

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Unlicensed Use of the 6 GHz Band)	ET Docket No. 18-295
)	
Expanding Flexible Use in Mid-Band Spectrum)	GN Docket No. 17-183
Between 3.7 and 24 GHz)	
)	

REPLY COMMENTS OF THE NATIONAL FOOTBALL LEAGUE

The National Football League (“NFL”) and its partner Zebra Technologies, Inc. (“Zebra”) rely on 6 GHz spectrum for ultra-wideband (“UWB”) technology that enables real-time player tracking at NFL stadiums and other facilities. These activities are part of the broader Internet of Things ecosystem that the Commission has been advocating. The NFL files these reply comments in the above-captioned proceeding to urge the Commission to protect use of UWB technology while it explores ways to permit new unlicensed usage in portions of the 5.925–7.125 GHz (“6 GHz”) band. In addition to robust usage of this band by UWB applications, the initial comments also reflect substantial licensed usage of 6 GHz spectrum for services that are also important to the NFL, including for broadcast and public safety purposes. The NFL appreciates and supports the Commission’s efforts to identify additional mid-band spectrum for Wi-Fi and other unlicensed services to meet evolving consumer demand for such services. At the same time, the NFL urges the Commission to ensure that any newly authorized devices do not cause harmful interference to incumbent users—both licensed and unlicensed—in the 6 GHz band.

I. THE COMMISSION SHOULD PROTECT UWB DEVICES IN THE 6 GHZ BAND FROM HARMFUL INTERFERENCE.

Through its partner Zebra, the NFL extensively uses unlicensed UWB devices that operate in the 6 GHz band for real-time player tracking. These devices are part of the NFL's tracking systems and permit the NFL through its "Next Gen Stats" initiative to capture real-time data for every player—on every play, anywhere in the field. This data includes player data like location, speed, and distance traveled, and charts individual movements of players, officials, and game balls. The NFL then uses this data to benefit its entire ecosystem, from health and safety studies, to game broadcasts, to fan research. Further, the NFL distributes player tracking data to all NFL member clubs, providing each team the flexibility to develop custom analytics and proprietary statistics to enhance competition and improve the overall quality of the game. The NFL has partnered with Zebra since 2014 to continue to develop its tracking capabilities.

We note that Zebra in its comments expressed "support [for] efforts to effectively allocate precious spectrum," while at the same time urging the Commission to ensure that new Wi-Fi deployments in the 6 GHz band can coexist with existing usage, including UWB devices.¹ Zebra's comments detail how its UWB-powered Dart system operates in the 6 GHz band, including its usage for real-time player tracking by the NFL.² As Zebra explains, Dart is deployed in a variety of environments—including both indoors and outdoors at NFL stadiums and other facilities—and is "very susceptible" to interference due to the same technical properties that allow it to obtain long range and high accuracy.³ While existing interference to UWB from incumbents (and vice versa) in the 6 GHz band has been quite manageable due to the

¹ Zebra Technologies, Inc. Comments in Response to Notice of Proposed Rule Making (FCC 18-147), ET Dkt. No. 18-295 et al. at 2 (filed Feb. 15, 2019) (hereinafter "Zebra Comments").

² Zebra Comments at 1.

³ Zebra Comments at 2.

predictable nature of that interference, Zebra reports that the NPRM's proposals would have a "devastating impact" on technologies including UWB in the 6 GHz band.⁴ The UWB Alliance similarly cautioned that the NPRM proposals "raise serious concerns" of interference with "consumer, commercial, medical, and scientific applications in the 6 GHz spectrum."⁵

In light of these substantial concerns with the NPRM's proposals from the providers of UWB technology who know best about the capability and limitations of their systems, the NFL shares these concerns and supports Zebra's and others' efforts to propose solutions that the Commission should adopt to allow for Wi-Fi deployments while still sufficiently protecting UWB devices in the 6 GHz band from harmful interference. Zebra is to be commended for proposing several flexible strategies that would allow Wi-Fi and UWB deployments to coexist within the 6 GHz band.⁶ In particular, Zebra's comments set forth four separate proposals, which may be varied and combined as appropriate to promote a "healthy coexistence" in the band: spectral limitation, power limitation, operational restriction, and exclusion beacons.⁷ Zebra also indicated that it "fully supports" the UWB Alliance's approach to spectrum re-allocation in the 6 GHz band.⁸ Like Zebra, the UWB Alliance's stated goal is "mutual coexistence" in the 6 GHz band, and the UWB Alliance's comments include additional technical suggestions to "satisfy the need for greater WLAN access while also promoting sharing of the spectrum with other equally important and valuable uses."⁹

⁴ Zebra Comments at 7.

⁵ Comments of the Ultra Wide Band (UWB) Alliance, ET Dkt. No. 18-295 et al. at 3 (filed Feb. 15, 2019) (hereinafter "UWB Alliance Comments").

⁶ See Zebra Comments at 3–6.

⁷ Zebra Comments at 3, 7.

⁸ Zebra Comments at 3.

⁹ UWB Alliance Comments at 3.

