

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)
)
Zebra Technologies) ET Docket No. 20-17
)
)
Request for Waiver of Sections 15.517(a),)
15.519(a)(1), or 15.250 of the Commission’s Rules)
)

ORDER

Adopted: October 19, 2021

Released: October 19, 2021

By the Acting Chief, Office of Engineering and Technology:

I. INTRODUCTION

1. By this Order, we grant a request by Zebra Technologies (Zebra) for a waiver of our rules governing unlicensed ultra-wideband (UWB) devices to permit the certification and marketing of its positioning system for use in the context of precision tracking in sports venues. We find that this device operating under the specified waiver conditions poses no greater risk of causing harmful interference to communication services than those devices already permitted under the existing rules and that grant of the waiver will serve the public interest.

II. BACKGROUND

2. On December 20, 2019, Zebra filed a request for waiver of the Commission’s Part 15 rules to allow Zebra to certify a version of its Dart positioning system for operation in the 7125-8500 MHz range (Zebra subsequently stated that it would operate in the 7125-7900 MHz range).¹ Zebra states that its system, which presently operates as a wideband² device in the 5925-7250 MHz band, is used to

¹ Zebra Technologies Request for Waiver of the Commission’s Ultra-Wideband Rules to Authorize a Positioning Device in the 7.125-8.500 MHz Band (Request), filed Dec. 20, 2019. *See also* Letter from Tony S. Lee, Counsel for Zebra Technologies, to Marlene H. Dortch, Secretary, FCC, at 6 (filed Feb. 25, 2021) (Zebra Feb. 25, 2021 *ex parte*) (narrowing the requested operating range).

² Although the current iteration of the DartTags is certified as wideband devices under Section 15.250 of our rules, Zebra seeks to certify the new version of its Dart system under the rules provisions for ultra-wideband devices. Unlicensed wideband devices are certified under Section 15.250 while ultra-wideband devices are certified under Section 15.501-15.525. Section 15.250(b) requires that the –10 dB bandwidth of the fundamental emissions shall be at least 50 MHz. Section 15.503(d) defines an ultra-wideband transmitter as an intentional radiator that, at any point

track small battery-powered tags attached to persons, assets, or safety equipment over a range of 100 meters to an accuracy of less than 30 centimeters.³ Applications associated with this instant waiver include tracking players in sports venues. NTIA noted as part of coordination that, in the 7125-7900 MHz band segment in the Zebra Technologies waiver request, there are 5,811 frequency assignments in the Government Master File. Approximately 90 percent of those assignments are for fixed systems used to support the missions of the federal agencies.

3. The Dart UWB Real Time Location System (RTLS) consists of a hub, connected by cable to multiple (four or more) receive-only devices that receive short UWB packet bursts transmitted from the associated Radio Frequency Identification (RFID) tags (DartTags). This set-up enables Zebra to obtain differential time of arrival calculations that provide accurate two-dimensional localization of individual assets or personnel. The current DartTags operating in the 5925-7250 MHz band on a nominal center frequency of 6550 MHz comply with the Part 15.250 rules and do not require a waiver.⁴ Each tag generally transmits 2.5 nanosecond pulses between 1-50 times per second. For purposes of their deployment in National Football League (NFL) applications, the DartTags transmit at different rates which range between 1 to 25 Hz. The tag transmit rate for each device is controlled by an embedded accelerometer and depends upon the specific use case associated with each tag.⁵ Zebra states that the DartTags can run for about a year on a small non-rechargeable coin-cell with a usable operating range of up to six hundred feet, depending on the accuracy requirement. Because the current tags operate under Section 15.250 of our rules, the maximum allowable average EIRP level is -41.3 dBm/MHz, which results in a signal level that is just above the thermal noise floor at a short distance. Zebra further states that the Dart system must be installed by competent professionals that are trained to ensure that it functions correctly when moved to different venues. It says that it is necessary to use professionally trained installers who are familiar with these systems due to the cost and complexity of the DartTags and associated passive receivers. Dart system operators also ensure that each DartTag is activated and deactivated via a magnetic wand before and after each game.

