March 30, 2020

Via Electronic Filing

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

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

Dear Ms. Dortch:

On March 26, 2020, Emily Fisher, Richard Ward and Aryeh Fishman from the Edison Electric Institute ("EEI"), Sharla Artz, Brett Kilbourne, David Rardin and Rob Thormeyer from the Utilities Technology Council ("UTC"), Ken Zdunek, Alan Wilson and Paul Erickson from Roberson and Associates, LLC ("Roberson"), and Craig Gilley, Josh Finestone, Meryl Bartlett and Adam Davis of Venable LLP met by telephone conference with the Office of Engineering and Technology. Additional electric power industry representatives also attended but did not participate in the discussion. A complete list of all meeting participants including Commission staff in attendance is attached.

The nation's critical infrastructure industries ("CII") (the electric distribution, gas, and water utilities, and oil and gas companies) all require protections against harmful interference to their mission-critical microwave communications systems in the 6 GHz band on a continuous (24/7), low latency, uninterrupted basis to ensure the capability to operate essential facilities and equipment and maintain the backbone of our nation's communications networks during emergencies and disasters. Without sufficient protection against interference to these microwave communications systems, the safety of our nation's utility infrastructure is placed at high risk.

Thursday's discussion focused on the utility participants' technical filings in the above-listed dockets and the importance of protecting incumbent CII use of the 6 GHz band.[1] As shown in these submissions and previous engagement with the Commission, the record has failed

[1] *See* Roberson & Associates, LLC, *Impact of Proposed Wi-Fi Operations on Microwave Links at 6 GHz* (2019) (*CII User Study*); Letter from EEI, AGA, APPA, AWWA, NRECA, NEI and UTC to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183 (Jan. 13, 2020); Letter from EEI, AGA, APPA, AWWA, NRECA, NEI and UTC to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183 (Mar. 20, 2020) (*Updated Technical Analysis*).

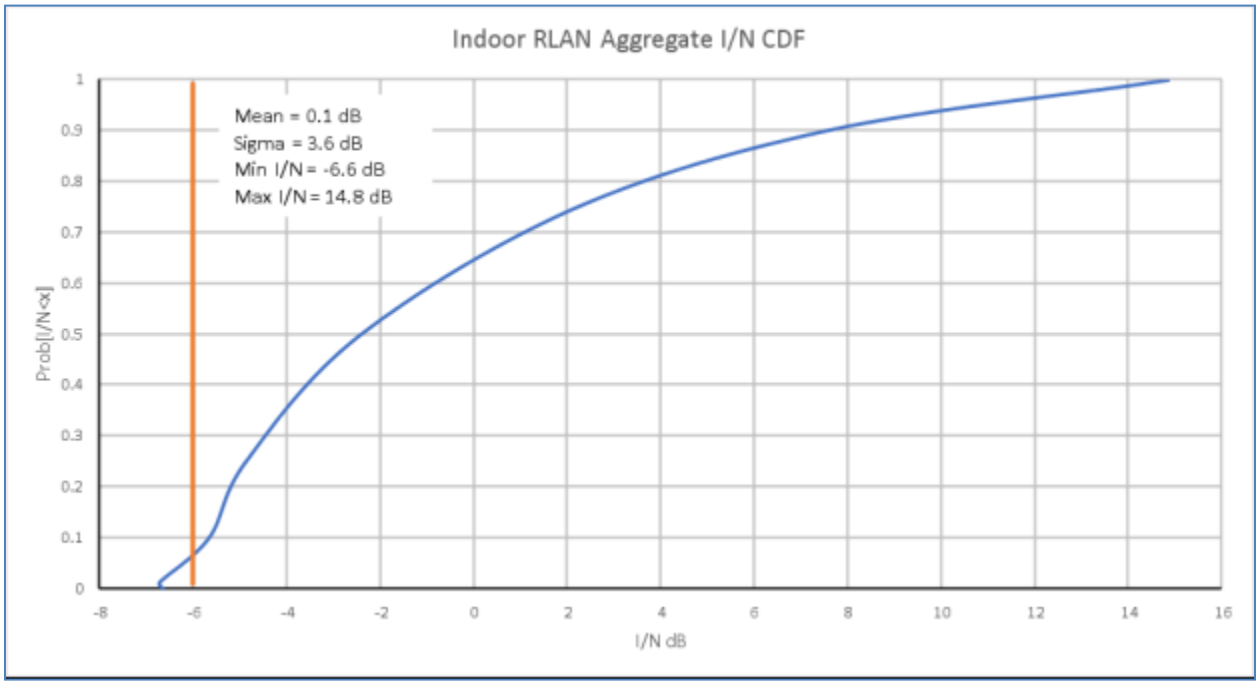
to reliably demonstrate a realistic situation in which uncoordinated shared use will not harm the integrity of the CII community's networks.[2] Both the initial CII User Study of the Houston metropolitan area and the Updated Technical Analysis show that the consequences of uncoordinated unlicensed use in the band would degrade 93% of licensed microwave point-to-point victim receivers in Houston in excess of the -6 dB I/N limit, including those receivers operated in service of CII, necessitating the use of Automated Frequency Control ("AFC") for all devices, including those deployed indoors.

