

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
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Modernizing and Expanding Access to the 70/80/90 GHz Bands)	WT Docket No. 20-133
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Amendment of Part 101 of the Commission’s Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees)	WT Docket No. 10-153
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Aeronet Global Communications Inc. Petitions for Rulemaking to Amend the Commission’s Allocation and Service Rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands to Authorize Aviation and Maritime Scheduled Dynamic Datalinks)	RM-11824 (Aviation) RM-11825 (Maritime)

COMMENTS OF NOKIA

Nokia submits these Comments in response to the Notice of Proposed Rulemaking (NPRM) exploring innovative new uses of the 71-76 GHz and 81-86 GHz bands (the 70/80 GHz band) and the 92-94 GHz and 94.1-95 GHz band (the 90 GHz band).¹

I. INTRODUCTION AND SUMMARY

In these Comments, Nokia urges swift adoption of the NPRM’s lead proposal to increase the maximum beamwidth 3 dB points from 1.2 degrees to 2.2 degrees and to reduce minimum antenna gain from 43 dBi to 38 dBi. This simple rule change will allow needed flexibility to deploy smaller, lighter backhaul antennas to facilitate 5G deployments in urban settings. In addition, we ask that the Commission eliminate (or, alternatively, ease) the co-polar

¹ *Modernizing and Expanding Access to the 70/80/90 GHz Bands*, WT Docket No. 20-133 *et al.*, FCC 20-76 (rel. June 10, 2020) (“*NPRM*”).

and cross-polar discrimination requirements below 5 degrees. Eliminating these requirements would be consistent with ETSI specifications as well as Commission Part 101 regulations for other bands. Nokia urges caution with respect to the proposal to allow “slant” polarization, as we expect it would make coordination more difficult, especially for the longer-distance links that currently operate in the band and which will continue to be an important use case even if the Commission permits lower minimum gain.

Nokia believes that a “Class B” antenna category in the 70/80 GHz band would have limited utility in the near-term because of the already very-small size of the proposed 38 dBi antennas in the 70/80 GHz band compared to the larger antennas used in other bands. However, we do not oppose adding this second antenna category. We further urge that the Commission implement a mechanism to ensure that registered links are actually built so that unbuilt links do not hinder coordination of new links. As a final matter with respect to the 70/80 GHz band, if the Commission determines to adopt a channel plan, Nokia asks that the Commission base it on the widely accepted channel plan defined by the ITU.

The Commission’s proposals to allow communications to ships and aircraft, as well to revise the rules governing 90 GHz, require more study. These proposals are not yet well-vetted and would benefit from a more fulsome record. For example, Nokia believes that the 90 GHz band may be ideal for innovative terrestrial mobile uses and that the Commission’s proposal to simply extend the 70/80 GHz band framework to that band may not optimize use of that spectrum. In contrast, the Commission should expedite grant of the proposed rule changes that would allow smaller backhaul antennas in the 70/80 GHz band, which have been under consideration for many years and could have an immediate positive impact on 5G deployment in the United States.

II. NOKIA SUPPORTS RULE CHANGES TO ALLOW FOR SMALLER, LIGHTER ANTENNAS IN THE 70/80 GHZ BAND

The Commission should increase maximum beamwidth and reduce minimum gain in the 70/80 GHz Band. In the NPRM, the Commission proposes to increase the maximum beamwidth 3 dB points from 1.2 degrees to 2.2 degrees and to reduce minimum antenna gain from 43 dBi to 38 dBi, while retaining the proportional EIRP reduction requirement.² This is the very core of the 5G Wireless Backhaul Advocates proposal and FWCC proposal, and promises to be a major tool for the deployment of 5G network infrastructure. Specifically, Nokia fully agrees that the Commission should implement this rule change, which will permit “the use of smaller, lighter, lower cost, less susceptible to pole sway, and more visually attractive antennas for wireless backhaul, ideal for 5G network densification where wired backhaul is often not available to every site.”³ It is also desirable that the proposed change “would allow the same ETSI Class 3 antennas to be used in the US, offering a broader selection of available antennas and creating a common market for the US, Europe and Canada.”⁴

