

**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)	GN Docket No. 17-183
Spectrum Between 3.7 and 24 GHz)	

**COMMENTS OF
SOUTHERN COMPANY SERVICES, INC.**

Jeffrey L. Sheldon
LEVINE, BLASZAK, BLOCK & BOOTHBY, LLP
2001 L Street, N.W., Suite 900
Washington, DC 20036
202-857-2574
jsheldon@lb3law.com

Its Attorney

February 15, 2019

TABLE OF CONTENTS

I. Introduction	2
A. Southern Company Services	2
B. Southern Relies on Fixed Microwave and the 6 GHz Band in Particular	3
II. The Risks Associated with Interference Are Too High in the 6 GHz Band	5
A. Fixed Microwave Systems Are Used to Backhaul Data from Critical Utility Applications.	6
B. Interference to Microwave Links Can Have Serious Consequences	9
III. The Sharing Parameters Described in the <i>NPRM</i> are Inadequate to Eliminate the Risk of Interference to Public Safety and CII Microwave Systems	13
A. Automatic Frequency Coordination (AFC) Generally	13
B. Technical Data Needed for the AFC System	14
C. Protection of Adjacent Channels	15
D. Propagation Model	15
E. Fading	15
F. Height of Unlicensed Device Above Ground	16
G. Protection from Client Devices	17
H. Low Power Indoor Operations	17
I. Mobile Hotspots and Transportable Operations.....	18
J. Use in Moving Vehicles or Unmanned Aircraft Systems	19
K. Transmission of Identifying Information	19
L. Interference Resolution	19
M. Information to Consumers.....	21
IV. The 6 GHz Band is Not Suitable for Unlicensed Devices if the Interference Risk Cannot be Eliminated	22
V. Conclusion	23

EXECUTIVE SUMMARY

Southern Company Services, Inc. is a wholly-owned subsidiary service company of The Southern Company, a holding company which operates electric and gas distribution utilities, and power generation and transmission facilities. Southern relies on fixed microwave to backhaul data from applications that are critical to utility operations. Many of these utility applications require last-mile communications systems engineered for very low latency and very high reliability to provide requisite visibility into and control over key components of the electric grid. In turn, the communications systems that provide backhaul must achieve the same levels of latency and reliability. For these reasons, Southern does not agree that the 6 GHz band is the right band in which to introduce new unlicensed operations.

Introduction of unlicensed devices into a band with critical uses will require exceptional conditions to ensure there will be no possibility of interference to systems licensed on a primary basis. Once unlicensed devices are released into the wild, it will be extremely difficult to pull them back without major disruption to and confusion within the consumer marketplace. No amount of consumer advisories or warning labels will provide assurance that fixed microwave systems will be protected. This is an engineering issue and will require strict engineering measures to protect Fixed Service systems.

The cost-benefit analysis must start with the premise that fixed microwave systems, licensed on a primary basis and used to support the nation's energy infrastructure, must be protected at all costs. Proponents of unlicensed devices in the 6 GHz band will have to make their own cost-benefit analysis of whether the costs associated with protecting fixed microwave systems are reasonable in relation to the business opportunity of selling devices in the band. If

the proponents report that the costs are too high, then the FCC should terminate this docket without action. In any event, proponents of unlicensed devices should not expect the interference criteria in Part 101 to be relaxed, especially for devices that will operate on a secondary, non-interference basis.

In these Comments, Southern provides a description of the critical utility applications supported directly or indirectly with microwave backhaul facilities, and the risks to utility operations if the communications systems supporting applications are subjected to interference. Southern also addresses how many of the sharing parameters suggested in the *NPRM* would have to be adjusted to reduce the potential for interference. As the FCC reviews the positions in this docket, it should be guided by a technological Hippocratic oath of, “first, do no harm” to communications systems licensed on a primary basis and used to support the nation’s critical infrastructure.

**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)	GN Docket No. 17-183
Spectrum Between 3.7 and 24 GHz)	

**COMMENTS OF
SOUTHERN COMPANY SERVICES, INC.**

Southern Company Services, Inc., on behalf of itself and its operating affiliates (collectively “Southern”), hereby submits its reply comments on certain of the issues raised in the *Notice of Proposed Rulemaking*, FCC 18-147 (“*NPRM*”), in the above-captioned matter.¹ Southern has serious concerns about the impact on point-to-point microwave systems used to support the nation’s critical infrastructure if unlicensed devices are permitted to operate in the 5.925-6.425 GHz and 6.425-7.125 GHz bands (together the “6 GHz” band). The proponents of unlicensed access to the 6 GHz band fail to offer much certainty that this spectrum can be shared without harmful interference to incumbent microwave systems, and the Commission’s proposed rules fall short of ensuring that no interference is caused to licensed microwave systems operating on a primary basis in this band.

