

ORAL ARGUMENT NOT YET SCHEDULED

No. 20-1190

Consolidated with 20-1216, 20-1272, 20-1274, 20-1281 & 20-1284

IN THE
**United States Court of Appeals
for the District of Columbia Circuit**

AT&T SERVICES, INC.,
Petitioner,

v.

FEDERAL COMMUNICATIONS COMMISSION and
UNITED STATES OF AMERICA,
Respondents.

On Petition for Review of an Order of the
Federal Communications Commission

**INITIAL BRIEF *AMICUS CURIAE* OF SOUTHERN COMPANY
SERVICES, INC. IN SUPPORT OF PETITIONERS**

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to D.C. Circuit Rule 28(a)(1), *amicus curiae* Southern Company Services, Inc. certifies the following:

Parties and Amici. With the exception of Southern Company Services, Inc., all parties, intervenors, and *amici* appearing in this Court are listed in the Initial Joint Brief of Petitioners. As of the time of this filing, no other parties have submitted *amicus* briefs or have filed notices of intent to file *amicus* briefs in support of either party. To the best of Southern Company Services, Inc.'s knowledge, no other *amicus* brief will be filed in this case.

Ruling Under Review. Reference to the ruling at issue appears in Petitioners' Initial Joint Brief.

Related Cases. Other than these consolidated cases, counsel is not aware of any related cases within the meaning of Circuit Rule 28(a)(1)(C).

/s/ Trey Hanbury
Trey Hanbury

CORPORATE DISCLOSURE STATEMENT

Pursuant to Federal Rule of Appellate Procedure 26.1 and D.C. Circuit Rule 26.1(a), Southern Company Services, Inc. certifies that it is a wholly owned subsidiary service company of Southern Company, a corporation that owns and operates regulated electric and natural gas utilities serving more than 9 million residential, commercial, and governmental customers in nine states. Southern Company is a publicly traded corporation that has no parent corporation and, according to publicly available filings required to be made with the U.S. Securities and Exchange Commission by holders of 5% or more of its stock, no publicly held corporation owns 10% or more of its stock.

/s/ Trey Hanbury
Trey Hanbury

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GLOSSARY

APA	Administrative Procedure Act
<i>Draft Order</i>	[Draft] Report and Order and Further Notice of Proposed Rulemaking, <i>Unlicensed Use of the 6 GHz Band</i> , FCC-CIRC2004-01, ET Docket No. 18-295 (rel. Apr. 2, 2020)
FCC	Federal Communications Commission
FERC	Federal Energy Regulatory Commission
GHz	Gigahertz
<i>Order</i>	Report and Order and Further Notice of Proposed Rulemaking, <i>Unlicensed Use of the 6 GHz Band</i> , FCC 20-51, ET Docket No. 18-295, 85 Fed. Reg. 31,390 (rel. Apr. 24, 2020)
Southern	Southern Company and its subsidiaries

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**INITIAL BRIEF *AMICUS CURIAE* OF SOUTHERN COMPANY
SERVICES, INC. IN SUPPORT OF PETITIONERS**

STATEMENT OF INTEREST OF *AMICUS CURIAE*¹

Southern Company Services, Inc. is a wholly owned subsidiary service company of Southern Company (Southern). Through its subsidiaries, Southern

¹ All parties have consented to the filing of this brief. *See* D.C. Cir. R. 29(b). No party's counsel authored this brief in whole or in part; no party or party's counsel contributed money intended to fund the brief's preparation or submission; and no person other than *amicus* contributed money intended to fund the brief's preparation or submission. Another attorney from Hogan Lovells entered an appearance for Petitioner Association of Public-Safety Communications Officials, International (APCO) in related case no. 20-1272. An ethical wall was constructed to ensure that no attorney representing APCO played any role in the drafting of this *amicus* brief.

operates regulated electric and natural gas utilities serving more than 9 million residential, commercial, and governmental customers in nine states.² Southern's three wholly owned electric utility subsidiaries, Alabama Power Company, Georgia Power Company, and Mississippi Power Company, provide retail and wholesale electric service throughout Georgia, the southern two-thirds of Alabama, and southeastern Mississippi. Southern supplies wholesale electric power to municipalities, rural electric cooperatives, and other distribution providers through its Southern Power subsidiary, which operates natural gas, solar, wind, and biomass generating facilities in nine states. Southern's wholly owned subsidiary Southern Communications Services, Inc. d/b/a Southern Linc operates an extensive commercial mobile wireless network that provides communications services to Southern's electric utilities and other public utilities in the region, as well as to state and local public safety agencies, emergency responders, school districts, rural local governments, and other commercial entities throughout the Southeast.

Southern monitors and controls its expansive electric power production and distribution network using 175 high-power, point-to-point microwave

² This brief refers to Southern Company and its subsidiaries collectively as "Southern" except where a specific entity is referenced.

communications links arrayed throughout its portion of the national electric grid.³ Southern's distributed microwave links allow the company to monitor vital grid performance information and ensure the safe integration of distributed energy resources together with energy from nuclear and fossil-fuel power-production sources that Southern operates. Southern's licensed microwave communications links operate primarily in the 6 GHz band, which is the only radiofrequency spectrum possessing the throughput, reliability, and performance characteristics necessary to efficiently gather, share, and act on electric-grid information throughout the company's sprawling network. Alternative transmission paths such as commercial fiber are unavailable or would prove cost prohibitive to replace the long-range 6 GHz links that Southern relies on today to control its portion of the national grid and protect against blackouts, brownouts, and catastrophic electrical overloads.

