

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554**

In the Matter of)
)
Requests of ZenFi Networks, Inc. and)
Geneva Communications LLC for Waiver) WT Docket No. 15-245
to Authorize Service in the 102-109.5 GHz)
Band)

COMMENTS OF BATTELLE MEMORIAL INSTITUTE, INC.

Battelle Memorial Institute, Inc. (“Battelle”)¹ submits these comments in support of the requests filed by ZenFi Networks, Inc. (“ZenFi”) and McKay Brothers, LLC through its subsidiary, Geneva Communications LLC, (“McKay”) seeking waivers of certain procedural and technical rules to extend the authorization of their respective Millimeter Wave Band Radio Service licenses to allow commercial operations in the 102-109.5 GHz bands.² Both ZenFi and McKay propose that operations in the band be coordinated and registered using the regulatory framework established for registering links in the 70/80/90 GHz bands. Battelle has pending before the Commission a petition to establish licensed service rules for the 102-109.5 GHz

¹ Battelle is the world’s largest non-profit research and development organization. *See* Battelle Memorial Institute, About Us, <http://www.battelle.org/about-us>. Battelle has an unparalleled track record of innovation that has had a material impact on the U.S. economy over many decades. Battelle has also been actively working for years on a technology solution to meet the growing demand for commercially-viable, high-bandwidth point-to-point wireless communications. Headquartered in the United States and with more than 22,000 employees at more than 130 locations globally, Battelle explores emerging areas of science, develops and commercializes cutting-edge technology, and manages research laboratories, including seven National Laboratories operated by the Departments of Energy and Homeland Security. Specifically, Battelle manages the Brookhaven National Laboratory, the Idaho National Laboratory, the Lawrence Livermore National Laboratory, the Oak Ridge National Laboratory, the Pacific Northwest National Laboratory, the National Renewable Energy Laboratory for the Department of Energy, and the National Biodefense Analysis & Countermeasures Center for the Department of Homeland Security.

² *Wireless Telecommunications Bureau Seeks Comment on Requests of ZenFi Networks, Inc. and Geneva Communications LLC for Waiver to Authorize Service in the 102-109.5 GHz Band*, Public Notice, DA 15-1167 (Wireless Telecomms. Bur. 2015).

band.³ The Commission recently stated that Battelle’s proposal, which was placed on public notice in February 2014 for public comment,⁴ will be considered in the Wireless Backhaul proceeding, WT Docket No. 10-153.⁵ Use of the 102-109.5 GHz band under the waiver requests would continue pending resolution of Battelle’s proposal.⁶

The 102-109.5 GHz band is currently allocated on a co-primary basis to fixed use, the radio astronomy service (“RAS”), and space research (passive). But the only current federal use of the band is by the RAS for observations at a small number of sites located far away from the metropolitan market areas identified in the ZenFi and McKay waiver requests. Because use under the waiver requests will be limited to specifically defined geographic market areas and not in direct line-of-site paths of radio astronomy observations, the degree of protection provided to passive service use of the band will be consistent with ITU-R Recommendation RA.769-2, which defines the most commonly cited interference thresholds. Moreover, counsel for Battelle recently engaged in informal discussions with NASA and NOAA about ZenFi’s proposed use, and each agency confirmed that it had no present concerns about the waiver request because use will be confined to the 102-109.5 GHz band. In addition, NASA confirmed it has no present concerns about out-of-band emissions from the proposed use. Accordingly, the use contemplated under the ZenFi and McKay waivers does not pose any current substantial interference threat to other users of the band.

³ See *Petition of Battelle Memorial Institute, Inc. for Rulemaking*, RM-11713 (filed Feb. 6, 2014).

⁴ *Consumer & Governmental Affairs Bureau Reference Information Center: Petition for Rulemaking Filed*, Public Notice, Report No. 3000 (2014).

⁵ See *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services et al.*, Notice of Proposed Rulemaking, FCC 15-138 at 30 ¶ 91 (2015).