As explained below, there is simply too much at risk to safety, the economy, and the nation’s infrastructure if unlicensed devices are released into the wild without first taking every

¹ The *NPRM* was published at 83 Fed. Reg. 64506 (Dec. 17, 2018), setting a comment deadline of February 15, 2019.

possible engineering precaution to eliminate the potential for interference. The cost-benefit analysis must include the cost to society, the economy, and to public health and safety if uncontrolled – or uncontrollable – consumer devices are allowed to jeopardize the functioning of systems used to support critical utility applications.

I. Introduction

A. Southern Company Services

Southern Company Services, Inc. is a wholly-owned subsidiary service company of The Southern Company, a holding company based in Atlanta, Georgia. Southern Company owns three electric utility subsidiaries – Alabama Power Company, Georgia Power Company, and Mississippi Power Company – that provide electric service to 4.1 million customers in a service territory of more than 100,000 square miles. Southern Company also supplies wholesale electric power to municipalities, rural electric cooperatives, and other distribution providers through its Southern Power subsidiary, which operates nearly 50 natural gas, solar, wind, and biomass electric generating facilities in nine states. Southern Company Gas distributes natural gas to 4.2 million customers, and operates natural gas storage facilities and intrastate natural gas pipelines.

Members of the Southern Company family use a variety of communications technologies and services to support the safe and efficient generation, transmission, and distribution of energy services to their retail and wholesale customers. Southern filed Comments and Reply Comments on the underlying *Notice of Inquiry* in this proceeding² and is pleased to have this opportunity to provide further comment on the specific proposals described in the *NPRM*.

² *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, GN Docket No. 17-183, Notice of Inquiry, 32 FCC Rcd 6373 (2017).

B. Southern Relies on Fixed Microwave and the 6 GHz Band in Particular

Southern holds about 175 licenses for point-to-point frequency paths in the 6 GHz band. Southern also holds about 1,000 licenses for point-to-point microwave facilities in the Fixed Service bands between 10.7 GHz and 19.7 GHz where shorter frequency paths can be accommodated. However, because of Southern's extensive service area, and the need to communicate with facilities in very rural areas, the 6 GHz band is the only band that can accommodate Southern's bandwidth and performance objectives over very long paths.

As explained in more detail below, Southern's fixed microwave facilities support a variety of utility applications, including voice and data communications between and among energy control centers, transmission and distribution substations, power generating stations, and the other utilities with which Southern must coordinate in real-time for management of the interconnected power grid. Microwave is also used to backhaul voice and data from land mobile radio systems used by field crews to coordinate the safe and efficient construction, maintenance, and restoration of Southern's electric facilities. Southern's wide-area land mobile system, operated by its affiliate, Southern Communications Services, Inc. d/b/a Southern Linc, also provides commercial mobile radio service – interconnected voice, dispatch, push-to-talk, text and picture messaging, internet access and data transmission – to state and local public safety agencies, school districts, rural local governments, public utilities, emergency responders, industrial users, and other commercial entities and individuals throughout the Southeast.

Southern also uses point-to-point microwave to backhaul data from supervisory control and data acquisition (“SCADA”) systems. These systems allow Southern and its operating companies to remotely monitor and control a multitude of devices on the power grid, thereby improving electric service to its millions of residential, commercial and industrial customers. Microwave systems also allow Southern to closely coordinate power flows and minimize service

disruptions among many other wholesale and retail power distributors (e.g., municipally-owned utilities, rural electric cooperatives, and other investor-owned electric utilities) with which Southern's electric system is interconnected.

Loss of the 1850-1990 MHz and 2110-2200 MHz ("2 GHz") Fixed Service bands for Personal Communications Services ("PCS") forced many more paths and users into the 6 GHz band, which is now the preferred band for medium- to long-distance paths where fiber is too expensive or impractical. Because of the transition of microwave systems from the 2 GHz Fixed Service bands occasioned by the Emerging Technologies proceeding, ET Docket No. 92-9,³ the 6 GHz band became the preferred replacement band for many frequency paths that had been licensed at 2 GHz. However, relocating paths from 6 GHz to the next higher microwave bands would be more problematic because the shorter path lengths that can be accommodated in the higher bands will require more hops and because of the number of paths currently licensed at 6 GHz.

Southern supports new technologies and optimizing use of spectrum. However, introduction of unlicensed devices into a band with critical uses will require exceptional conditions to ensure there will be no possibility of harmful interference to licensed services; not merely a low or "acceptable" probability of interference based on a series of assumptions that may or may not apply in reality.