This Court's review of the FCC's *Order*⁴ is a matter of significant importance to Southern. As the Petitioners' brief explains, the FCC failed to engage in reasoned decisionmaking by dismissing the interference risks that

³ A point-to-point microwave path transmits data and/or voice over a very narrow, tightly-focused radio beam between two fixed points that can be 25 miles or more apart.

⁴ *Unlicensed Use of the 6 GHz Band*, 85 Fed. Reg. 31,390 (May 26, 2020) (JA__).

unlicensed 6 GHz devices create. Southern, like other electric utilities, relies on 6 GHz microwave facilities for mission-critical wireless communications necessary for the safe and reliable delivery of electricity to homes and businesses. Any disruption to these critical communications links could obstruct management and control of the electric grid.

The electric grid is a complex combination of physical and technical systems that transmit electricity from power plants and distribute it to homes and businesses. Power distributors face constant threats to safe and effective network operations: transformers can overheat; loads on generators and transmission lines could exceed tolerances; and harmonic distortions can cause relays to fail. A failure in any part of the grid can cascade in ways that irrevocably damage or disable the grid, producing devastating economic and social consequences for the grid's infrastructure and for residential, commercial, or governmental equipment connected to it. The Federal Energy Regulatory Commission (FERC) has jurisdiction over standards for reliable operation of the interconnected electric grid.⁵ Electric utilities, including Southern, must comply with FERC-approved reliability standards,⁶ but allowing indiscriminate unlicensed 6 GHz operations will

⁵ 16 U.S.C. § 824o(b).

⁶ *See Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, 72 Fed. Reg. 16,416, 16,419, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

frustrate Southern's ability to fulfill its FERC-mandated obligations. Like other holders of licenses to operate in the 6 GHz band, therefore, Southern participated in the FCC's rulemaking process and submitted studies demonstrating the serious risk unlicensed devices operating in the 6 GHz range would pose to Southern's critical microwave links without controls to mitigate that risk.

The FCC's *Order* authorizes an unlimited number of unlicensed mass-market devices to use the 6 GHz spectrum that the FCC has licensed to Southern and other companies for exclusive use on designated paths. Manufacturers will embed the newly permitted unlicensed radiators in countless consumer electronics devices, where they will operate as randomly distributed, effectively untraceable points of interference to critical infrastructure. Southern Company Services, Inc. submits this *amicus* brief to explain how authorizing uncontrolled unlicensed operations in the 6 GHz band will damage Southern's mission-critical licensed operations and risk catastrophic, life-threatening consequences for consumers, businesses, government, and public safety organizations throughout the country. The FCC's analysis improperly disregarded interference studies from Southern and other parties, declined to impose even modest safeguards, such as automated frequency coordination system for unlicensed devices, and authorized unlicensed

operations with little or no explanation. These actions render the agency's ultimate decision arbitrary and capricious.

SUMMARY OF ARGUMENT

Southern relies on point-to-point microwave links to provide safe and reliable delivery of electricity to millions of homes and businesses in the Southeast. Many of the most mission-critical uses of these links require that they be available at least 99.999% of the time—meaning they can only have 5.25 *minutes* of downtime *per year* to be sufficiently reliable. Southern achieves that near-perfect level of reliability because it holds licenses that grant Southern exclusive use of the 6 GHz band where those links operate. So, when the FCC undertook a rulemaking that would allow millions of unlicensed consumer devices to operate indiscriminately in the 6 GHz band, each of which risks interfering with and disabling Southern's critical microwave links, Southern took a keen interest in the proceeding. It submitted studies to the FCC demonstrating the severe risk of interference from unlicensed devices to Southern's licensed microwave receivers, and it updated those studies in response to FCC staff's questions and comments.

At the end of the process, which also involved numerous other commenters, the FCC authorized two different types of unlicensed operation in the 6 GHz band. First was the operation of "standard power" devices under the control of an automated frequency coordination system that would protect licensed microwave

systems by controlling which frequencies an unlicensed device could use in a given location. Southern has no objection to this aspect of the *Order* because the automated frequency coordination system should provide reasonable protection for Southern's licensed use of the 6 GHz band.

The second type of operation the *Order* authorized is far more troubling: It permits potentially many millions of "low power indoor" devices to operate in the 6 GHz band without any automated frequency coordination control whatsoever. Southern supports Petitioners' challenge of the *Order* with respect to the rules adopted for this unlicensed low power operation. In particular, the FCC lacked a reasoned basis to conclude that unlicensed low-power devices in the 6 GHz band—without any form of automated frequency coordination control—pose no risk of harmful interference to the public or to customers of the licensed operators in that band, or to communications facilities that support critical infrastructure.⁷ The agency simply opted to ignore inconvenient data from Southern and other critical infrastructure providers in favor of unreliable data and false premises.

