



April 14, 2020

Ms. Marlene Dortch, Secretary
Federal Communications Commission
445 12th Street S.W.
Washington, DC 20554

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

Dear Ms. Dortch:

I write today on behalf of the National Spectrum Management Association (NSMA)¹ to address issues raised by the Commission's recent draft Report and Order² in the above-referenced Docket. We agree with the general findings of the Report and Order. However, we wish to draw your attention to a few concerns.

1. Pre-implementation Testing. The Commission plans to bring unlicensed transmitters into the 6 GHz frequency managed bands. Virtually all technical analysis has been "tabletop" hypothetical analysis unencumbered by empirical evidence. We simply do not know what we do not know³. Given the substantial evidence presented by the fixed wireless community that such interference could occur, this is not a risk that the Commission should take without a prior robust test of the planned operations. The draft Order does envision testing of the Automated Frequency Coordination (AFC) system by a multi-stakeholder industry group, but this process is entirely voluntary and no testing is mandated by the rules. NSMA strongly urges the Commission to include in its rules a requirement that before unlicensed devices can be distributed for use under the rules as adopted, both (i) the effectiveness of the AFC system and (ii) the potential for interference from non-AFC controlled devices must be tested through a peer-reviewed process.

The necessary testing facilities are readily available. For example, the federally managed Idaho National Labs (INL) spectrum test bed is specifically designed to assess under real-world

¹ The NSMA, established in 1984, is a voluntary association of individuals involved in the spectrum management profession including service providers, manufacturers, frequency coordinators, engineers and consultants. NSMA's goal is to promote rational spectrum policy through consensus views formulated by representatives of diverse segments of the wireless industry. NSMA provides a linkage between government regulations and industry practice by developing recommendations (<https://nsma.org/recommendations/>) that streamline and standardize procedures used by the frequency coordination community.

² *Unlicensed Use of the 6 GHz Band*, Report and Order and Further Notice of Proposed Rulemaking, ET Docket No. 18-295; GN Docket No. 17-183, April 2, 2020, <https://docs.fcc.gov/public/attachments/DOC-363490A1.pdf>

³ *Comments of the National Spectrum Management Association*, ET Docket No. 18-295 and GN Docket No. 17-183, February 15, 2019

conditions whether mission-critical wireless systems serving national infrastructure can safely collocate with other proposed systems.⁴

Such tests should be conducted within the peer-review process and with transparency and the material input of all existing and proposed system services. The peer-review process provides the ability to validate proposed designs, gather empirical evidence, and avoid subjecting the nation's infrastructure to experimentation. A variety of (i) best-case and (ii) worst-case scenarios, as defined by the incumbent and the unlicensed parties, are recommended for the tests.

The availability of 6 GHz incumbent devices is confirmed. The ability to make available for testing the various iterations of proposed unlicensed 6 GHz devices is also necessary for conducting industry-standard live testing. That will bring more empirical data to the record. Facilities exist at INL in Idaho and Utah, and in the Washington, DC area. Numerous incumbent 6 GHz incumbent facilities in various locations across the country, especially those that are being temporarily off ramped for tower replacements, scheduled maintenance, facilities renovations, etc., could be potential, supplemental live test bed locations as well.

Federally-managed test beds and test protocols could make certain that operations records are continuously recorded, that difficult to replicate scenarios are transparently available to all parties for peer-reviewed analysis, that professional spectrum management and coordination protocols are verifiably observed, and that all parties can remove uncertainty from their operations plans. Validation of safe deployment and operations plans can occur which benefits all parties involved.

Precedents of large-scale introduction of new unlicensed or new service devices are instructive. In some instances, the 2400-2483.5 GHz band saw large-scale deployment of unlicensed devices while certain, low-unit volume licensed systems remained in operation in certain (typically rural areas). That scenario did not involve a heavily occupied incumbent microwave networks. One scenario in which large-scale licensed, mission-critical transport, backbone and backhaul networks were set for exposure to ubiquitous deployments by a new service, such deployments took place over a decade-long timeline and allowed for very careful exclusion zones and ultimately replacement of the transport, backbone and backhaul services under closely negotiated terms. See for example, the Spectrum Refarming Proceeding (PR Docket 92-235) at 2 GHz.