Once unlicensed devices are released into the wild, it will be difficult to pull them back without major disruption to the consumer marketplace. The stakes are too high to allow consumer devices to jeopardize licensed communications facilities on which public safety

³ *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, ET Docket No. 92-9, Second Report and Order, 8 FCC Rcd 6495 (1993).

agencies and critical infrastructure industries rely. Moreover, it is unrealistic and naive to believe that any amount of interference protection can be provided through operating instructions or warnings to consumers. This is an engineering problem that will require a tight and verifiable engineering solution, and without any realistic expectation that after-the-fact interference detection and mitigation will help protect licensed systems.

Southern agrees there is need for broader access to spectrum for new technologies, but it does not agree that the 6 GHz band is the right band. Southern recommends that the FCC be guided by a technological Hippocratic oath of “first, do no harm,” when considering whether to unleash many millions of unlicensed devices into a band with critical communications systems that support the very lifeblood of the country.

II. The Risks Associated with Interference Are Too High in the 6 GHz Band

The FCC’s proposals include various spectrum sharing concepts (such as Automated Frequency Coordination (AFC) databases, calculated protection zones around microwave paths, and prevention of transmissions within protection zones) that would build on some of the concepts adopted for other bands, such as for TV White Space devices and the Citizens Broadband Radio Service (CBRS) at 3.5 GHz.⁴ However, these techniques have not been deployed to any significant degree (TV White Space devices) or have not been commercially deployed at all (3.5 GHz CBRS band). Southern therefore urges the FCC to defer consideration

⁴ *Unlicensed Operation in the TV Broadcast Bands*, ET Docket No. 04-186, *Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Docket 02-380, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807 (2008); *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015).

of these techniques in the 6 GHz band – where the impact of interference could be substantially more detrimental to public safety, critical infrastructure, and the U.S. economy.

There is too much at risk in the 6 GHz band to unleash unproven sharing technologies. Southern relies on 6 GHz to support utility operations, and interference could have devastating consequences to grid operations. In managing the grid, Southern uses a variety of applications that depend on secure and reliable communications networks. These networks can consist of company owned and managed (COAM) fiber optic lines; carrier-provided circuits, both wired and wireless; and private wireless facilities. There is no one-size-fits-all solution, and Southern selects the best technology or technology mix for each application in a given area, considering factors such as geography, availability, reliability, bandwidth, and cost. In many situations, point-to-point microwave is the preferred communications medium for direct backhaul or to tie “last-mile” connections to Southern’s backbone optical fiber networks.

A. Fixed Microwave Systems Are Used to Backhaul Data from Critical Utility Applications

The following are some of the utility applications that rely on communications networks, including backhaul connections to a last-mile connection.

- **Automated Metering** – remotely monitoring customer meters for billing, outage analysis, and theft-of-service.
- **Demand Response** – the ability to send pricing signals or allow remote shut-off of water heaters, AC compressors, and other appliances, with customer consent, to help shed load on the system during periods of peak electricity demand, thereby eliminating the need for additional generating capacity just to meet peak load conditions.

- **Wide Area Situational Awareness** – the ability to monitor and analyze overall system performance to ensure that the entire system remains balanced and functioning efficiently.
- **Distributed Energy Resources (DER) and Energy Storage** – the ability to manage the addition of many new power sources to the distribution system, such as those from independent power producers (e.g., solar farms, co-generation facilities, windfarms) or even residential solar arrays, as well as new and evolving energy storage facilities.
- **Electric Transportation** – the ability to monitor and account for additional load on the electric system and shifts in peak loading from electric vehicle charging stations and in-home charging, including the potential for EVs to provide energy storage and additional distributed energy resources.
- **Distribution Grid Management** – the ability to remotely monitor key performance metrics throughout the electric distribution system and to remotely adjust operations (open circuit breakers, divert power along different pathways, etc.) to protect the system from cascading faults. Grid management can also be used in connection with Outage Management Systems, described below.
- **Outage Management** – the ability to remotely identify system components that show signs of failure so they can be repaired or replaced before total failure. This reduces the need for unnecessary truck rolls and improves system reliability by replacing failing components before they can cause an outage.
- **Phasor Measurement Units** - measure current and voltage by amplitude and phase at selected transmission substations throughout the interconnected grid. High-precision

time synchronization (via GPS) allows real-time comparison of measured values (synchrophasors) from different substations that are far apart and allows instantaneous assessment of system state and dynamic events on the system. 30 to 120 measurements are taken per second at each site, and the time-stamp associated with each measurement must be accurate to within one millisecond to allow comparison of system state as measured at each unit. Emerging technology will require 100 nanosecond accuracy in time-stamping associated with each of the 30-120 measurements per second taken at each unit. This technology contributes greatly to Wide Area Situational Awareness, described above.