This failure of reasoned decisionmaking poses serious risks to critical infrastructure, including the electric grid. Southern relies on the 6 GHz band to protect the electric grid and the lives and property of consumers, state and local

⁷ Southern does not challenge the *Order* with respect to the rules adopted for "standard power" operations under automated frequency coordination control.

governments and public safety agencies, emergency responders, hospitals, school districts, and industrial and commercial entities throughout the Southeast who depend on it. Southern Company Services, Inc. therefore submits this *amicus* brief to give the Court information and context about three essential points particularly relevant to Southern's use of the 6 GHz band.

First, the consequences of the FCC's decision: Permitting indiscriminate use of the 6 GHz band by unlicensed, mass-market low power devices on an uncontrolled basis dramatically increases the risk that critical utility systems will fail or malfunction due to unavoidable communication interruptions.

Second, the FCC's failure to engage with the full record: Even though many aspects of Southern's operations could suffer harm by even fleeting or transitory interference to its 6 GHz microwave system—including generating facilities, substation operations, and nuclear emergency response centers—the FCC ignored and dismissed Southern's detailed technical analyses demonstrating that unlicensed, low power, indoor devices would cause harmful interference to its licensed 6 GHz microwave links.

And *third*, recent testing under real-world conditions confirms Southern's technical analyses were correct: Southern has now conducted the very field testing of unlicensed devices that Southern and other parties consistently told the FCC was

needed prior to authorizing such use in the 6 GHz band.⁸ The results show that low power operations under the rules and parameters adopted in the *Order* do indeed cause harmful interference to Southern’s microwave links.

Southern appreciates the need to make additional spectrum available for Wi-Fi and other broadband technologies and supports opening the 6 GHz band to unlicensed operations in a manner that will not cause interference to critical utility communications systems. In particular, the *Order*’s authorization of unlicensed “standard power” operations under the control of an automated frequency coordination system provides a promising framework for effective shared use of the 6 GHz band by both licensed and unlicensed systems. If the FCC had simply required automated frequency coordination for the low power unlicensed devices, Southern would not formally object to the *Order*. However, the FCC was so focused on bringing new low power unlicensed devices to market as quickly as possible that it arbitrarily ignored and dismissed extensive factual evidence in the record that did not support the agency’s predetermined outcome and reached a decision that improperly—and unnecessarily—endangers licensed 6 GHz systems used for critical infrastructure and public safety communications.

⁸ Because proponents of the *Order* consistently declined to provide Southern with prototypes of unlicensed devices, it was impossible for Southern to conduct real-world testing before the *Order* became final. *See infra* Section III. The test was performed using a vector signal generator. *See infra* n.18.

Considering the FCC’s stated policy goals of expanding wireless broadband connectivity and “secur[ing] U.S. leadership in the next generation of wireless services,” *Order* ¶ 1 (JA__), the disruption that unlicensed low power devices operating under the parameters adopted in the *Order* will cause to electric utility communications and operations is especially ironic, given that these devices—and everything that they connect with—*require* electricity to operate in the first place.

For all these reasons, and those in Petitioners’ brief, the Court should vacate those portions of the *Order* authorizing unlicensed low power indoor operations and remand this proceeding to the FCC.

ARGUMENT

I. **THE *ORDER* ENDANGERS SOUTHERN’S INFRASTRUCTURE FOR THE SAFE AND RELIABLE DELIVERY OF ELECTRICITY TO MILLIONS OF CONSUMERS.**

A. **Southern Relies On Uninterrupted Use Of The 6 GHz Band To Keep Power Grids Functioning Properly And Safely.**

Southern uses 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.

As described in the record of this proceeding, Southern and other electric utilities rely on 6 GHz microwave facilities for mission-critical wireless communications to support utility applications necessary to the safe and reliable delivery of electricity to homes and businesses nationwide, including:

- **Monitoring** – Real-time monitoring of high and medium voltage transmission lines;
- **System Control** – Remote operation of Supervisory Control and Data Acquisition systems – a critical situational awareness tool for operating electric grids and other critical infrastructure;
- **Teleprotection** – Selective isolation faults on transmission lines, transformers, reactors, and other vital items of electrical plants;
- **Outage Management** – Remote monitoring of system components for repair or replacement before failure, reducing the need for unnecessary truck rolls and improving system reliability by replacing failing parts before they can cause an outage;
- **Energy Control Communications** – Voice and data communications between energy control centers, substations, power generating stations, and the other utilities with which Southern must coordinate in real-time for management of the interconnected power grid;
- **Security Monitoring** – Real-time monitoring for physical and electronic intrusions into grid infrastructure and systems; and
- **Backhaul** – Network transport for critical voice and data communications, including for mobile radio systems used by field crews to coordinate the safe and efficient construction, maintenance, and restoration of electric facilities, for everyday use and for emergency service restoration and storm response operations.

Most of these applications require very high reliability with uptime availability of 99.999% or greater. This reliability requirement translates into no more than 5.25 minutes of downtime per year.

