

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)
)
Requests of Aviat Networks and) WT Docket No. 15-244
CBF Networks, Inc. d/b/a Fastback Networks)
For Waiver of Certain Antenna Requirements)
in the 71-76 and 81-86 GHz Bands)

REPLY COMMENTS

CBF Networks, Inc. (d.b.a Fastback Networks) (“Fastback”) hereby submits these reply comments to address comments submitted to the Commission with respect to the waiver requests (the “Waiver Requests”) filed by it and Aviat Networks (“Aviat”) that are the subject of the above-referenced proceeding. Fastback and Aviat each have requested a partial waiver of the antenna standards for the 71-76/81-86 GHz bands that are set forth in Section 101.115 of the Commission’s rules.

I. Most Parties Support Grant of the Waiver Requests.

To begin, Fastback notes that the vast majority of comments filed with respect to the Waiver Requests support their grant. For example, The Fixed Wireless Communications Coalition (FWCC”) concurs with the assessment that, while the originally intended application that underlies the Commission’s current service rules for the 71-76/81-86 GHz “has failed to materialize,” the antenna technologies presented in the Waiver Requests “would be ideal” for meeting today’s needs “for small, light, esthetically inconspicuous antennas, particularly to provide backhaul for small-cell

installations.”¹ Echoing a similar theme, PEG Bandwidth urges that grant will “spur more extensive development” of this underutilized band.² T-Mobile notes that that the current service rules reflect “former technology requirements rather than the need for small-cell backhaul....”³

The Waiver Requests are also supported by Comsearch who requests clarification as to scope of those who would be covered by the waiver relief.⁴ Comsearch suggests,⁵ and Fastback concurs, that the waiver relief should be available to all licensees employing equipment that meets the antenna waiver standards.

II. The Single Party Opposing the Request Provides No Basis for Leaving Valuable Spectrum Largely Fallow.

Against this support, only one party, Dash Networks Corporation (“Dash”), who describes itself as “a company focusing on the manufacture and telecom services primarily using the 71-76 and 81-86 GHz bands,”⁶ opposes the waivers. Much of Dash’s Comments seem devoted to harkening back to arguments made to the Commission more

¹ See Letter from Mitchell Lazarus, Counsel for FWCC to Marlene H. Dortch, Secretary, Federal Communication Commission, WT Docket No. 15-244 (May 23, 2013), at 2.

² See Letter from Vijay Lewis, Chief Technology Officer, PEG Bandwidth, LLC to Marlene H. Dortch, Secretary, Federal Communication Commission, WT Docket No. 15-244 (Apr. 10, 2015), at 2.

³ See Letter from Kathleen O’Brien Ham, Vice President, Federal Regulatory Affairs, T-Mobile USA, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No 15-244 (Mar. 12, 2015), at 2.

⁴ See Comments of Comsearch, WT Docket No 15-244 (November 12, 2015), at 1.

⁵ *Id.*

⁶ See Dash Comments on 15-244, WT Docket No 15-244 (November 12, 2015)(“Dash Comments’) Whether DASH actually today manufactures equipment or provides service in these bands or simply hopes to do so in the future is unclear from its Comments.

than 12 years ago as to what was then perceived as to the best uses of the band.⁷ Dash does not dispute that the bands are underutilized, but argues that they should not be “pollut[ed]”⁸ with smaller, lower-cost antennas meeting today’s communications requirements against the hope that, by maintaining current antenna restrictions, “two very large blocks” of spectrum “would one day have a significant and important impact on global telecommunications.”⁹

With due respect, Fastback submits that 12 years to keep valuable spectrum largely fallow based upon outdated views of spectrum requirements is long enough to wait. The concern Dash expresses that grant of the waivers will destroy the “uniqueness” and “utility” of the 71-76/81-86 GHz bands¹⁰ in essence comes down to its fear of the greater usage of the bands as will inevitably occur with products that are lower cost, sized appropriately for available structures, and generally easier to deploy . As explained in the attached engineering Statement of Dr. Kevin T. Negus, CTO and Co-Founder of Fastback:

“These bands are today unfortunately “unique” primarily by their woeful under-utilization as evidenced by the only 5500 registered links since 2005 across all of the USA as noted by Dash. The real “uniqueness” of this band is that with 10 GHz of spectrum impaired only by rain fading, the 71-76/81-86 GHz bands are ideal for high density wireless backhaul and competitive broadband access at ranges such as 1-3 km where 57-64 GHz band products are completely impractical due to oxygen absorption. The real “utility” of this band will be greatly enhanced by the min 38 dBi antenna gain requirement that enables much higher density deployments in metro

⁷ See Dash Comments at 3-4, 6-8.