- **Security Monitoring** – with growing concerns about physical and cyberattacks on the power grid, and pursuant to the Critical Infrastructure Protection (CIP) Standards of the Federal Energy Regulatory Commission (FERC), many more devices and systems are being deployed throughout the system to monitor for physical and electronic intrusions.
- **Field Crew Dispatching and Workforce Management** – mobile voice and data communications needed to dispatch and coordinate field crews who maintain the transmission and distribution systems. These wireless communications systems require ubiquitous coverage over the electric system as well as push-to-talk capability to permit instantaneous communications among all personnel assigned to a given work order. Because of the hazards associated with working near energized lines and equipment, field communications must be clear and instantaneous; for example, so all personnel working to repair a line are aware of when the decision is made that all necessary repairs have been completed along the line and that the line is about to be

reenergized. Because of the inherent risk of working on energized power lines and the way electricity flows along the path of least resistance, field work on the power grid must be coordinated very closely and very deliberately to protect utility personnel and property.

All of these applications rely on some form of communications for both the last mile and for communications transport – whether by fiber or point-to-point microwave – to connect the last-mile communications facilities with the rest of Southern’s system. Two-way communication is needed to make the “smart grid” smart, and to ensure that the grid is operated safely and efficiently. Trying to operate the grid blindly puts the grid and everything that relies on the grid at risk.

B. Interference to Microwave Links Can Have Serious Consequences

Each last-mile connection is engineered to meet the bandwidth and reliability requirements of the applications they support, and the transport/backhaul facilities must accommodate the cumulative bandwidth requirements of these last-mile connections without sacrificing the reliability needs of any of the supported applications. Just as a chain is only as strong as its weakest link, utility applications will perform only as well as the weakest link in the communications pathways that connect them.

For this reason, Southern prefers to use company owned and managed fiber optic facilities or private point-to-point microwave facilities for communications backhaul. Southern’s use of private facilities also minimizes the cascading harms that can flow from interdependencies between commercial power systems and commercial communications networks. In situations involving wide-area disruption to power and communications infrastructure, such as during or following a hurricane, interdependencies between power and communications can exacerbate

service restoration for both industries. Because commercial communications networks (including the customers they serve) are increasingly dependent on the availability of commercial power, a delay in restoring power will hamper restoration of communications service. Likewise, if power utilities are too dependent on commercial communications they will lose visibility into and control over the grid. The risks associated with allowing commercial power systems and commercial communications networks to become interdependent have been well known for a long time and continue to be an issue of concern in preserving public safety, health and welfare.⁵

Disruption to the communications links supporting utility applications can have serious consequences to utility operations. Inability to control grid functions and operations creates dangerous situations and potential damage to grid infrastructure. The command-and-control applications described above require very low latency and very high reliability (availability). For example, in a 2010 study by the U.S. Department of Energy, it was reported that electric utilities at that time expressed a requirement for latency as low as 20 milliseconds and reliability as high as 99.9999% for some applications.⁶ As noted above, newer technologies, such as synchrophasors,

⁵ See, e.g., *NSTAC Report to the President on Telecommunications and Electric Power Interdependencies: People and Processes: Current State of Telecommunications and Electric Power Interdependencies*, January 31, 2006, at 3.1 and 3.2., available in the compilation of NSTAC reports at https://www.dhs.gov/sites/default/files/publications/NSTAC_XXIX_Reports_082206_0.pdf (last visited February 4, 2019) and U.S. Department of Energy, *Energy Resilience Solutions for the Puerto Rico Grid*, Final Report, June 2018, at 15-16 (available via link from <https://www.energy.gov/oe/articles/office-electricity-releases-energy-resilience-solutions-puerto-rico-grid-report>, last visited February 4, 2019) (Interdependencies among infrastructure systems with electric power “can cause cascading failures across various essential services.”)

⁶ U.S. Department of Energy, *Communications Requirements of Smart Grid Technologies* (2010), at Appendix A (available at https://www.energy.gov/sites/prod/files/gcprod/documents/Smart_Grid_Communications_Requirements_Report_10-05-2010.pdf).

have extremely tight tolerances, on the order of 1 millisecond or better, and are expected to proliferate on electric transmission systems and potentially at the distribution level.

Mobile radio networks supporting utility and public safety land mobile networks can also suffer severe consequences from interference. The Fixed Wireless Communications Coalition (FWCC) has noted that if a microwave link is part of a network (as most are), interference sufficient to overcome the fade margin will cause the *network* to lose synchronization. FWCC noted that cellular and land mobile sites typically need 15 minutes to resync after even a short interruption.⁷ Loss of a mobile communications site for that period of time, and particularly at a site that provides service to emergency responders, utility crews, and other critical users such as those supported by Southern Linc, is unacceptable.

In addition to direct operational impacts, interference would impose additional costs and burdens on microwave licensees in tracking down the source of the interference and identifying a possible solution. These are real costs in time and manpower that would otherwise be devoted to managing the electric grid. These efforts are especially difficult when trying to identify interference from mobile sources and are almost impossible when trying to identify and correct interference from unlicensed devices for which there is no publicly accessible database of possible users and for which there is almost no regulatory accountability as there is in the case of licensed services.