It is also instructive that the 5 GHz Unlicensed National Information Infrastructure (U-NII) device deployments resulted in a string of Notices of Apparent Liability (NALs) and related enforcement actions due to interference with Federal Aviation Administration (FAA), Military and privately-owned TV weather radar systems. The policing of those interference events taxed FAA and FCC resources and also caused instability in mission-critical scenarios. In the 5 GHz case there were at least 53 separate FCC actions.⁵

⁴See: Federally-managed spectrum test bed facilities, Idaho National Laboratory, Improving Wireless Communication, Reliability and Security, Wireless Testing, <https://inl.gov/research-programs/wireless-research/>

⁵ Enforcement Advisory No. 2012-07, DA 12-459, (September 27, 2012), U-NII and TDWR Interference Enforcement. "The Enforcement Bureau took the actions listed below against companies operating devices that caused interference to primary services operating within the Unlicensed National Information Infrastructure (U-NII) spectrum. Primary services operating within this spectrum include the Terminal Doppler Weather Radar (TDWR) systems operated by the Federal Aviation Administration (FAA), US Armed Forces and TV broadcast stations. TDWR systems serve the critical function of providing quantitative measurements for gust fronts, wind shear, microbursts, and other weather related hazards." <https://www.fcc.gov/general/u-nii-and-tdwr-interference-enforcement>

2. Propagation Models. In paragraphs 63 to 69, pages 24 through 27, the Commission outlines a detailed description of propagation models potentially appropriate for analysis of radio propagation in a clutter and obstruction environment. These models currently have industry support⁶, but they simply represent a starting point for that analysis. We strongly recommend those models not be specifically described within the Commission’s rules. State the requirements but not the methodology. We believe that evolving models developed by a multi-stakeholder industry group would serve the industry much better than models based upon little or no experience in the proposed situation.

It is unusual for the Commission to hard code a propagation model in its modern rules. Refining and improving a model become exceedingly difficult when rule changes are required because modifying the Commission’s rules can be a burdensome and time-consuming process. We strongly recommend those models not be specifically defined within the Commission’s rules, but instead be defined in a Public Notice or Knowledge Database (KDB) issuance. The industry will certainly learn much about appropriate propagation models during testing and early deployments and updating the models will be much easier if they are not hard coded into the rules. The Commission can begin with the model described in the draft Order as a starting point and issue a Public Notice or KDB entry immediately. As experience is gained⁷, better band- and use-specific models will certainly be developed and updating the models by a subsequent Public Notice or KDB entry will be much simpler than conducting a rulemaking proceeding to change the rules.

3. Duty Cycle Limitations: Explicitly Clarify the 0.4% Transmitted Power Average Weighted Activity Limit. Many studies have demonstrated possible interference into Fixed Service (FS) receivers by unlicensed Radio Local Area Network (RLAN) devices. In paragraphs 114 through 120, pages 41 through 44, The Commission discounts those studies by citing CableLabs reports⁸. In its technical analysis, the draft Order repeatedly identifies a weighted 0.4% duty cycle as a significant reason FS receiver interference will not occur. The RLAN proponents, however, consistently describe their duty cycle as referring to the percentage of time their equipment is being “utilized”- i.e., the time the equipment is carrying data. At no time do they state the percentage of time the transmitter is actually *transmitting*. The draft Order assumed that utilization time is transmission time but that is never explicitly stated. The draft rules nowhere limit such transmissions to 0.4% of the time. Devices could therefore have significantly higher transmission duty cycles which would render the Commission’s entire interference analysis inaccurate. The concept of “weighting” was not defined in the CableLabs report. Whether or not it makes sense in the context of interference analysis is not clear. For the Commission’s analysis to be logical, the transmitted power average weighted activity factor must be no greater than 0.4% and must be embodied in the rules. In addition, the concept of “weighted” must be included in the rules.

4. Contention-based protocol. The contention-based protocol described in paragraphs 103 and 104 of the draft Order will offer no protection to incumbent licensees. A contention-based protocol is not an appropriate mitigation tool where RLAN devices will typically have 6 dBi gain antenna and incumbent fixed service operator will be using at least a 39 dBi gain antenna. Simply put, RLAN receivers will be unable to detect and avoid fixed service signals. Contention-based

⁶ *Propagation Models and Interference Protection Criteria for Sharing between the Fixed Service and Unlicensed Devices in the 6 GHz Band*, Wireless Innovation Forum Document WINNF-TR-1002, Version V1.0.0, 17 December 2019 and RLAN AFC *Ex Parte* (Mar 19 2020).

⁷ FWCC *Ex Parte* Communication on AFC Design, March 13, 2020, Appendix: *Suggestions Regarding RF Path Loss Estimation*

⁸ CableLabs Dec. 20, 2019 *Ex Parte*; CableLabs Jan. 17, 2020 *Ex Parte*.