Any disruption to the communications links supporting these and other essential applications can have dire consequences to utility operations and the public. For example, the inability to properly manage and control power

distribution can result in outages and service interruptions to customers, including hospitals, clinics, senior living facilities, and refrigerated food and medical storage facilities. The ability to maintain stable voltage levels across the grid is also necessary to prevent inconsistent spikes that will damage residential, commercial, or governmental equipment plugged in to the grid, including devices needed for broadband internet access. Moreover, any interference that disrupts these critical communications links will significantly increase the risk of severe damage to the infrastructure of the electric grid itself. Finally, allowing indiscriminate unlicensed operations in the 6 GHz band threatens Southern's ability to comply with the obligations FERC imposes on Southern and other electric operators to ensure the reliability and safety of the nation's interconnected grid.⁹

Grid control applications are essential to Southern's everyday operations and are even more critical for maintaining and restoring electric service following large-scale disasters, including numerous recent hurricanes in the Southeast. In addition to keeping the grid operational during disasters, Southern uses 6 GHz microwave links throughout recovery periods to, among other things, temporarily replace damaged or destroyed communications links, handle recovery-related

⁹ See *Mandatory Reliability Standards for the Bulk-Power System*, 72 Fed. Reg. at 16,419.

surges in critical communications traffic, and establish and support staging areas and field operations centers for storm restoration activities.

B. Southern Has Identified Certain Especially Critical Operations That Will Be Undermined By Interference.

Even fleeting or transitory interference to its 6 GHz system would irreparably harm several of Southern's operations and gravely endanger public safety. To name just a few:

1. Generating Facilities

Southern uses 6 GHz microwave links at generating facilities for numerous purposes, including remote or autonomous control of critical plant systems to manage loads and prevent outages or catastrophic damage to both the electric grid and generating components when a generating facility is brought onto the grid or in the event of a fault either at the plant or elsewhere in the electric system. These applications require uninterrupted connectivity and must not incur even a second of outage time, since they require an instantaneous response in both directions. Interference from unlicensed low power indoor operations will disrupt these critical communications and significantly increase the risk of severe damage to the generating facility, the transmission grid, and switching devices both inside and outside connected substations, likely resulting in power outages and endangering the safety of employees and of the public.

2. Substation Operations

Southern also uses 6 GHz microwave links to support substation operations, which require a stable, highly reliable connection for critical functions such as protective relaying, which must react within milliseconds to manage electric loads, prevent cascading faults, and avoid damage to or destruction of substation breakers, transmission and distribution lines, and downstream distribution facilities such as transformers. Microwave links are also used to connect the substations of Southern and of neighboring utilities to exchange real-time, critical information about the interconnected electric grid such as voltages, current loads, and phase, as well as real-time status information on breakers, line switches, and load capacities. Real-time communications help ensure the grid does not become unstable or overloaded, which may lead to brownout or blackout conditions and damage to interconnecting tie points, switches, transmission lines, and substations.

Any interference from unlicensed low power operations will disrupt these critical substation communications and significantly increase the risk of dangerous, if not disastrous, power outages.

3. Nuclear Emergency Response Centers

Southern uses 6 GHz microwave links to provide critical communications to its two Nuclear Emergency Response Centers/Joint Information Centers. These centers are critical in case of an abnormal event at a nuclear facility and are

required to meet specific criteria set forth by the Nuclear Regulatory Commission. Any degradation in a 6 GHz microwave path serving these centers as a result of unlicensed low power indoor operations will hinder the response in addressing any emerging or ongoing problem with potentially catastrophic results.

II. THE FCC ACTED ARBITRARILY AND CAPRICIOUSLY BY FAILING TO PROVIDE A REASONED RESPONSE TO SOUTHERN'S DETAILED TECHNICAL ANALYSES DEMONSTRATING HARMFUL INTERFERENCE.

To satisfy the Administrative Procedure Act (APA), an agency must “examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made.” *Motor Vehicle Mfrs. Ass’n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (internal quotation marks omitted). One way to run afoul of that mandate is by “failure to respond meaningfully to objections raised by a party,” for “unless the agency answers objections that on their face seem legitimate, its decision can hardly be classified as reasoned.” *PPL Wallingford Energy LLC v. FERC*, 419 F.3d 1194, 1198 (D.C. Cir. 2005) (internal quotation marks and brackets omitted); *see also Canadian Ass’n of Petroleum Producers v. FERC*, 254 F.3d 289, 299 (D.C. Cir. 2001). In such circumstances, a court must “hold unlawful and set aside” the “agency action.” 5 U.S.C. § 706(2).