There are also potential “political” costs to public safety and critical infrastructure licensees in trying to halt interference due to the perception that consumers are being asked to terminate use of devices that they lawfully purchased and installed. Although a multitude of

⁷ *Ex Parte* Submission of Fixed Wireless Communications Coalition in GN Docket No. 17-183 and ET Docket No. 18-295 (filed Oct. 2, 2018) at 3.

devices carry Part 15 warnings, the typical consumer has never received an interference complaint, so there is a high potential for confusion and consumer resistance in resolving these cases. These are not discussions that Southern or any other microwave licensee wishes to initiate.

The Commission has acknowledged that the communications systems used by electric utilities are deserving of heightened protection in connection with the use of radio spectrum. In concluding that wireless communications systems operated by electric utilities are “public safety radio services” under Section 309(j)(2) of the Communications Act of 1934, as amended, the Commission identified two unique characteristics shared by utilities and other Critical Infrastructure Industries (“CII”):

77. ... First, these entities have an infrastructure that they use primarily for the purpose of providing essential public services to the population at large. In this context, an infrastructure can be described as fixed physical facilities that extend beyond the licensee's place of business to areas where the public at large live and work and are therefore exposed to adverse results stemming from a breakdown in the licensee's infrastructure. The second common characteristic is that the reliability and availability of the communications systems for these entities is necessary for them, as part of their regular mission, to prevent or respond to a disaster or crisis affecting the public at large. Specifically, the public depends on these services, which affect the daily lives of members of the public and interruption in the service may have dangerous consequences. ...

78. For instance, an electric utility meets both prongs of the two-part standard. Power lines extend far beyond the utility's power plant and into areas where members of the public live and work. A breakdown in the electric utility's infrastructure or fixed physical facilities (e.g., a live wire) creates a dangerous condition for members of the public. Additionally, a dependable communications system is necessary for an electric utility to respond to an interruption in service that may hinder the delivery of vital services (e.g., without power, a home may lack heat in the winter or air conditioning in the summer). ...[citations omitted]⁸

⁸ *Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended*, WT Docket No. 99-87, Report and Order and Further Notice of Proposed Rule Making, 15 FCC Rcd 22709 (2000) at paras. 77-78.

For all of the foregoing reasons, Southern urges the Commission to “first, do no harm” to the microwave systems operated by Southern and other utilities in considering whether it is prudent to allow potentially hundreds of millions of unlicensed devices in the 6 GHz band.

III. The Sharing Parameters Described in the *NPRM* are Inadequate to Eliminate the Risk of Interference to Public Safety and CII Microwave Systems

As explained below, Southern agrees with the concerns and findings of other subject matter experts that the proposals in the *NPRM* would be inadequate to prevent interference to fixed microwave systems. In this section, we note the limitations of the various criteria suggested in the *NPRM*. Although Southern believes some of these criteria could be made more stringent without significant additional cost to unlicensed device manufacturers and users, Southern does not believe that it is prudent or possible to introduce unlicensed devices in the 6 GHz band without unwarranted risk of interference to the critical licensed systems.

A. Automatic Frequency Coordination (AFC) Generally

Devices should be registered, and the AFC operator should be responsible for verifying device location. The AFC operator should be held responsible if an interfering device that should have been under its control is found at an unauthorized location or with operating parameters that vary from the parameters dictated by the AFC operator. Initial registration of a device should be outside the 6 GHz band. A device should be de-registered if it loses contact with the AFC system for more than 24 hours. The AFC system should assume maximum permissible operating power for each device without regard to whether the device might be operated at lower power.

AFC operators should be subject to a transparent testing and validation process similar to what is required for TV White Space and CBRS administrators. To the extent the AFC system is replacing traditional coordination, which is premised on actual notice to potentially affected

users and opportunity for objection, so too the AFC system should be certified only after a rigorous process to verify that all devices authorized by the system have no potential to cause harmful interference to fixed microwave systems.

Devices should be designed and verified as restricting user access to controls that could take it out of compliance with the AFC system. Unlicensed devices at 6 GHz should be subject to security requirements comparable to those used for U-NII devices at 5 GHz.⁹

B. Technical Data Needed for the AFC System¹⁰

The AFC operator must maintain the same data used by coordinators today to coordinate microwave paths under Part 101. If data is missing from ULS, the AFC system should use the most conservative operating parameters possible in protecting the path until accurate information can be obtained. Assumptions should always err on the side of the microwave paths to be protected because they are licensed on a primary basis and are entitled to interference protection. In addition, the AFC operator should commence protection of a new or modified frequency path promptly after receipt of a prior coordination notice (PCN), just as other coordinators are expected to conditionally protect a path that is in the prior coordination process. This will help ensure that the new or modified path will be immediately protected by the AFC system if the licensee elects to commence operation under conditional authority.¹¹ Use of an AFC system is a convenience to unlicensed users and is not a technique to dilute the interference criteria or circumvent time-tested coordination requirements.