4. A version of the Dart system that Zebra currently uses operates across 500 MHz in the 63006800 MHz band and is compliant with the stringent Section 15.250 power limits.⁶ Zebra desires to manufacture a Dart system that would operate in the 7125-7900 MHz band, which it has identified as being well-suited for precision tracking in sports venues. It seeks a waiver because outdoor operations of the Dart system are not permitted in this higher frequency band under the Part 15 unlicensed technical rules.

5. Zebra identifies three potential rule sections for operation under a waiver to allow it to use its Dart system above 7125 MHz: Sections 15.517(a), 15.519(a)(1), or 15.250(a) and (d)(1).⁷ Section 15.517 governs the technical requirements for indoor UWB systems and Section 15.517(a) limits operation under the rule to UWB transmitters employed solely for indoor operation. Zebra states that it would require a waiver of this requirement because the Dart system has some outdoor applications. Section 15.519 specifies the technical requirements for hand held UWB systems. Under Section 15.519(a)(1), a UWB device may transmit only when it is sending information to an associated receiver and must cease transmission if it fails to receive an acknowledgement from the associated receiver that its

in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

³ See Request at 1-2.

⁴ Dart RTLS User Guide, Document D2119 Rev F. This document is posted on Zebra's website at https://www.zebra.com/content/dam/zebra_new_ia/en-us/manuals/location-solutions/dart-uwb/dart-rtls-ug-en.pdf.

⁵ Letter from Tony S. Lee, Counsel for Zebra Technologies, to Marlene H. Dortch, Secretary, FCC, at 1 (filed Feb. 11, 2021).

⁶ See Request at 3.

⁷ 47 CFR §§ 15.517(a), 15.519(a)(1), and 15.250, respectively.

transmission is being received. Because DartTags transmit but do not receive transmissions, Zebra states that it would need a waiver of Section 15.519(a)(1) for the Dart system to operate under the Section 15.519 rule provisions. Section 15.250 governs operation of wideband systems in the 5925-7250 MHz band. Specifically, Section 15.250(a) requires that the -10 dB bandwidth of a device operating under this section must be contained within the 5925-7250 MHz band under all conditions of operation and Section

15.250(d)(1) specifies the maximum allowable EIRP limits. Zebra states that if it were to continue to operate the Dart system as a wideband device in its requested frequency range, it would need a waiver of the upper frequency limit in Section 15.250 as well as a waiver of Section 15.250(d)(1) to permit operation in the spectrum above 7250 MHz at the EIRP levels at which the Dart system currently operates.

6. The Office of Engineering and Technology (OET) sought comment on Zebra's Request, including the relative merits of each of the three options Zebra has identified.⁸ The GPS Innovation Alliance (GPSIA) was the only party other than Zebra that submitted comments addressing the Request.⁹ GPSIA does not oppose Zebra's petition but instead urges the Commission to address the Request in a way that avoids creating an unwanted precedent; it fears that future requests from other parties to expand UWB use could introduce interference concerns for GPS and related critical navigation and positioning operations.¹⁰¹¹

III. DISCUSSION

7. We are authorized to grant a waiver under Section 1.3 of the Commission's rules if the petitioner demonstrates good cause for such action.¹¹ Good cause, in turn, may be found "where particular facts would make strict compliance inconsistent with the public interest."¹² To make this public interest determination, the waiver cannot undermine the purpose of the rule, and there must be a stronger public interest benefit in granting the waiver than in applying the rule.¹³ The UWB standards in Part 15 were adopted to ensure that UWB devices, including hand held devices, do not cause harmful interference to authorized radio services, including those operated by the Federal Government.¹⁴ As discussed below, we find that, with appropriate operational and technical limitations, granting Zebra's request for waiver poses no greater risk of causing harmful interference to radio communications services than any other device operating under our rules. In addition, we find that there is a stronger public interest benefit in granting this waiver than in strictly applying the rules. Dart devices can provide unique player tracking

⁸ *Office of Engineering and Technology Seeks Comment on Zebra Technologies Request for Waiver of Part 15 Rules to Permit use of its Ultra-Wideband Positioning System in the 7125-8500 MHz band*, Public Notice, DA 20-70 (OET 2020).