That is required here. The FCC failed to respond meaningfully to the data and objections that Southern presented to the FCC, which demonstrated that

unlicensed use of nominally indoor devices without automated frequency coordination controls would have catastrophic effects on Southern's licensed microwave links. Southern entered the fray during the FCC's rulemaking after proponents of unlicensed 6 GHz-band use submitted technical studies purporting to show there would not be significant interference, which were challenged in turn by incumbent licensees' studies indicating significant risks of interference with their licensed systems.¹⁰

These competing studies came to a broad range of conclusions, and Southern sought to understand what effects the FCC's potential actions might have on its own operations. It engaged the engineering firm of Lockard & White to analyze the real-world effects on Southern's 6 GHz microwave links in representative urban, suburban, and lightly-populated rural environments when applying the various parameters, assumptions, and models used in the studies submitted in the record. Letter from Coy Trosclair, Dir. of Telecom Servs., Southern Co. Servs., to

¹⁰ See Petitioners' Br. 26-27 (AT&T's technical study); *id.* at 41-43 (the CableLabs technical study); *id.* at 67 (Edison Electric Institute's technical study); Letter from Rob Alderfer, Vice President of Tech. Pol'y, CableLabs, to Marlene H. Dortch, Sec'y, FCC, ET Docket No. 18-295, GN Docket No. 17-183 (filed Dec. 20, 2019); Letter from Michael P. Goggin, AT&T Servs., Inc., to Marlene H. Dortch, Sec'y, FCC, ET Docket No. 18-295, GN Docket No. 17-183 (filed Nov. 12, 2019) ("AT&T Letter of 11/12/19") (JA__ -__); Emily S. Fisher, Gen. Counsel, Edison Elec. Inst., et al., to Marlene H. Dortch, Sec'y, FCC, ET Docket No. 18-295, GN Docket No. 17-183 (filed Jan. 24, 2020) ("EEI Letter of 1/24/20") (JA__ -__).

Marlene H. Dortch, Sec’y, FCC, ET Docket No. 18-295, GN Docket No. 17-183 (filed Feb. 6, 2020) (“Southern Letter of 2/6/20”) (JA__ -__).

To be conservative, Southern’s technical study used assumptions favorable to the *proponents* of unlicensed operations. *Id.* at 2. The study addressed two different scenarios for each microwave link it analyzed: (1) the aggregate impact of multiple unlicensed devices along the path of the microwave link (the approach used in many of the other studies); and (2) the impact of a *single* unlicensed device located along the licensed microwave path. *See* Letter from Coy Trosclair, Dir. of Telecom Servs., Southern Co. Servs., to Marlene H. Dortch, Sec’y, FCC, ET Docket No. 18-295, GN Docket No. 17-183, at 2 (filed Feb. 14, 2020) (“Southern Letter of 2/14/20”) (JA__).

Buildings, trees, and other “clutter” can block or attenuate radio frequency emissions. The authors of the study therefore simulated real-world clutter conditions by using satellite photos to select multiple sets of residential and commercial buildings located along the narrow main beam of each of the microwave paths and compiled data on these buildings such as quantity, ground elevation, geometry and geography between the buildings and the microwave receiver, and any obstructions between the buildings and the receiver. *See* Southern Letter of 2/14/20, Attachment B (JA__ -__). The authors then used

industry-standard methods to account for clutter when calculating the expected interference. *Id.* at 4 (JA__).

The results of this technical study demonstrated that, even using the assumptions favorable to unlicensed proponents, unlicensed low power indoor devices will cripple Southern's licensed 6 GHz microwave links, rendering them unusable to support critical electric utility operations. *See* Southern Letter of 2/6/20 at 3 (JA__). The study demonstrated that even a *single* unlicensed device could cause debilitating interference. *Id.*

Southern and Lockard & White representatives met with staff of the FCC's Office of Engineering and Technology and discussed the study thoroughly, including the FCC's perceptions about possible improvements. Southern Letter of 2/14/20 at 3 (JA__). Following the meeting, Southern submitted a detailed description of the study's methodology. *Id.* Southern and Lockard & White then revised the study's methodology in response to feedback from the FCC and to technical filings by other parties, re-ran the study using this revised methodology, and submitted the results and underlying data on February 27, 2020. Letter from Coy Trosclair, Dir. of Telecom Servs., Southern Co. Servs., to Marlene H. Dortch, Sec'y, FCC, ET Docket No. 18-295, GN Docket No. 17-183 (filed Feb. 27, 2020) ("Southern Letter of 2/27/20") (JA__ - __). Even with these revisions, the analysis reached the same result: a single unlicensed low power indoor device can create

harmful interference to Southern's licensed microwave systems. Moreover, the study illustrated that, as market penetration increases, so does the risk of harmful interference due to the increasing number of devices located along the path of the microwave beam. *See* Southern Letter of 2/27/20, Attachment B at 9-10 (JA__ - __).

In late March 2020, Southern heard reports that the FCC was considering authorizing unlicensed low power indoor devices to operate without automated frequency coordination control with a power limit nearly *double* the power level modeled in the Lockard & White studies showing that harmful interference would occur. Southern submitted a letter to the FCC detailing its concern that this latest proposal would exacerbate the already-demonstrated harms to its licensed microwave systems. Letter from Coy Trosclair, Dir. of Telecom Servs., Southern Co. Servs., to Marlene H. Dortch, Sec'y, FCC, ET Docket No. 18-295, GN Docket No. 17-183, at 1 (filed Apr. 1, 2020).