⁹ 47 C.F.R. §15.407(i).

¹⁰ *NPRM*, paras. 39-40.

¹¹ 47 C.F.R. §101.31(b).

C. Protection of Adjacent Channels¹²

Adjacent channels should be protected to the same extent in the AFC process as in traditional Part 101 coordination. There is no reason why an automated process should not consider adjacent channel systems. Consideration of adjacent channel systems is simply an additional step in the AFC algorithm and requires no additional data.

D. Propagation Model¹³

Whatever model is used should be premised on line-of-sight propagation, unless the AFC operator can demonstrate availability and use of a database that is accurate and kept up-to-date with data that would rely on actual clutter loss on a path-by-path basis. The model used for the AFC system should not be based on a model that estimates clutter loss because it will, of necessity, fail to protect microwave systems in areas that do not strictly conform to the assumptions and averages built into the model. Interference protection for fixed microwave systems must be based on more exacting criteria than would be used to predict coverage or potential interference. The model must prevent interference, and for now, must be premised on line-of-site propagation.

E. Fading¹⁴

The AFC system should protect the same fade margins that would otherwise be protected for each microwave path through the Part 101 coordination process. This proceeding is inappropriate for a wholesale reexamination of microwave coordination and licensing merely to

¹² *NPRM*, para. 44.

¹³ *NPRM*, paras. 48-49.

¹⁴ *NPRM*, paras. 45-47.

facilitate “automated” coordination for unlicensed devices that must operate on an unlicensed basis. To the extent the proponents of unlicensed devices see room for improvement in frequency coordination generally, they should work through the existing standard-setting processes before approaching the FCC with proposals that have not been vetted through the user community.

As secondary users, the unlicensed user community must accept the bands as they found them without expecting the licensee community to adopt unproven methodologies or assumptions just to make it easier for devices to be “automatically” coordinated. Coordination is coordination, whether conducted under the time-tested procedures outlined in Part 101 requiring notice and opportunity for response, or through an automated procedure that is so conservative that no microwave licensee would require notice or feel the need to respond.

F. Height of Unlicensed Device Above Ground¹⁵

Height of the unlicensed device above ground is a concern that cannot be managed merely by assuming a maximum height or dictating by rule that a user may not operate the device above a certain height. Antenna height is a fundamental parameter for frequency coordination and is even more relevant here where the transmitter is operating on a purely non-interference basis to critical licensed services. The rules must anticipate that unlicensed users will locate devices anywhere, subject to AFC coordination, and that users will not feel constrained by a regulation limiting height of the antenna. Experience with the roll-out of U-NII devices in the 5 GHz band illustrated that even with very clear instructions to users on operating

¹⁵ *NPRM*, paras. 51-52.

conditions intended to prevent interference, many users were either unaware of this obligation or chose to ignore the instructions, with harmful interference to critical airport radar systems.¹⁶

A possible alternative might be to expand the exclusion zone around microwave paths to account for any devices that might be line-of-sight to the receiver, unless the manufacturer can demonstrate that the device is capable of reporting its actual height above ground through an automatic means that is not under user control. If the device can report its actual height, the exclusion zone around nearby microwave receivers can be reduced to take actual height into consideration.

G. Protection from Client Devices¹⁷

Client devices should be subject to the same AFC registration requirements. Alternatively, the client device could be permitted to operate without AFC registration provided the access point is at least a certain distance beyond the normal exclusion zone around the microwave path and provided the client device cannot be user-configured to operate as anything other than a client device. In any event, probe requests should be transmitted outside the 6 GHz band.

H. Low Power Indoor Operations¹⁸

Unlicensed devices should be subject to the same operating requirements whether indoors or outdoors. Consumers should not be expected to abide by such operating conditions, and

¹⁶ See *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, ET Docket No. 13-49, First Report and Order, 29 FCC Rcd 4127 (2014).

¹⁷ *NPRM*, paras. 53-54.

¹⁸ *NPRM*, para. 73.

microwave licensees should not be expected to trust that (a) consumers will not operate “indoor” devices outside, and (b) that all “indoor” operation will be sufficiently attenuated that no interference could possibly be caused to a microwave receiver.

FWCC and CommScope demonstrated that an indoor device, operating at any useful power level, will risk unacceptable levels of interference to microwave receivers.¹⁹ Uncontrolled use of devices indoors also carries with it a higher potential for interference due to the aggregate power of many users (*e.g.*, in a high-rise office or apartment building) all facing in the same general direction of a microwave receiver. Resolution of interference problems would be magnified in trying to assess the location of the interference source(s) and in finding ways to prevent future interference, short of advising all such users to cease use of the devices. In any event, licensed users would have virtually no ability to enforce such a mandate nor an ability to enforce such a requirement against other users who bring additional devices into the building.