⁹ GPS Innovation Alliance reply.

¹⁰ *Id.*

¹¹ CFR § 1.3. *See also* *ICO Global Communications (Holdings) Limited v. FCC*, 428 F.3d 264 (D.C. Cir. 2005); *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164 (D.C. Cir. 1990); *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

¹² *Northeast Cellular*, 897 F.2d at 1166; *see also* *ICO Global Communications*, 428 F.3d at 269 (quoting *Northeast Cellular*); *WAIT Radio*, 418 F.2d at 1157-59.

¹³ *See, e.g.,* *WAIT Radio*, 418 F.2d at 1157 (stating that even though the overall objectives of a general rule have been adjudged to be in the public interest, it is possible that application of the rule to a specific case may not serve the public interest if an applicant's proposal does not undermine the public interest policy served by the rule); *Northeast Cellular*, 897 F.2d at 1166 (stating that in granting a waiver, an agency must explain why deviation from the general rule better serves the public interest than would strict adherence to the rule).

¹⁴ *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, First Report and Order, ET Docket No. 98-153, 17 FCC Rcd 7435 (2002) (*UWB First R&O*); *see also*, 47 CFR. §§ 15.501-15.525.

and positioning information that cannot be readily accomplished through other means. Thus, we find that the waiver standard has been met.

A. Waiver of the operational requirements in Sections 15.250 and 15.517

8. We recognize that Zebra offers three separate waiver options to permit the operation of the DartTags at the requested higher frequency. We find that the options presented with regard to Sections 15.250 and 15.517 represent fundamental rule departures and do not meet the high bar required for a waiver of the rules.

9. The rules for Section 15.250 were specifically developed as a less restrictive alternative to the UWB rules for emerging wideband systems due to its designation of a frequency band that does not encroach on any of the restricted bands of operation defined in Section 15.205.¹⁵ As such, Section 15.250 explicitly limits the operating frequency range to the 5925-7250 MHz band and issuance of a waiver to permit DartTags to operate above 7250 MHz would be contradictory to the original rule intent.

10. The technical requirements of Section 15.517 were developed to specifically accommodate indoor-only UWB devices. Because Zebra's use model envisions outdoor use, waiving Section 15.517(a)'s requirement that UWB transmitters must be employed solely for indoor operation runs directly opposite to the original rule intent.¹⁶

B. Waiver of the operational requirements in Section 15.519(a)(1)

11. By contrast, we believe that Section 15.519 of the UWB rules offers the best option for Zebra's RTLS operation within the desired frequency range of 7125-7900 MHz. Section 15.519(a) includes three separate provisions applicable to hand held UWB systems.¹⁷ The first provision, identified in the preamble of the rule, limits the use of devices operating under this section to hand held devices. The second provision, identified in Section 15.519(a)(1), requires that a UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. Furthermore, the UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. Moreover, an acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.¹⁸ At the time this rule was adopted the commission anticipated that it would be used to enable the operation of short-range, high-throughput digital communications devices. The 10-second acknowledgement requirement was intended to limit the time that a UWB transceiver would poll in search of a companion device with which to establish a communications link and in so doing, reduce the chances of unnecessary interactions with incumbent devices.

12. The impediment to certification under UWB rule part 15.519 is the requirement under 15.519(a)(1) that requires the UWB intentional radiator to cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. RTLS applications such as DartTags are not equipped with a receiver to realize reception of an acknowledgement and the Dart receivers are not equipped with a transmitter to broadcast such an

¹⁵ *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, Second Report and Order and Second Memorandum Opinion and Order, ET Docket No. 98-153, 19 FCC Rcd 24558 at 2456624572 (2004). See also 47 CFR § 15.250.

