

Before the
FEDERAL COMMUNICATIONS COMMISSION

Washington, DC 20554

In the Matter of)	
)	
Expanding Flexible Use in Mid-Band)	GN Docket No. 17-183
Spectrum Between 3.7 and 24 GHz)	
)	
)	

To: The Commission

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REPLY COMMENTS OF
WISER SYSTEMS, INC.

WISER Systems, Inc. respectfully submits these Reply Comments in response to
Comments already submitted in the proceeding at hand.

WISER Systems is an innovative, woman-owned, Small Business Innovation Research (SBIR) supported startup company in its first year of commercialization. WISER uses redundant radio localization and tracking (RRLT) technology to track tagged materials with sub-meter accuracy in any environment in real time, and WISER employs this technology in a number of critical applications in inventory management and security. WISER opposes the potential allocation of bands for unlicensed operation between 3 and 10 GHz, given that so many critical applications already operate under existing rules in these bands. WISER submits that changing

guidelines just as new innovations are gaining marketplace traction in these bands would have adverse consequences, as other Comments have observed, in the following categories:

- Safety and Security
- Interference with Existing, Critical Services
- Innovation and Economic Growth
- International Competition
- Market Monopoly
- The Sharing of Bands

I. SAFETY AND SECURITY

The possibility of the FCC allocating additional uses for unlicensed space—or even licensing additional mid-band spectrum space, as many companies have requested—is alarming, in part, because so many current and critical devices already operate in bands being considered. Boeing’s use of the 4.2-4.4 GHz band for altimeters is one compelling example, as are Duke Energy’s critical microwave applications around the Lower 6 GHz Band.

Like Zebra Technologies and Decawave, WISER also has safety and security concerns in multiple bands under consideration, with incumbent use cases including guidance of first responders in emergency situations, patient security in hospitals and home care settings, personnel safety around operating machinery, and security / entry systems for automobiles. Many of these use cases would be impossible to achieve if higher powered devices occupied the bands in question. Most importantly, these innovative solutions are impossible to replicate with conventional technologies like Wi-Fi.

WISER provides autonomous, real-time location and asset tracking, using ultra-wideband (UWB) to locate tagged materials at a scale that is not replicable with WiFi because of latency problems—such as when tracking tens of thousands of units concurrently in the same location. WISER’s use of UWB allows unparalleled 3-D accuracy, lower and safer power levels, and resistance to reflection around metal and other indoor clutter that typically makes autonomous industrial locating and tracking impossible. Due to reflection and interference, other solutions are inferior and unsuitable for applications like WISER’s real-time localization and autonomous inventory technology, which WISER currently employs in U.S. aerospace and other industrial facilities where real-time security geofencing and disaster recovery are of critical concern.

The safety and security benefits hinging on these solutions merit a thorough and cautious approach to any changes in licensing of the mid-bands.

II. INTERFERENCE WITH EXISTING, CRITICAL SERVICES

Most of the safety concerns mentioned above have to do with interference with existing devices and services. FCC PART 15 Subpart C Section 15.250 currently protects the bands between 3 GHz and 10 GHz for unlicensed use within certain equivalent isotropically radiated (low) power (EIRP) density levels.

If the FCC relaxes power level restrictions for these bands, we can expect the following: a) critical services will be jeopardized by interference and congestion; b) significant investments from U.S. and other companies would be effectually voided¹; c) a large number of U.S. companies, including many small and emerging IoT innovators, will be undermined and would likely fold since their technologies and services could no longer work reliably; and d) although

¹ In their respective comments, Duke Energy estimates that they alone have invested \$15 million into just equipment operating in the 6 GHz bands, and Decawave reports that over \$1B has been invested worldwide in technologies like theirs in the last few years alone.

these bands are a matter of federal concern (federal aviation and military R&D initiatives could both be jeopardized), significant taxpayer-funded investments in low-power wireless innovation, such as WISER's, would be threatened or even nullified. Furthermore, U.S. companies' international competitors not facing the same guidelines would thus gain a significant edge over U.S. developers already at work in the bands in question, as will be addressed later.