I. Mobile Hotspots and Transportable Operations²⁰

Southern sees no viable way to permit mobile hotspots or transportable operations without significant risk of interference to fixed microwave systems. Southern also has concerns that, even if mobile devices are prohibited under these rules, there is no practical way to prevent operation of such devices in moving vehicles or on a transportable basis. For this very reason, if an AFC solution is adopted, it will be important for device location to be verified frequently (*e.g.*, no less than daily) and for the AFC operator to be required to deactivate a device that is

¹⁹ “Determining the Impact of Non-Coordinated Indoor 6 GHz RLAN Interference on Fixed Service Receivers,” *Ex Parte* Submission of the Fixed Wireless Communications Coalition in GN Docket 17-183 (filed Aug. 28, 2018). See also “Exploration of Sharing at 6 GHz,” *Ex Parte* Submission of CommScope, Inc., in GN Docket No. 17-183 (filed Aug. 24, 2018).

²⁰ *NPRM*, para. 76.

found to have been relocated more than would be typical for a fixed access point (e.g., if reported at a new location more than twice in any 30-day period).

J. Use in Moving Vehicles or Unmanned Aircraft Systems²¹

Operation with moving vehicles or unmanned aircraft systems raises the same concerns as stated above for mobile hotspots or transportable devices. The risk is far too great that devices will come into range of licensed microwave receivers and cause interference before the location of the device can be identified and corrective action taken.

K. Transmission of Identifying Information²²

Identifying information would be somewhat helpful in resolving interference; but, as explained below, the primary responsibility should be on the AFC operator to immediately adjust or terminate operation of devices suspected of causing interference. If this information would be useful to the AFC operator, then it should be required or at least allowed.

L. Interference Resolution²³

Enforcement of operating conditions is especially problematic for unlicensed devices targeted to the mass market. Earlier comments have estimated there could be nearly a *billion* unlicensed devices operating in the 6 GHz band.²⁴ Neither the FCC nor licensed microwave users have the time or resources to track down interference, notify suspected interferers, explain

²¹ *NPRM*, paras. 84-85.

²² *NPRM*, paras. 87-88.

²³ *NPRM*, para. 90.

²⁴ See RKF Engineering, “Frequency Sharing for Radio Local Area Networks in the 6 GHz Band,” *Ex Parte* Submission of Apple Inc., *et al.* in GN Docket No. 17-183 (filed January 26, 2018) at 13.

the nature of the interference, verify the interference, and find a solution that will protect the licensed microwave system from further interference. As previously explained by three FCC Bureau Chiefs, placing an obligation on primary licensees to detect and report harmful interference after suffering degradation in service from secondary users would be inappropriate because it would create “unwarranted burdens” on the primary licensees.²⁵

If unlicensed devices are allowed in the 6 GHz band, the only logical mechanism to resolve interference is through the AFC operator. The AFC operator is the only entity that will have information on devices that have been deployed in the area and that has the means to readily alter or terminate operation of a given device. It is unfair to licensed users to put them in the position of enforcing secondary operating rights against consumers, and it is inequitable to expect them to take on this policing activity with no means of being reimbursed for this enforcement function. In addition, most consumers do not expect to be involved in interference disputes, do not have technical know-how to respond to an interference complaint, and would likely perceive any such complaint as an infringement of their “right” to use lawfully-purchased consumer device.

Only the AFC operator has the financial and technical wherewithal and incentive to enforce the non-interference condition. The AFC operator will also be subject to continuing FCC oversight, such that the FCC could sanction (including potentially decertifying its AFC system and, by extension, all devices authorized by that system) if the AFC operator does not take appropriate steps to prevent interference or promptly resolve interference cases. Moreover, the AFC operator will be able to maintain records of interference cases, which should be useful in

²⁵ *Utilities Telecom Council and Winchester Cator, LLC*, RM-11429, Order, 28 FCC Rcd 7051, 7054 (2013).

troubleshooting the AFC system or adjusting exclusion zones as necessary in areas where interference is a continuing problem.

M. Information to Consumers²⁶

Part 15 consumer notifications have become “background noise” in the consumer marketplace because they are found on virtually all electronic devices and because they are widely assumed to be a simple warning that the device might receive interference and might cause interference, with almost no reported instances of an unlicensed device being made the subject of an enforcement complaint. Consumers understand that Part 15 devices have no protection from interference, but they have far less understanding that operation of a consumer device could cause serious disruption to critical communications systems. They assume the FCC and equipment manufacturers have taken all possible steps to ensure that consumer devices can be operated without any real concern that they will, in fact, cause such interference.