Southern was disappointed to then see this proposal adopted in the Commission's draft order, [Draft] Report and Order and Further Notice of Proposed Rulemaking, ET Docket No. 18-295GN Docket No. 17-183, FCC-CIRC2004-01, at 39, 41 (rel. Apr. 2, 2020) ("*Draft Order*") (JA__, __), and was surprised by the FCC's decision to adopt this approach based primarily on a study

by CableLabs. CableLabs never submitted its underlying analysis into the record. *See* Petitioners' Br. 40-44 (explaining how the CableLabs study is a black box).

More troubling still, the *Draft Order* grossly mischaracterized the detailed technical studies that Southern submitted and arbitrarily dismissed their results. The *Draft Order* discussed only the initial study submitted by Southern on February 6, 2020. It failed to acknowledge, let alone discuss, the subsequent studies and materials that Southern filed on February 14 and February 27, 2020.¹¹ In effect, then, Southern submitted a study, the FCC found room for improvement, Southern and Lockard & White made those improvements, and then—faced with a study that now met its requirements—the FCC merely ignored it and repeated the now-outdated criticisms. *Bus. Roundtable v. SEC*, 647 F.3d 1144, 1151 (D.C. Cir. 2011) (vacating rule where the agency unreasonably “discounted” adverse studies and “instead relied exclusively and heavily upon two relatively unpersuasive studies”).

The *Draft Order* first stated that the results of the Southern/Lockard & White technical study were not convincing because “[t]he study uses free space as

¹¹ Although there is no mention of these submissions in the FCC’s critique in either the *Draft Order* or the *Order*, they are listed in Appendix E (“Technical Studies Submitted”) in both the *Draft Order* and the *Order*. *See Order* Appendix E 123 (JA __).

the propagation model” and “applies a clutter loss to only a few of the scenarios.”¹² *Draft Order* ¶ 135 (JA__). The *Draft Order* then states that a “more appropriate methodology would have been to” “use a propagation model that inherently includes clutter loss” such as “WINNER II.” *Id.* But Southern’s supplemental submissions responded to *these very criticisms* and clearly stated that the Southern/Lockard & White study applied *both* the free space model *and* the ITU M.2135 model—a propagation model that is based on and derived from WINNER II and which, like WINNER II, “inherently includes clutter loss.” Letter from Coy Trosclair, Dir. of Telecom Servs., Southern Co. Servs., to Marlene H. Dortch, Sec’y, FCC, ET Docket No. 18-295, GN Docket No. 17-183, at 3 (filed Apr. 9, 2020) (citing Southern Letter of 2/14/20, Attachment C at 1, 3) (“Southern Letter of 4/9/20”) (JA__). Moreover, as discussed above, Southern submitted new studies that, as before, included calculations based on both Free Space Loss and on ITU M.2135; both models resulted in similar showings of harmful interference to Southern’s fixed microwave link. Southern Letter of 2/14/20 (JA__ - __).

In short, the record shows that the Southern/Lockard & White technical studies did indeed “use a propagation model that inherently includes clutter loss.” By simply ignoring inconvenient facts, the “Commission’s reply” was “illogical,”

¹² Clutter loss measures how much a radio signal will be weakened as it encounters buildings, vegetation, trees, or other obstacles as it travels towards the receiver. *See supra* p. 17; *see also* Petitioners’ Br. 33.

and its “failure to respond meaningfully to the evidence renders its decisions arbitrary and capricious.” *Tesoro Alaska Petroleum Co. v. FERC*, 234 F.3d 1286, 1294 (D.C. Cir. 2000).

The *Draft Order* also improperly rejected the Southern/Lockard & White technical study for not using “a statistical approach such as in Monte Carlo simulations” to evaluate the potential for spectrum sharing. *Draft Order* ¶ 135 (JA__). The FCC said a probabilistic analysis was required to evaluate a range of possible unlicensed device characteristics, such as different numbers of devices used near Southern’s microwave links or different levels of unlicensed-device use. This is wrong for two reasons. *First*, it presupposes that Monte Carlo simulations were needed to assess the risk of harmful interference to 6 GHz microwave links caused by a *single* unlicensed device. To be sure, a Monte Carlo analysis attempts to derive overall probabilities of a particular event (e.g., harmful interference) occurring when there are multiple independent factors that each have their own probabilities. But the sheer number of unlicensed devices, estimated by the unlicensed device proponents at nearly a billion,¹³ combined with an installed base

¹³ Letter from Paul Margie, Counsel to Apple Inc. et al., to Marlene H. Dortch, Sec’y, FCC, GN Docket No. 17-183, Attachment at 12 (filed Jan. 26, 2018) (JA__).

of nearly 100,000 microwave links,¹⁴ means that actual harmful interference events become a statistical certainty. Petitioners' Br. 23-24, 48-49. In other words, the use of a Monte Carlo analysis is irrelevant to whether the Southern/Lockard & White technical study was valid, and thus the FCC's rejection of Southern's study on that basis is arbitrary and capricious.

Second, this criticism ignored the study's most significant finding: the potential for harmful interference to Southern's licensed microwave links from a *single* low power unit operating in the path of the microwave link. In such a basic scenario involving a single device, a Monte Carlo or other complex statistical approach is irrelevant because it would arrive at the same result. After all, if a single device near a microwave link will interfere with the link, then nothing is to be gained from analyzing whether multiple devices with different characteristics will interfere with any one of numerous such links. There was thus no rational basis to dismiss the results of the Southern/Lockard & White technical study for this reason, and certainly no basis to dismiss the results of the study regarding the impact of a single unlicensed low power device.