One approach to the problem of interference would be to increase the permitted power levels for devices already in use in the mid-bands. If, for instance, technologies like UWB could use additional power, they would be better able to resist interference from other technologies. However, increasing power levels to match services like Wi-Fi would eliminate some of UWB's innovative advantages, such as its safer use around sensitive devices or materials like military assets, munitions, and volatile chemicals. Also, small increases in power levels for UWB would still not be enough to enable conventional Wi-Fi, BLE, or similar technologies to use the bands in question without interference.

The better approach, since the FCC already regulates power levels in these bands, is likely to require any technologies newly entering the mid-bands to adhere to existing power rules. This will preserve critical applications already in place and will not undermine the work of companies who have innovated within FCC standards. Furthermore, it would help small and innovative emerging companies better to compete with giant Wi-Fi monopolies.

III. INNOVATION AND ECONOMIC GROWTH

In previous Comments, many companies argue that expanding bands for services like Wi-Fi—including licensing additional space specifically for Wi-Fi—is critical for ongoing innovation. However, this is not only at odds with the very history of Wi-Fi (Wi-Fi's inadvertent invention would have been impossible without unlicensed space in the ISM band), but it is at

odds with the notion of innovation itself. Pushing Wi-Fi into additional bands will only help maintain a status quo—that of Wi-Fi being ubiquitous. By developing lower-power, new-to-the-world technologies and services in unlicensed bands, companies like WISER Systems, Decawave and their partners are innovating *now* in ways and verticals where Wi-Fi and other technologies cannot deliver.

For example, UWB enables numerous security / military / defense use-cases that cannot be achieved via Wi-Fi, Bluetooth, GPS, Cellular or other conventional technologies. UWB's resistance to reflection makes it the only real-time locating solution that works accurately and inexpensively in cluttered and metallic environments, and its low power helps it stay safe for use around sensitive materials or other wireless networks. Furthermore, UWB can be used for indoor or highly-accurate (inch-level in some conditions) location of robots, drones or unmanned vehicles. This sort of high-precision navigation technology is currently being developed with EcoPRT, a self-navigating vehicle, for use at North Carolina State University, for instance.

UWB powers numerous RTLS cases where similar solutions are unsatisfactory. This makes it highly valuable for industrial applications in aerospace, defense, healthcare settings and numerous other verticals. However, this would be impossible if additional, higher-powered technology uses were allocated across the mid bands.

This push to open additional bands for Wi-Fi and similar technologies is also anti-innovation in regards to the physical limits of wireless technologies at large. The electromagnetic spectrum can only accommodate so many connected devices and signals at once, no matter which bands these signals occupy. By spreading Wi-Fi across additional bands, the FCC would be allowing the problem (physical limits) continue to restrict investments and R&D, rather than

allowing U.S. developers to find cleaner, faster and more innovative alternatives, as many companies are already doing.

A number of companies arguing for licensing or additional unlicensed allocations in mid-bands² make their arguments on the grounds of economic growth. While it's clear that these companies stand to gain financially from additional use in the mid-bands, the evidence is strong that smaller businesses actually create more jobs, fuel more competitive innovation, and birth more new industries³.

WISER Systems, for instance, is a small, U.S.-based startup company that has worked for a decade to develop its new RRLT technology introduced into the marketplace this year. The RTLS market is estimated to be a \$3.5B market in 2018, with an annual growth rate of 37%⁴. This market is coming increasingly to rely on UWB technologies, which outperform conventional wireless systems in every key RTLS category (cost, accuracy, power efficiency, and scalability).

Maintaining space for companies like WISER to innovate—by upholding FCC PART 15 Subpart C Section 15.250—will not only enable greater innovation (including in the emerging IoT), but it also stands to propel more job creation and ultimate economic growth.