¹⁶ We note that our rules do not prohibit the operation of Zebra's system for indoor-only operation under this rule. Zebra can now operate its new version of the Dart System indoors under this section of the rules without needing a waiver.

¹⁷ 47 CFR § 15.519(a).

¹⁸ 47 CFR § 15.519(a)(1).

acknowledgement. However, we find that the operational restrictions and conditions that Zebra proposed for this waiver will sufficiently address concerns associated with the DartTags transmitting continuously.

13. In its waiver request, Zebra notes that strict compliance with this rule would require adding receivers to the location tags and that operational limitations on the tags' size, weight, and battery capacity make this an impracticable expectation.¹⁹ Zebra states that it accomplishes the same result as the Section 15.519 rule by other means.²⁰ It states that all Dart systems are professionally installed and that the tags ship from the factory with the transmitter disabled.²¹ For its NFL use case, Zebra states that Zebra personnel enable the tags a few hours before the game starts and turn them off soon after it finishes. It is reasonable to assume that battery life considerations create every incentive to prevent the tag devices from unnecessarily transmitting. Installation begins by placing enough receivers around the area where tags are to be tracked so that at least three Dart receivers can receive the signal from each tag (whose range is approximately 100 meters). Trained personnel enable the tags' transmitters in the coverage area or in a staging area nearby and tags are never shipped with the transmitters activated.²² These tags also share properties with handheld UWB devices.²² Specifically, Zebra claims that Dart systems are never mounted on fixed infrastructure and when used outdoors, most systems operate within a few meters of ground level.²³

14. We find that Zebra has made a persuasive case that under the requested waiver, its operations will be sufficiently limited so as not to undermine the purpose of the rule. Because the DartTags are small UWB transmitters capable of operating without the need for fixed infrastructure and will comply with the established low EIRP limits, they do not represent any more interference potential than other handheld UWB systems already operating in the band as long as certain operational restrictions are in place.

15. We will further ensure that the purpose of the rule is not undermined and that federal spectrum users in the band are protected by limiting operations to a specifically tailored frequency band. With input from federal agencies, we agree that the 7125-7900 MHz frequency band is most suitable for the Dart System operations. While there are federal fixed links and earth stations that operate in the 7125-7900 MHz band segment,²⁴ we are confident that the operational conditions, as described below, are appropriate to protect these fixed links earth stations from harmful interference.

16. The Zebra Dart system mitigates the interference potential in various ways. First, rapid signal attenuation due to propagation characteristics at 7125-7900 MHz coupled with the relatively low EIRP limits will help to mitigate any potential for interference. For example, the received interference power spectral density (PSD) at an earth station with 0 dBi gain toward horizon, due to a DartTag operating at 7.5 GHz with a maximum PSD of -41.3 dBm/MHz, at an assumed distance of 500 meters, will be -145 dBm/MHz, assuming free space path loss.²⁵ Similarly, for fixed links, the received

¹⁹ Request at 6-7.

²⁰ *Id.*

²¹ *Id.*

²² *Id.*

²² See 47 CFR § 15.503(m). Section 15.503(m) defines a hand held UWB device as a portable device, such as a laptop computer or a PDA, that is primarily hand held while being operated and that does not employ a fixed infrastructure

²³ Request at 7-8.

²⁴ The band contains primary federal allocations for the Fixed, Space Research, Earth Exploration-Satellite, FixedSatellite, Mobile-Satellite, Mobile except aeronautical mobile, Meteorological-Satellite, and Maritime MobileSatellite services. See 47 CFR § 2.106, Table of Frequency Allocations.