Despite this conclusion, the CII has continued to work with OET and stakeholders to further refine the record's assessment of the impact of indoor use at certain power thresholds. To that end, Thursday's discussions initially focused on the harm presented by various indoor power limits. Neither of the proposed power limits of 5 and 8 dBm/MHz make a difference to the conclusion that AFC is required for indoor devices. CII's analysis evaluated 160 MHz and 80 MHz channels at the 5 dBm/MHz level and less and were unable to reach a tolerable level of interference.[3] Therefore, this analysis does not show any meaningful difference between a 5 dBm versus an 8 dBm threshold and the original conclusion remains: AFC is still required for indoor device uses, even at 5 dBm/MHz EIRP.

[2] Letter from EEI to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183 (Mar. 30, 2020); Letter from EEI, NRECA, AGA, UTC, APPA, NEI and AWWA to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183 (Feb. 7, 2020); Letter from EEI, UTC and APPA to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183 (Jan. 24, 2020); Letter from EEI to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183 (Dec. 11, 2019); Letter from EEI, UTC, AGA, API, AWWA, AAR, APPA, IAFC, GWTCA, NRECA, NEI and 58 other individual industry stakeholders to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183 (Nov. 18, 2019); Letter from EEI, UTC, NRECA, APPA, and AWWA to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183 (May. 17, 2020); EEI, UTC, NRECA, APPA, API and AWWA Reply Comments, FCC Docket Nos. 18-295, 17-183 (Mar. 18, 2019); EEI, UTC, NRECA, APPA, API and AWWA Comments, FCC Docket Nos. 18-295, 17-183 (Feb. 15, 2019).

[3] Indoor RLAN EIRP was 250 mW for 160 MHz, 80 MHz, and 40 MHz Wi-Fi channels, or 2 dBm/MHz, 5 dBm/MHz, and 8 dBm/MHz PSD respectively.

Indoor RLAN Aggregate I/N Distribution for 2325 FS Receivers



Commission staff next asked the consulting engineers to explain a 27 dB discrepancy in the path loss calculation between the initial Houston modeling and that of unlicensed use proponents. After much investigation into their calculations, it is apparent that unlicensed proponents misunderstand the propagation model employed in the CII initial study.

It is well established that total path loss between indoor RLAN transmitters should be composed of building entry loss and propagation loss due to distance between the building and the FS receiver. For indoor RLAN interferer distances less than 1 km, the CII initial study properly used free-space path loss plus building entry loss, and the unlicensed proponents' assertion that the study used a path loss less than free space for distances less than 1 km is wrong. In fact, the 27 dB discrepancy is actually due to issues with the unlicensed use in proponents' own analysis. For interferer distances greater than 1 km, unlicensed use proponents used entirely unrealistic and inconsistent parameters in the M.2135 NLOS equation compared to those used in the CII initial study. For example, for the entire nine county Houston area they assume a uniform 20 meter average building heights (about 6 stories tall) on a grid of streets 20 meters wide, an assumption that clearly does not reflect reality not only in Houston but in almost every other major metropolitan area.