A Nokia study included with the 5G Wireless Backhaul Advocates’ presentation earlier this year demonstrates that the proposed rule change will not adversely affect the interference environment.⁵ As the study demonstrated for a simulated deployment in Manhattan, even under unrealistically conservative assumptions (such as not accounting for interference mitigation from buildings in this urban setting), there would be no increase in interference among fixed links in the band that would result from lower minimum gain antennas, despite their wider beamwidth. Taking into account the potential for jump-starting 5G, the globally

² NPRM, ¶ 11.

³ Letter from Jeffrey A. Marks, Head of Regulatory Affairs North America, Nokia, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-153, *et al.* (filed Mar. 17, 2020) (“5G Wireless Backhaul Advocates Ex Parte”).

⁴ *Id.*, Presentation at 13; NPRM, ¶ 11.

⁵ *Id.*, Presentation at 17.

harmonized ecosystem, and the lack of countervailing interference concerns, Nokia strongly supports this proposal.

The Commission should eliminate co-polar and cross-polar discrimination requirements entirely for angles below 5 degrees. Nokia agrees with the proposal to reduce the co-polar and cross-polar discrimination requirements applicable to the 70/80 GHz band, and in fact requests that such requirements be removed altogether for angles below 5 degrees from the centerline of the main beam.

As the NPRM notes, the current rules stipulate that, “between 1.2 and 5 degrees from the centerline of the main beam, co-polar discrimination must be G-28, where G is the antenna gain in dBi; and at angles of less than 5 degrees . . . cross-polar discrimination must be at least 25 dB.”⁶ FWCC proposes this requirement be eased from G-28 dB to G-33 dB and only apply between 2.5 and 5 degrees from the centerline of the main beam and that the cross polar discrimination requirement be reduced from 25 dB to 21 dB.⁷

The FWCC proposal appears to be workable, but it would also perpetuate a U.S.-specific quirk in the rules that is out of step with international standards and, in fact, unusual in the U.S. compared to part 101 regulations for other bands. Specifically, ETSI antennas are not specified below 5 degrees. Similarly, the Commission’s Part 101 rules do not specify co-polar and cross-polar discrimination requirements below 5 degrees for any other antennas for any other bands. As such, 70/80 GHz is an outlier among U.S. Part 101 bands.

The NPRM asks if it is correct that “relatively short-distance links for small-cell backhaul will not require high-capacity shard paths.”⁸ While Nokia agrees with this statement that there will be fewer shared paths for urban, short-distance backhaul links, we disagree with

⁶ NPRM, ¶ 12 & n.49 (citing 47 C.F.R. § 101.115(b)(2)).

⁷ *Id.* n. 49.

⁸ *Id.* ¶ 12.

the premise of the question. The proposed change in the Commission's rules related to lower minimum gain would permit flexibility to allow for smaller, lighter antennas that will facilitate dense urban deployments, but longer haul links will also continue to be deployed in the band in the manner they are today. Whether short-distance or long-distance links, such rules below 5 degrees in the 70/80 GHz band should be removed. There is no need for the Commission's rules to specify co-polar or cross-polar discrimination below 5 degrees for the 70/80 GHz band whether for the proposed urban deployment scenario or for the more traditional longer-haul links that exist in the band.

If the Commission does not ultimately agree to eliminate the co-polar and cross-polar discrimination rules below 5 degrees, Nokia believes the FWCC proposed relaxation is an acceptable alternative. Nokia's informal review of antennas currently on the market indicates that these existing antennas would comply with FWCC's proposal. Thus, the FWCC proposal appears to be benign, but would not be in step with specifications in other U.S. bands or specifications in other countries for the 70/80 GHz band, which do not specify co-polar or cross-polar discrimination below 5 degrees.

The Commission should not allow slant polarization in the 70/80 GHz band.