Southern submitted a detailed response to the *Draft Order's* mischaracterizations of its technical studies on April 9, 2020 and met with the FCC

¹⁴ Letter from Stacey Black, Assistant Vice President of Fed. Reg., AT&T Servs., Inc., to Marlene H. Dortch, Sec'y, FCC, GN Docket No. 17-183, at 1 (filed Mar. 19, 2018).

to discuss these issues in detail. Southern Letter of 4/9/20 (JA__ - __); Letter from Coy Trosclair, Dir. of Telecom Servs., Southern Co. Servs., to Marlene H. Dortch, Sec’y, FCC, ET Docket No. 18-295, GN Docket No. 17-183, at 1 (filed Apr. 16, 2020). But the final *Order* effectively ignored Southern’s responses. The *Order* simply repeated the *Draft Order* verbatim in mischaracterizing the Southern/Lockard & White study’s treatment of clutter loss, without responding to Southern’s detailed objections. *Order* ¶ 135 (JA__). The *Order* did add a new footnote to respond to Southern’s objections, but it merely repeated the *Draft Order*’s unsubstantiated view that only a Monte Carlo simulation would suffice when analyzing the impact of even a *single* device. *Order* n.345 (JA__). Because the FCC failed to “address” Southern’s objections in its “final rule,” the Court should remand for the FCC to “provide a reasoned response.” *Cape Cod Hosp. v. Sebelius*, 630 F.3d 203, 211 (D.C. Cir. 2011).

The FCC also erroneously found that the Southern/Lockard & White analysis “assumes that all of the unlicensed devices are on the same side of the building facing the microwave receivers and transmitting at the same time.” *Order* ¶ 135 (JA__). To support this assertion, the FCC inexplicably cited not to the Southern/Lockard & White analysis, but to a CableLabs filing that predated Southern’s filing by more than six weeks. *Order* n.349 (JA__). However, the Southern analysis *did not* assume all unlicensed devices operated on the same side

of a building. Rather, it used a probability analysis (as the FCC suggested) to determine the likelihood that an unlicensed device would operate in a location with sufficient building loss to protect the fixed microwave path from harmful interference. *See* Southern Letter of 2/27/20, Attachment A at 7-9 (JA__ - __).

All told, then, the *Order* rejected the Southern/Lockard & White studies principally by simply misdescribing them—namely, by falsely stating they do not “use a propagation model that inherently includes clutter loss.” *Order* ¶ 135 (JA__). But Southern pointed out that the FCC was wrong about that. It therefore “challenged that premise” by which the FCC dismissed Southern’s objection “by attacking [the FCC’s] underlying assumptions.” *PPL Wallingford*, 419 F.3d at 1199. The agency’s “failure to respond meaningfully . . . renders its decision arbitrary and capricious.” *Id.* at 1198 (internal quotation marks omitted).

Likewise, when Southern challenged the FCC’s “unexamined premise” that a Monte Carlo simulation was required even for analyzing the impact of a single device, its response was mere “conclusory statements,” which “cannot substitute for the reasoned explanation that is wanting in this decision.” *ARCO Oil & Gas Co. v. FERC*, 932 F.2d 1501, 1504 (D.C. Cir. 1991); *see Order* n.345 (JA__).

The FCC’s actions were especially arbitrary and capricious here where it instead decided to “cherry-pick a study,” the CableLabs study, and to base its conclusion on that study’s “complex mix of controversial and uncommented upon

data and calculations” that were never disclosed. *Am. Radio Relay League, Inc. v. FCC*, 524 F.3d 227, 237 (D.C. Cir. 2008) (internal quotation marks omitted).

III. SOUTHERN’S RECENT TESTING UNDER REAL-WORLD CONDITIONS PROVES HARMFUL INTERFERENCE WILL OCCUR.

“The Commission’s prediction” that no harmful interference will occur “is not only unexplained”; “it is also wrong.” *U.S. Postal Serv. v. Postal Reg. Comm’n*, 886 F.3d 1261, 1272 (D.C. Cir. 2018). Southern conducted field testing that shows the FCC’s rule will cause harmful interference and gravely endanger public safety. This recent study further indicates that the FCC’s assumptions were incorrect and its reasoning was flawed.

Throughout the proceeding leading up to the *Order*, Southern and other parties consistently pointed to the need for rigorous field testing of unlicensed devices under real-world conditions before authorizing their use in the 6 GHz band.¹⁵ Southern’s technical study demonstrated that, contrary to filings by unlicensed proponents, unlicensed low power indoor devices would cause harmful interference to licensed 6 GHz microwave links if allowed to operate without automated frequency coordination control, and detailed technical studies in the

¹⁵ See, e.g., Letter from Coy Trosclair, Dir. of Telecom Servs., Southern Co. Servs., to Marlene H. Dortch, Sec’y, FCC, ET Docket No. 18-295, GN Docket No. 17-183 (filed Dec. 13, 2019).

record by other parties reached a similar conclusion. AT&T Letter of 11/12/19 (JA __); EEI Letter of 1/24/20 (JA __).

