & General Counsel
Timothy J. Strafford
Associate General Counsel & Corporate
Secretary
The Association of American Railroads
425 Third Street, S.W. Suite 1000
Washington, DC 20024