The Commission seeks comment on the FWCC recommendation to allow +/- 45 degree polarization, or "slant polarization," in addition to horizontal and vertical polarization currently specified in the Commission's rules.⁹ Adding a "slant" polarization would be a third polarization option intended to allow even more intensive use of the band. Nokia anticipates, however, that slant polarization will make it harder to coordinate links in the band, especially the longer-distance links that currently operate in the band, and which we anticipate will continue to be

⁹ *Id.* ¶ 13.

desirable. Thus, Nokia is concerned that allowing slant polarization could stifle the diversity of use cases (i.e. a mix of short hops and longer links) that are desirable for the 70/80 GHz band.

Adopting a second “category” of antennas for the 70/80 GHz band is not necessary, but Nokia does not oppose this proposal. The NPRM seeks comment on whether to include an additional less-stringent antenna standard – Category B – in the 70/80 GHz band, similar to its service rules in other bands regulated under Part 101.¹⁰ Nokia does not oppose a Category B in the 70/80 GHz band, but also is not a strong proponent. As an initial matter, we note that a second category already exists in ETSI specifications and Canada, so U.S. adoption of Category B would be in line with global standards.

As a practical matter, however, if the Commission adopts the proposal to allow for lower minimum gain in the 70/80 GHz band, Nokia does not anticipate Category B antennas to be deployed in in the near term. The antenna size difference between Category A and Category B would be relatively small compared to other bands. In other bands, Category B antennas may be one, two or more *feet* smaller than the Category A antennas in that band. In contrast, antennas in the 70/80 GHz band under the proposed minimum gain of 38 dBi would already be as small as about 6 inches in diameter, allowing one to shave only a couple inches off the diameter for Category B. Also, an antenna with gain of 38 dBi would be approximately the same size as the accompanying integrated transceiver. If the transceiver size stays constant (which would be the case using today’s technology), shrinking the size of the antenna would not materially benefit the overall footprint of the installation.

For these reasons, Nokia does not believe a Category B in the 70/80 GHz band would have much near-term utility, but we also do not oppose this second category if the Commission is inclined to adopt a two-category framework.

¹⁰ NPRM, ¶ 14.

There should be a mechanism to facilitate removing unconstructed links from the database. Nokia urges that the Commission adopt a method that ensures that only active links persist in the database.¹¹ In Nokia’s experience and discussions with other industry participants, it appears that the 70/80 GHz band suffers from the same “phantom link” issue as is pervasive in other bands. In the 4 GHz band for example, a Nokia survey based on a sample of 600 licensed sites found that up to 33% of the licensed stations do not exist and some continue to be renewed despite the fact that satellite images confirm that they do not exist. It is intuitive that a less-crowded, more accurate database would make coordination easier and more efficient.

While Nokia does not feel strongly regarding how to achieve a more accurate database, we note that link registrants have the opportunity to correct/delete unbuilt links as part of the routine coordination process. It would be prudent to legally obligate a link registrant to affirm that the link does or does not exist, and empower third-party database managers to adjust their databases accordingly. (At present, we understand that these third-party managers do not have authority to proactively remove unbuilt links.) A legal obligation to remove unbuilt or decommissioned sites in the database would discourage users from continuing to license “phantom” sites, and ease coordination efforts to extend 5G networks using wireless backhaul in the 70/80 GHz band.

The Commission should adopt an existing, well-accepted channelization plan for the 70/80 GHz band. The NPRM notes that the FWCC has requested that the Commission adopt a channelization plan for the 70/80 GHz band,¹² although it did not specify the details. Nokia does not believe a channelization plan will have much, if any, impact for coordinating fixed service (FS) links. Adoption of lower minimum gain, as proposed in this proceeding, does

¹¹ NPRM, ¶ 18.

¹² *Id.* ¶ 46 *et seq.*

not change our conclusion. However, we believe adoption of a channelization plan may be important for coexistence of fixed links with the proposed communications with aircraft and ships (after additional study as discussed below).