Similar criticisms about unrealistic assumptions used in the unlicensed proponents' methodology for urban areas have been raised by others in the docket, most succinctly by the City of New York: "We remain unconvinced that the [unlicensed use proponents'] Studies' recommendations sufficiently protect public safety FS microwave licensees in NYC, in part due to the analysis lacking consideration of the real-world environment in which these links operate, among other concerns, some of which are articulated below. For example, NYC public safety

agencies are concerned that the analysis, as detailed in the Studies: (1) assumes that all high-rise buildings are equipped with windows that provide 30 dB of Radio Frequency ("RF") isolation without providing any documentation in support; (2) equates thermal efficiency with RF isolation, also without providing any proof; (3) makes assumptions regarding the existing noise floor without providing any field measurement data; and (4) uses nebulous terms such as "typical" to justify conclusions without performing the field measurements required to arrive at accurate results."[4]

The path loss model and the results of the initial CII study are robust. Nonetheless, in our March 20 filing the CII also responded to unlicensed proponents' criticism of the propagation model used in the initial CII study and applied the well-known path loss model described in 3GPP TR-38.901, whose parameters and applicability match the interference scenario in the nine county Houston area well. In order to be completely transparent and avoid misunderstanding, the path loss was plotted in graphic form, included as Figure 1 in our March 20 filing. Additionally, in the same March 20 filing, for distances below 1 km, both LOS (line of site) and NLOS (non-line of site) components of path loss were applied, just as unlicensed proponents did in their own analysis.

Significantly, the interference results (I/N distribution) for FS receivers reported in the March 20 filing using the path loss model described above are essentially the same as the results of our initial study. This confirms the applicability of our initial path loss model and provides further validation of the conclusion that indoor RLAN devices must be equipped with AFC to protect CII receivers. Criticism of the initial findings by unlicensed proponents based on allegations of errors in the application of path loss models in our initial study is without merit.

Commission staff also asked the consulting engineers to explain the basis for evaluating indoor RLAN antennas in the Houston area without any directional patterns in the calculations. The analysis of aggregate interference computed the distribution of average interference levels experienced by 2325 FS receiving antennas. This was done because it is important to look at interference in aggregate across the entire nine-county Houston metropolitan area, as this has not been done before for any metropolitan area. It is undisputed that there will be indoor RLANs in the Houston area installed with gain antennas. However, the average aggregate interference from a large population of RLANs with gain oriented in random directions azimuthally will average out the effect of gain, resulting in average interference functionally equivalent to all the RLAN antennas having zero gain.

Therefore, even if a random orientation of a 6 dBi gain antennas is factored into the analysis, the average gain over all azimuth directions for antennas with gain will revert to the equivalent of 0 dBi gain. In short, the gain factor from hundreds or thousands of directional antennas would be self-nullifying, leading to no effective change in our analysis. It is for this

[4] Letter from New York City Mayor's Office of the Chief Technology Officer, Department of Information Technology and Telecommunications, New York Police Department ("NYPD"), and Fire Department of New York to Marlene H. Dortch, Secretary, FCC Docket Nos. 18-295, 17-183, pp. 1-2. (Mar. 30, 2020).

reason that we determined directional antenna gain should not be considered in the technical assessments.

Given the importance of CII communications and the inability to walk back shared use should interference be debilitating, the burden of demonstrating that the interference impact of shared use will not impact CII communications should be on those proposing new use of the band, not incumbents.[5]

Nevertheless, CII continues to work in good faith with engineers and other stakeholders to reconcile the need for CII communications protections and sufficient spectrum to allow for 5G innovation. Accordingly, the CII community remains committed to working with OET and interested shareholders to identify realistic AFC parameters and other interference mitigation safeguards to protect the vital CII networks, including the ability to trace-back interference to the offending device and power down to mitigate further harm. Any regime allowing sharing of 6GHz must ensure that our systems can operate as designed without interruption.

[5] 47 U.S.C. § 301. *See, e.g.*, Am. Radio Relay League, Inc. v. F.C.C., 524 F.3d 227, 234 (D.C. Cir. 2008) ("The Commission has long interpreted section 301 of the Act to allow the unlicensed operation of a device that emits radio frequency energy as long as it does not "transmit[ ] enough energy to have a significant potential for causing harmful interference" to licensed radio operators.") (citing Revision of Part 15 of the Commission's Rules Regarding Ultra–Wideband Transmission Systems, 19 F.C.C.R. 24,558, 24,589 & n. 179 (2004); Revision of Part 15 of the Rules, 4 F.C.C.R. 3493, 3493 (1989); Part 15 Incidental and Restricted Radiation Devices, 20 Fed. Reg. 10,055, 10,056 (Dec. 29, 1955)).

We appreciate OET staff's time to engage with us and hope the foregoing will clarify the real-world risk that would result from unlicensed use of the 6 GHz band without interference mitigation, especially to the broad cross-section of the nation's critical infrastructure licensees that depend daily on the 6 GHz band for essential and mission-critical communications.

Respectfully submitted,

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Dated: March 30, 2020

cc: Office of Engineering and Technology

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