Zebra also highlighted the many uses of its UWB solutions including for industrial production processes, such as ensuring worker safety at airline assembly facilities.¹⁰ The Boeing Company (“Boeing”) similarly highlighted this airline industry usage of UWB, and cautioned that the NPRM proposals pay little attention to protecting the continued viability of UWB in the 6 GHz band.¹¹ The NFL agrees with Boeing that “the Commission should undertake efforts to ensure that the substantial investments that businesses and individuals have made in UWB systems are not forfeit by the wide scale introduction of Wi-Fi type devices in this spectrum.”¹²

As an intensive user of UWB technologies that rely on 6 GHz spectrum to operate, the NFL urges the Commission to take due account of the compromise solutions proposed by Zebra, the UWB Alliance, and other commenters. It appears based on the record that the Commission can authorize additional unlicensed Wi-Fi usage in the 6 GHz band, while still crafting rules that protect incumbent UWB usage in the band. The NFL defers to others on the specific technical means to achieve coexistence between UWB and Wi-Fi usage in the 6 GHz band, but urges the Commission to modify the current proposals along the lines of Zebra’s and the UWB Alliance’s proposals to better ensure the continued viability of UWB technologies that operate in the 6 GHz band. This would allow Zebra to continue using innovative UWB technology to provide cutting-edge services to the National Football League that enables real-time player tracking at NFL stadiums and other facilities. These and other applications, including the industrial processes at Boeing, are all part of the Internet of Things ecosystem the Commission is seeking to promote.

¹⁰ Zebra Comments at 1.

¹¹ Comments of the Boeing Company, ET Dkt. No. 18-295 et al. at 1–2 (filed Feb. 15, 2019) (hereinafter “Boeing Comments”).

¹² Boeing Comments at 6.

We urge the Commission to ensure these services continue to be viable under any new allocation of spectrum.

II. THE COMMISSION SHOULD ALSO ACCOUNT FOR THE CONCERNS OF LICENSED 6 GHZ INCUMBENTS.

The record reflects that UWB is not the only current usage of 6 GHz spectrum that could be imperiled by the NPRM's proposals to allow unlicensed Wi-Fi operations in the band.

Among others, broadcasters and public safety organizations using licensed spectrum in the 6 GHz band filed comments expressing concern that the NPRM proposals threaten substantial harmful interference to these critical operations. The NFL echoes the concerns raised by its partners in the broadcast industry, in addition to those raised by public safety advocates.

The National Association of Broadcasters ("NAB") and others filed comments detailing the vital importance of broadcast auxiliary services ("BAS") operations in portions of the 6 GHz band for which there is no readily available substitute.¹³ As NAB explained, coverage of breaking news, special events, and sporting events (including NFL games) depends on BAS in the 6 GHz band to support low-power transmitters on portable cameras, omni-directional receive antennas, and wireless microphones.¹⁴ NAB cautioned that the NPRM proposals would *not* sufficiently protect BAS operations from harmful interference, and urged the Commission to

¹³ Comments of the National Association of Broadcasters, ET Dkt. No. 18-295 et al. at 2–4 (filed Feb. 15, 2019) (hereinafter "NAB Comments"); *see also* Comments of NCTA - The Internet & Television Association, ET Dkt. No. 18-295 et al. at 2–4 (filed Feb. 15, 2019) ("NCTA's members depend on widely-deployed systems in the 6 GHz band to deliver news, sports, and entertainment programming that hundreds of millions of Americans depend on every day.").

¹⁴ NAB Comments at 2–4; *see also* Comments of the Society of Broadcast Engineers, Incorporated, ET Dkt. No. 18-295 et al. at 2–3 (filed Feb. 15, 2019) ("The National Football League and the NFL Network uses the band for an in-stadium, low-power, player tracking system as part of its video production operations during televised games.").

move forward in the BAS portions of the 6 GHz band only once a “robust, reliable mechanism is developed to coordinate these operations with licensed BAS uses—including mobile uses.”¹⁵

Finally, the Association of Public-Safety Communications Officials-International, Inc. (“APCO”) filed comments explaining the heavy usage of 6 GHz spectrum for fixed point-to-point microwave links that are “essential to public safety services,” and also for mobile and air-to-ground public safety operations.¹⁶ APCO cautioned that these public safety operations must “remain reliable and free from interference,” and therefore should not be subject to “new, unproven spectrum sharing and frequency coordination methods.”¹⁷ APCO noted that in order to adequately protect these public safety operations in the 6 GHz band, the NPRM proposals would need to be “substantially revise[d]” to incorporate effective mechanisms to mitigate and resolve potential harmful interference, and proposed several technical parameters designed for that purpose.¹⁸

The NFL urges the Commission to account for the concerns of these additional incumbent operations in the 6 GHz band, and to allow additional unlicensed usage of the band only in a manner that will not cause harmful interference to these incumbents.

CONCLUSION

The NFL appreciates and supports the Commission’s efforts to expand access to unlicensed spectrum in the 6 GHz band to meet burgeoning consumer demand for Wi-Fi and other services. That goal, however, need not and should not come at the expense of incumbent

¹⁵ NAB Comments at 2.

¹⁶ Comments of APCO International, ET Dkt. No. 18-295 et al. at 2 (filed Feb. 15, 2019) (hereinafter “APCO Comments”).

¹⁷ APCO Comments at 1–2.

¹⁸ APCO Comments at 2–20.

licensed and unlicensed usage of the 6 GHz band. Commenters, including Zebra, have proposed reasonable compromise solutions that would allow for additional Wi-Fi usage in the 6 GHz band while still protecting incumbents from harmful interference. The Commission should carefully consider these proposals and craft rules in the 6 GHz band that adequately protect existing users in the band, including UWB, broadcast, and public safety users.

Respectfully submitted,

/s/ Gerard J. Waldron

Gerard J. Waldron
David J. Bender
COVINGTON & BURLING LLP
One CityCenter
850 10th St., NW
Washington, D.C. 20001
(202) 662-6000

Counsel for the NFL

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