If the Commission adopts a channelization plan, we recommend it choose one that is globally harmonized and already in use to avoid disruption to the market and also avoid creating the need to develop U.S.-only equipment. Existing equipment manufactured for use in the 70/80 GHz band operates in line with current plans defined in the ITU and the European Electronic Communication committee, or ECC, that are substantially the same. To best achieve harmonization, we recommend that the U.S. base its channelization plan on Recommendation ITU-R F.2006: “Radio-frequency channel and block arrangements for fixed wireless systems operating in the 71-76 and 81-86 GHz bands.”

III. COMMUNICATIONS TO SHIPS AND AIRCRAFT IN THE 70/80 GHZ BAND REQUIRES FURTHER STUDY, AND THIS PROPOSAL MUST NOT DELAY ADOPTION OF NEW 5G WIRELESS BACKHAUL RULES

Nokia’s focus in this proceeding is to urge the Commission to make a minor change to its rules to facilitate 5G wireless backhaul in the 70/80 GHz band and we urge the Commission to move swiftly to make that change. The Commission also seeks comment on whether to add a new service in the band for “endpoints in motion,” i.e., service to ships and aircraft.¹³

Nokia opposes adding this new service, as it is likely to negatively impact the interference environment for incumbent and new FS users in the band. Because of the mobile nature of the new service, there are any number of maritime and air-to-ground uses of the band that could transit near fixed use cases (short hops or longer-distance). As FS would be unable to

¹³ *Id.* ¶ 22 *et seq.*

coordinate with mobile aerial or maritime endpoints, at the very least such systems would need to be able to have some method to detect and avoid FS system frequencies. Nokia recommends that this new service not be added at this time, but we would not oppose testing of such services for potential inclusion on a non-interference basis at a later date subject to successful co-existence trials.

It is important to recognize that most of the proposed changes in this proceeding, anchored by the proposal for lower minimum gain, are non-controversial longstanding requests that should move forward independent of the proposal to authorize endpoints in motion at this time. Nokia respectfully urges that the Commission not allow this novel proposed use case to delay implementation of the common-sense reforms to FS that have been sought for nearly 10 years.

IV. THE COMMISSION SHOULD ALLOW MORE TIME FOR STUDY OF THE 90 GHz BAND, INCLUDING POTENTIAL TERRESTRIAL MOBILE SERVICES

Nokia supports the Commission continuing to get the most out of all spectrum bands, including the 90 GHz band. However, unlike the 70/80 GHz band, which has been studied by Nokia and others for the last decade, Nokia respectfully suggests that the 90 GHz band requires additional industry review. In particular, instead of simply adopting the same rules for 90 GHz as the other bands considered in this proceeding, Nokia would like the Commission to consider mobility in the 90 GHz band as part of a future proceeding.

A promising use case is Integrated Access and Backhaul (IAB) as developed by 3GPP, for which Nokia sees great promise and is studying extensively.¹⁴ IAB is an alternative for faster and cost-efficient deployment of 5G mmWave sites without the need to densifying the

¹⁴ Paul Norkus, Looking for faster 5G mmWave roll-out? Find out how #IAB will help!, June 26, 2020, available at <https://www.nokia.com/blog/looking-for-faster-5g-mmwave-rollout-find-out-how-iab-will-help/>.

fiber transport network. IAB shares the same mmWave spectrum at a cell site used by mobile devices to also deliver backhaul connectivity from one cell site to another. IAB is being deployed in lower mmWave bands and could also be deployed in the higher mmWave bands like 90 GHz. Thus, Nokia asks the Commission to allow a more fulsome discussion of 90 GHz beyond the proposal in the NPRM prior to ruling on the optimum use of that band.

V. CONCLUSION

Nokia urges the Commission to implement its proposal to allow lower minimum gain in the 70/80 GHz band, as discussed above, without delay. We recommend that the Commission proceed with caution and allow further study for its proposals related to communications with ships and aircraft as well as proposals for the 90 GHz band.

Respectfully submitted,

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