The existence of studies by different parties with different results emphasizes the need for *actual* field testing to verify which of those studies' predictions are correct in real-world circumstances before unleashing the mass deployment of uncontrolled unlicensed devices in the 6 GHz band. As Southern repeatedly explained to the FCC, once unlicensed devices enter the market, it will be nearly impossible to “put the genie back in the bottle.” *See, e.g.*, Southern Letter of 4/9/20 at 5.

Southern frequently told the FCC it would assist with and participate in any testing to evaluate the performance of unlicensed 6 GHz devices under real-world conditions, and Southern and other parties repeatedly asked proponents of unlicensed use to participate in such real-world testing.¹⁶ The unlicensed proponents consistently ignored or rejected those requests (and continue to do so) and even declined to provide prototype devices to use in real-world tests. Given the importance of assessing the actual impact of unlicensed 6 GHz operations on the licensed fixed microwave systems used across the country to support critical infrastructure operations and public safety communications, Southern partnered

¹⁶ Letter from Coy Trosclair, Dir. of Telecom Servs., Southern Co. Servs., to Marlene H. Dortch, Sec’y, FCC, ET Docket No. 18-295, GN Docket No. 17-183 (filed Sept. 11, 2020).

with CTIA¹⁷ to perform a field test in the vicinity of Southern's 6 GHz microwave receiver in Columbus, Georgia, one of the microwave links previously analyzed in the Southern/Lockard & White studies discussed above.¹⁸

Southern and CTIA conducted the testing in fall 2020 and publicly submitted the results to the FCC on November 13, 2020. Letter from Jennifer L. Oberhausen, Dir., Reg. Affs., CTIA, to Marlene H. Dortch, Sec'y, FCC, ET Docket No. 18-295 (filed Nov. 13, 2020). The results were clear: unlicensed low power operations under the *Order's* parameters caused harmful interference to Southern's microwave link. The field test of actual operations in real-world conditions demonstrated that a *single* low power device transmitting at the power levels authorized in the *Order* can cause harmful interference to a licensed microwave link from as far as 9 kilometers away. *Id.*, Attachment at 3 ("CTIA 6 GHz Field Test Report"). That matters for this Court's review: "[S]peculative factual assertion[s]," especially when those assertions are proven wrong, do not

¹⁷ CTIA is a trade association representing the U.S. wireless communications industry.

¹⁸ The test was conducted during a planned maintenance window for this microwave receiver to avoid any disruptions to Southern's operations. Test devices were requested from numerous manufacturers, but Southern and CTIA were informed that low power devices for the 6 GHz band were not available. The testing was therefore performed using a vector signal generator that simulated the operation of an unlicensed 6 GHz device under the rules adopted in the *Order*.

warrant judicial deference. *Chem. Mfrs. Ass'n v. EPA*, 28 F.3d 1259, 1266 (D.C. Cir. 1994) (internal quotation marks omitted).

The real-world test also belied the *Order*'s premise that the assertedly low “duty cycle” of an unlicensed device—a measure of the amount of time that the device is on and capable of creating interference—would prevent low power devices from having a significant impact on licensed incumbent systems. *See, e.g., Order* n.339 (JA__). The field test showed instead that interference to a licensed microwave link is triggered *instantaneously* when the unlicensed device is turned on, which means that the device’s “duty cycle” is irrelevant. CTIA 6 GHz Field Test Report at 3, 14.

By assessing the impact of just a single unlicensed transmitter on the licensed microwave link—and showing that it was enough to wreak havoc on the licensed link—the field test also corroborated Southern’s argument that Monte Carlo simulations were unnecessary because even a *single* unlicensed device could interfere with a licensed microwave link. When unlicensed devices are deployed on a wide scale, as both the unlicensed proponents and the FCC anticipate, the likelihood that a microwave link will experience interference from a single device “increases considerably, as does the potential for an” aggregate impact from multiple unlicensed devices transmitting simultaneously. *Id.* at 14; *see also* Petitioners’ Br. 54.

Overall, the results of this field test validate the results of the technical studies submitted by Southern, which the FCC arbitrarily ignored or dismissed. These results, which were derived from actual operations under real-world conditions, merely corroborate what Southern's technical studies already showed: that the computer models and simulations that the FCC relied on were fatally flawed. They do not provide any rational basis for the rules adopted in the *Order*, which, absent the "simple" and "easy to implement" solution of automated frequency coordination on low power unlicensed devices,¹⁹ manifestly fail to protect licensed operations in the 6 GHz band from harmful interference as required by the Act.

¹⁹ *Unlicensed Use of the 6 GHz Band*, 83 Fed. Reg. 64,506, 64,510 (proposed Dec. 17, 2018).

CONCLUSION

For the foregoing reasons, and those offered in Petitioners' brief, the Court should vacate the *Order* as it relates to unlicensed low power indoor devices and remand to the FCC for further proceedings.

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Respectfully submitted,

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I certify that on December 23, 2020, the foregoing was electronically filed through this Court's CM/ECF system, which will send a notice of filing to all registered users.

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