⁸ *Id.* at 4.

⁹ *Id.* at 6.

¹⁰ *Id.* at 4.

areas and the opportunity to use this spectrum with lower cost and easier to deploy products in smaller towns and rural areas where density issues are of no concern relative to a 38 dBi versus 43 dBi antenna gain requirement.¹¹

Dash's attack on the technology reflected in the Waiver Requests is unsubstantiated and, upon simple analysis, erroneous and. As explained by Dr. Negus:

- (i) Dash erroneously implies that granting the Waiver Requests will result in one mile links with antenna beamwidths of 150 yards;¹² under Dash's own analysis, the beamwidth of such a link, while wider than the estimated 15 yards under existing antenna deployments, would be more in the order of 27 yards, still a "pencil beam" under today's engineering standards;¹³
- (ii) Dash's completely unsubstantiated assertions of potential interference to a hypothetical deployment of its "project[ed]" wireless links¹⁴ as well as its assertions that deployment of 38 dBi minimum antenna gain products, as would be permitted under the Waiver Requests, would somehow "increase the probability of interference" to a hypothetical "daisy-chain of links"¹⁵ are unsupported and unsupportable. Among other things, the experience in Europe, where such products are deployed today, in real-world, not imagined hypothetical examples, is precisely to the contrary.¹⁶

Finally, Dash suggests that, sometime in the future, the Commission might consider allocating other higher frequency bands for applications such as those proposed in the Waiver Requests.¹⁷ Fastback urges that whether some other

¹¹ See Attachment A, Technical Statement of Dr. Kevin T. Negus ("Negus Statement") at 2.

¹² See Dash Comments at 9

¹³ See Negus Statement. at 1

¹⁴ See Dash Comments at 10.

¹⁵ Id. at 12.

¹⁶ See Negus Statement at 2

¹⁷ See Dash Comments at 15.

spectrum might someday be made available for use is not a hypothetical that need be addressed. The facts are that there is present technology, present need, and present largely unused spectrum that could be employed to respond to that need without interfering with currently authorized use. That should be enough to support the requested waiver.

The 71-76/81-86 GHz bands are valuable spectrum. On that point, at least, as Dr. Negus notes,¹⁸ Dash and Fastback agree. Where they part company is whether the Commission should permit smaller and less expensive antennas to be deployed making practical the use of this spectrum in both metropolitan areas and smaller towns and rural areas or whether the spectrum should continue to be under-utilized.

¹⁸See Negus Statement at 3.

III. **Conclusion**

Fastback respectfully submits that it is time to put this valuable spectrum to good use. We urge prompt action on the Waiver Requests.

Respectfully submitted,



By: _____

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November 30, 2015

Technical Statement of Dr. Kevin J. Negus in Response to Dash Networks Corporation Comments (“Dash Comments”) on Requests of Aviat Networks and CBF Networks, Inc. d/b/a Fastback Networks (“Fastback”) for Waiver of Certain Antenna Requirements in the 71-76 and 81-86 GHz Bands (“Waiver Requests”)

Qualifications of Dr. Negus

Dr. Negus is the CTO and Co-Founder of Fastback Networks, a company that develops and manufactures leading edge wireless backhaul equipment in the 5 GHz, 60 GHz and 70/80 GHz bands. Dr. Negus is also a Professor of Electrical Engineering at Montana Tech University in Butte, MT where he leads a research program to cost-effectively bring mobile broadband service to currently unserved or underserved regions of the USA, primarily in the Rocky Mountain West. Dr. Negus has 30 years of technology development experience in the wireless industry at the chip and system level for both terminal and infrastructure companies. He holds approximately 40 US patents all related to wireless technology deployment. Dr. Negus is also a former appointee to both the Wyoming Telecommunications Council and the FCC Technological Advisory Committee.

Discussion

I have reviewed the Dash Comments and, for the reasons set forth below, found many of the assertions made therein erroneous and unsubstantiated, including at least as follows:

First, Dash (*see* Dash Comments at p.9) implies that granting the Waiver Requests to adopt the same min 38 dBi antenna gain requirement as used in Europe will result in 1 mile links with an antenna beamwidth of 150 yards versus 15 yards for the existing USA 43.5 dBi requirement. This is incorrect. The requested Fastback/Aviat waiver would enable antenna beamwidths of about 1.8 degrees (38 dBi) versus about 1 degree (43.5 dBi), or thus to the extent that “15 yards” is a reasonable estimate of antenna pattern at 1 mile today per Dash, then that would become about “27 yards” under the Fastback/Aviat waiver request.