⁶ See File No. 0006884202, ZenFi Request for Waiver at 3 (filed Jul. 22, 2015); File No. 0006910034, McKay Ex Parte Support of Petition for Rulemaking RM-11713 or, In the Alternative, Request for Waiver at 7 (filed Aug. 10, 2015).

Grant of the ZenFi and McKay waiver requests will serve the public interest. Granting the waiver requests will advance the Commission's mission of supporting and encouraging further innovation and investment in wireless technology, promote greater access to and efficient use of spectrum, and assign spectrum so that it can be used in ways that best meet the needs of the market.⁷ Battelle long ago recognized substantial demand among a broad range of users for a wireless solution with the high bandwidth of fiber. Such users include government, healthcare providers, educational institutions, the financial community, co-location data center operators, mobile carriers, and other intensive data users operating in areas where fiber optic service is not cost effective or otherwise feasible or where path diversity is needed. But Battelle quickly learned there was no commercially available solution for these users: while modern fiber optic networks supported 10 gigabit/second Ethernet, the limits of the existing wireless technology and the propagation characteristics of the available spectrum under 100 GHz constrained wireless users of these bands to far lower capacity – generally 1 gigabit/second. Battelle therefore focused its efforts on developing advanced wireless technologies to provide highly-reliable wireless links that can support the cost-effective wireless delivery of 10 gigabit/second Ethernet data streams. Specifically, Battelle focused its efforts on spectrum above 100 GHz, which offers favorable propagation characteristics and can readily be shared with incumbents. After 10 years of effort and approximately \$10 million invested in research and development, Battelle demonstrated under experimental special temporary authority that it can achieve high-bandwidth transmission on a millimeter-wave carrier and proved that the 102-109.5 GHz band now can support the cost-effective wireless delivery of one or more 10 gigabit/second Ethernet data streams with spectrum efficiency greater than 1 bps/Hz.

⁷ See, e.g., *Fostering Innovation in the Wireless Communications Market; A National Broadband Plan for Our Future*, Notice of Inquiry, FCC 09-66, 24 FCC Rcd. 11,322, 11, 323, 11,326-27 ¶¶ 1, 20 & 22 (2009).

Permitting use of the 102-109.5 GHz band by ZenFi and McKay during the pendency of Battelle's proposal will begin to address the growing commercial demand for wireless links capable of delivering 10 gigabit/second Ethernet service, particularly in areas where fiber is not available or deployment is not economically feasible. If a user's needs change, wireless links can be moved or repurposed relatively quickly and at a cost that is significantly less than for moving or changing fiber infrastructure (assuming that such fiber even can be moved or changed). It will also provide useful information about how this technology works in practice to the Commission as it considers rule changes for the band.

Importantly, the 102-109.5 GHz band is largely fallow and thus significantly underutilized. Allowing spectrum to lie fallow does not increase consumer welfare and disserves the public interest, particularly when there is growing demand for highly-reliable wireless links capable of delivering 10 gigabit/second Ethernet service, like in the urban areas identified in the waiver requests. Grant of the waiver requests will promote the efficient use of spectrum that is currently underutilized.

Importantly, grant of the waiver requests will not interfere with the current and planned RAS observations and will not impose any unmanageable link coordination and registration issues. Therefore, considering the public interest in fostering innovation and not allowing spectrum to remain fallow, the value of seeing how the technology works in practice as rule changes are considered, and the absence of interference potential of the proposed use, grant of a waiver pending the outcome of Battelle's proposal will serve the public interest.

For the reasons set forth above, Battelle urges the Commission to promptly grant the ZenFi and McKay waiver requests to extend the authorization of their respective Millimeter

Wave Band Radio Service licenses to allow commercial operations in the 102-109.5 GHz bands,
while Battelle's rulemaking proposal advances through the relevant Commission processes

Respectfully submitted,

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