IV. INTERNATIONAL COMPETITION

International competition / maintaining global leadership is rightly a point of concern for many companies participating in this discussion. Most Comments approach international competition in terms of expanding consumer services or 5G, however, and not in terms of current technologies already occupying the bands in question. The U.S. is already competing via

² Google, Verizon, and Hewlett Packard Enterprise, for instance.

³ “Measuring the Role of the SBIC Program in Small Business Job Creation.” *Federal Research Division*, Library of Congress, January 2017.

⁴ “World Real-Time Location Systems (RTLS) Market.” Frost and Sullivan, July 2015.

other technologies in the mid-bands, and will lose its competitive advantage if the FCC allocates new unlicensed uses in these important bands.

As previously mentioned, Decawave, which is a UK-based company, serves developers that offer critical services in a variety of industries and to a number of U.S. customers. Most of Decawave's partners, however, are not U.S. companies. A significant portion of the innovation with their technology is occurring in Europe and Asia. To access the immense RTLS industry, U.S. companies must compete with international companies like these in developing innovative and cost-efficient solutions.

Some of these solutions under development include, for example, the difficult problem of locating emergency calls from cell phones. Current cellular approaches utilizing signal strength and tower triangulation are unreliable. UWB companies like WISER are currently innovating novel solutions to this and other problems where the ability to locate in real time, in three dimensions, and within one foot or less is imperative. Likewise, it is currently difficult, using conventional technologies, for terrestrial and airborne robots or UAVs to navigate both autonomously and reliably.

If the FCC allocates the mid-bands for additional uses that could overpower or interfere with existing technologies like UWB (which includes multi-billion dollar opportunities in aerospace, healthcare, manufacturing, warehousing, energy, and retail), then international companies will dominate the RTLS market.

U.S. companies wishing to compete in this industry would have to relocate overseas, pulling jobs, revenue, and cost-saving innovations out of U.S. markets perhaps permanently. WISER currently competes with and outperforms many similar companies internationally, and does so while both manufacturing and operating entirely in the U.S. Changes in FCC licensing of

mid-bands would severely damage companies like WISER that have developed technology in line with current regulations and have invested significantly to meet certification standards.

Companies working on 5G or other next generation technologies should continue to innovate, solve congestion issues, and compete internationally in their own spheres, but these developments must not come at the cost of critical, life-saving, cost-reducing and internationally competitive technologies already in operation.

V. MONOPOLY

If the FCC allocates new unlicensed uses in the mid-range, very large multi-national companies will likely benefit most directly. This would occur to the detriment of smaller domestic companies already operating in the mid-bands.

Furthermore, if the FCC licenses additional bands in the mid-range, it is also highly likely that large companies will benefit most directly, since they have purchasing power far beyond that of smaller and younger companies. Again, this is not only harmful for the innovative environment of the U.S., but it also extends the monopoly of large telecoms or technology companies, letting them become more and more entrenched in operations and daily activities across the country while a significant number of smaller companies are displaced or forced to fold.

VI. SHARING BANDS

Several Comments⁵ propose to share bands between technologies and services. They do this largely in acknowledgement that a number of important and critical services already rely on unlicensed bands in the mid-range. While this idea is worth exploring, it is very unlikely that higher-power systems (5G or Wi-Fi systems, per se) can operate in the same or adjacent bands

⁵ Including Comments made by Sony and Verizon, for instance.

without causing interference. If it is possible for high power technologies to operate in the same bands as lower-power ones without harmful interference, the scientific premise for such band sharing has yet to be demonstrated satisfactorily.

Any discussions of sharing bands should only proceed where there is evidence that bands can actually be shared in non-interfering ways. Sharing bands without such caution would likely harm all existing operators in those bands. The impact of these spectrum modifications would likely be more detrimental to the American public in the long run than it would be immediately beneficial to large Wi-Fi providers.

CONCLUSION

For these reasons, WISER Systems, Inc. opposes the potential proposed allocations for unlicensed access to bands between 3 and 10 GHz, and respectfully submits that such changes would be detrimental to the safety and security, innovation, growth, and entrepreneurial environment of the United States, and of companies currently adhering to FCC standards.

Respectfully submitted,

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