Part 15 notifications that dictate where and how a device may be used are unlikely to have any appreciable impact on consumer behavior because the typical Part 15 notice is a simple “buyer beware” warning and not the restatement of an affirmative regulatory obligation on how the device may be lawfully operated.

Notifications to consumers are advisable, but a notification requirement should not be a substitute, in whole or in part, for mandatory design elements needed to prevent risk of interference. Licensed radio users, who have spent many thousands or millions of dollars coordinating and building compliant communications networks for critical communications should not have to depend on every user of an unlicensed device abiding by instructions printed

²⁶ *NPRM*, para. 91.

in a user manual. It is even questionable whether most users of consumer devices even bother to read the boilerplate warnings in user manuals. Pretending that notices in a user manual will play any role in preventing interference is unrealistic and dangerous to the nation's infrastructure.

Nevertheless, consumers should be warned about the necessity of using an AFC system to make the device operable, that the device may be unusable if it no longer communicates with the AFC system for any reason, including that the AFC system operator could go out of business, and that it is a violation of federal law to make any adjustments to the equipment that would defeat the AFC system.

IV. The 6 GHz Band is Not Suitable for Unlicensed Devices if the Interference Risk Cannot be Eliminated

If the proponents of unlicensed devices are unwilling to accept rules that will ensure no risk of interference to fixed microwave systems, there are only two alternatives for the Commission:

1. Allocate another band of spectrum to which fixed microwave users can be relocated at the new entrants' expense. This would be extremely expensive and time-consuming, even if suitable alternate spectrum could be identified. In addition, and per FCC policy in similar situations, the costs would have to be borne by the new entrants, which, in this case, would most likely be consumers who are required to pay higher equipment costs or AFC subscription fees to reimburse manufacturers for relocating microwave incumbents from the band.
2. Allow operation of unlicensed devices in a different band where the impacts of harmful interference would not be as severe to the nation's critical infrastructure and public safety. The FCC has already allocated a significant amount of new spectrum to both licensed and unlicensed devices, so it is by no means clear that the 6 GHz band is even needed for unlicensed operations. If there is such a great demand for unlicensed devices at 6 GHz, the incremental cost per device should be very low to incorporate very robust interference prevention techniques.

If neither of these alternatives is viable, and if the FCC is convinced that additional spectrum for unlicensed devices is necessary despite the vast amounts of bandwidth already

devoted to commercial uses and unlicensed operations, the FCC should make the hard decisions now to ensure that unlicensed devices in this band are locked down from ever causing interference to fixed microwave systems. Once these devices are in the marketplace and found to be causing interference it will be too late to impose new conditions. Experience after a number of years might suggest that these conditions could be modified to incorporate new interference-reducing technologies or operating protocols, but until then, the FCC must “first, do no harm” to the thousands of microwave paths on which Southern and others rely for mission-critical communications in support of public safety, health and welfare.

If the proponents of unlicensed devices – which must operate on a strictly non-interference basis – determine that the costs of manufacturing and deploying are too high relative to the anticipated market, that is a business decision they will have to make. In no event should those costs or obligations be shifted to licensed users who are the primary and protected users of the band. In addition, the FCC should make clear that the presence of unlicensed devices does not alter the band’s primary allocation for point-to-point microwave and will have no bearing on the coordination or licensing of new or modified microwave paths under Part 101.

V. Conclusion

There is simply too much at stake in the safe and efficient operation of the nation’s critical infrastructure to allow unlicensed devices to be deployed in the 6 GHz band without imposing exceptional engineering conditions on their use. Microwave systems that support utility operations are engineered to achieve high levels of reliability regardless of atmospheric conditions, and the Part 101 coordination process is key to ensuring those levels of reliability.

Proponents wishing to short-circuit the notice/response prior-coordination process bear the burden of demonstrating how a change in process for unlicensed devices will always ensure a

level of protection to which no microwave licensee would object if the operations were, in fact, subject to the traditional Part 101 notice/response coordination process. If the operation of unlicensed devices would require adjustments in interference criteria, those should be considered only after proper vetting through the industry standards groups that have carefully developed and implemented those criteria over many years. Microwave licensees should never have to be concerned about identifying and enforcing non-interference conditions against the many millions of consumer devices that proponents estimate could be deployed in this band.

WHEREFORE, THE PREMISES CONSIDERED, Southern Company Services, Inc. respectfully requests that the Commission take action in this docket consistent with the views expressed herein.

Respectfully submitted,

SOUTHERN COMPANY SERVICES, INC.

By: /s/ Jeffrey L. Sheldon
Jeffrey L. Sheldon
LEVINE, BLASZAK, BLOCK & BOOTHBY, LLP
2001 L Street, N.W., Suite 900
Washington, DC 20036
202-857-2574
jsheldon@lb3law.com

Its Attorney

February 15, 2019