Second, Dash’s assertion that any reduction in antenna gain requirements will lose the “pencil beam” requirement of the existing rules is similarly incorrect (*see* Dash Comments at pp. 8, 9, 11). An antenna for the 71-76/81-86 GHz bands with about 1.8 degree beamwidth is still very much a “pencil beam” as anyone who has actually tried to install point to point links with 38 dBi gain antennas at distances such as 1 mile apart can readily attest to.

Third, Dash's unsubstantiated assertion (*see* Dash Comments at p. 10) that in a hypothetical deployment from one fiber POP to 12 uniformly distributed buildings some of the connections would not be possible if min 38 dBi antennas were allowed is completely unsupported. Although Dash provides no simulations nor even basic deployment dimensions for this hypothetical example, it is my engineering judgment and experience that 71-76/81-86 GHz band products with 38 dBi min antenna gain, as legal today in Europe, can easily support the depicted density of links in typical real world building connectivity deployments.

Fourth, Dash's view that 71-76/81-86 GHz band products with 38 dBi min antenna gain constitute a "niche market" (*see* Dash Comments at p. 12) when used for applications such as small cell backhaul is misplaced. As evident from the extremely low deployment of 71-76/81-86 GHz band products with 43.5 dBi min antenna gain to date, it is Dash's preferred larger antenna scenario that is the "niche market". Furthermore, Dash's unsubstantiated claim that the usage of the same min 38 dBi antenna gain requirement as used in Europe may "increase the probability of interference" to a hypothetical "daisy-chain of links" (*see* Dash Comments at 12) is not supported by specific measured data or simulations. I note that advances in signal processing, such as used in Fastback's current products, enable significant interference mitigation for such fixed wireless deployments and thus rules for usage of these bands should not be restricted to protect the specific limitations of some manufacturers' inferior products. Additionally, for small cell backhaul applications where min 38 dBi antenna gain products are likely to be deployed at much higher densities than current 71-76/81-86 GHz band products, substantial attenuation of potentially interfering signals will inevitably result from buildings or other objects when such backhaul links are co-located with small cell emplacements.

Fifth, I fundamentally disagree with Dash's view (*see* Dash Comments at p. 16) that allowing much greater usage of the 71-76/81-86 GHz bands, as will inevitably occur with products that are lower cost, sized appropriately for street assets and easier to deploy, will "destroy the uniqueness and utility" of these 71-76/81-86 GHz bands. These bands are today unfortunately "unique" primarily by their woeful under-utilization as evidenced by the only 5500 registered links since 2005 across all of the USA as noted by Dash. The real "uniqueness" of this band is that with 10 GHz of spectrum impaired only by rain fading, the 71-76/81-86 GHz bands are ideal for high density wireless backhaul and competitive broadband access at ranges such as 1-3 km where 57-64 GHz band products are completely impractical due to oxygen absorption. The real "utility" of this band will be greatly enhanced by the min 38 dBi antenna gain requirement that enables much higher density deployments in metro areas and the opportunity to use this spectrum with lower cost and easier to deploy products in smaller towns and rural areas where density issues are of no concern relative to a 38 dBi versus 43 dBi antenna gain requirement.

In addition to the particulars above, I am in agreement with Dash on at least a few points. These include the fact that the 71-76/81-86 GHz bands are valuable spectrum that can be used as an alternative to fiber in metro areas as well as many smaller towns and even rural areas for services at 10 Gb/s throughput or even higher. However, it is my judgment that smaller antennas at 38 dBi are much more practical for cost-effective deployment in these smaller towns and rural areas than existing antennas of 43 dBi. And, in these smaller towns and rural areas, interference issues in the 71-76/81-86 GHz bands is even less of a concern than in metro areas. Thus, in addition to enabling higher density deployments in metro areas, grant of the Waiver Requests will permit smaller towns and rural areas even more non-interfering backhaul connectivity options than available today by allowing 71-76/81-86 GHz band products to use the same min 38 dBi antenna gain restriction available to such customers today in Europe.

I hereby certify that I am a technically qualified person responsible for the preparation of engineering information contained in this statement and that this statement is complete and accurate to the best of my knowledge.

By: /s/ Kevin J. Negus
Kevin J. Negus
CTO, Chairman, and Co-Founder of
Fastback Networks