²⁵ Normally stadiums are surrounded by parking lots and other sports-related facilities that can span several hundred meters away from the playing field - a conservative value may be about 500 meters. Furthermore, given that stadium grounds are private property, requiring explicit permission from the owners for installation of antenna

interference power spectral density (PSD) at a fixed directional antenna with 10 dBi gain towards ground, due to a DartTag operating at 7.5 GHz with a maximum PSD of -41.3 dBm/MHz, at an assumed distance of 500 meters, will be -135 dBm/MHz, assuming free space path loss. For comparison, the thermal noise power density at room temperature is -114 dBm/MHz. Therefore, the maximum unwanted power from a DartTag transmitter into an Earth station receiver located 500 meters distant or greater will be at least 31 dB below the thermal noise floor. Similarly, a fixed receiver at 500 meters away will be receiving the maximum unwanted power of 21dB below the thermal noise floor from a DartTag transmitter. This is based on a very conservative assumption without any clutter and receiver antenna directivity consideration. Secondly, the stadium structure will provide additional signal propagation path attenuation relative to free space, especially in the horizontal direction, which will further reduce the potential interference power to a victim receiver outside of the stadium. Thirdly, the nature and operation of the DartTags for outdoor sports venues is scheduled, infrequent, and limited since there are relatively few outdoor locations. More specifically, the outdoor deployments under the most recent terms described by Zebra will be limited to 87 locations for sports venues.²⁶ This includes 72 NFL game-day stadiums and practice fields, one college Senior bowl venue, and 14 college game and practice venues. Systems installed at these locations will not operate continuously, instead only operating during the dates and times where a game or practice session occurs.²⁷ Finally, the DartTags are turned on a few hours prior to an event and they are deactivated by magnetic field shortly after an event or game has concluded. To ensure the deployment of the Zebra Dart system does not contravene the purpose of the rules we will include a condition that requires Zebra to limit the number of deployments of the Dart system to those locations specified in the grant condition.

17. The interference potential to incumbent users of this spectrum band is further mitigated by the fact that the Dart system has low transmit duty cycle. Zebra describes the duty cycle of the DartTags as having a less than 0.4 percent of total on airtime in a worst-case scenario.²⁸ If Zebra's worst-case scenario were to occur, then the total off airtime (no transmission) would be 99.6 percent. This worstcase scenario would only occur during a game or practice. Therefore, when combined with the very low duty cycle, very low power, infrequent use cases, limited number of locations, and shielded operational environment, the potential of the Zebra Dart system to harmfully interfere with the incumbents in the band is very low. Finally, we note that in its September 27, 2021 *ex parte* submission, Zebra identified a point of contact who would be available "should there be an immediate need to address interference concerns."²⁹ As a further layer of assurance, we include in our grant conditions the specific requirement that Zebra maintain such a point of contact.

C. Waiver of the operational requirements in Section 15.503

18. We also recognize that while the DartTags are not technically hand held, we believe that these devices operate in a similar manner to a device that will satisfy the spirit of the hand held definition of Sections 15.503(m) and 15.519(a) of our rules. That is, while the DartTags are not primarily held in a person's hand, nearly all of these devices are intended to be worn on the user's body (as part of the clothing or protective equipment) during use in the sports applications Zebra describes in its Request. When the DartTags are not in active use, they are deactivated with a magnetic wand by a professional who is familiar with the operation of this equipment. We therefore believe that these devices will share

structure, any Federal receiver installations will likely lie beyond the 500-meter radius we have used for our calculations.

²⁶ Zebra Sept. 27, 2021 *ex parte*.

²⁷ *Id.*

²⁸ Zebra Feb 25, 2021 *ex parte* at 2-3. For example, Zebra states that in a football stadium, even if the 600 tags were operating simultaneously, the total on airtime would not exceed 0.4 percent.

²⁹ Zebra Sept 27, 2021 *ex parte* at 1.

similar operational limitations as the hand held devices originally envisioned by the Commission. A narrowly tailored waiver in this manner will not frustrate the purpose of the hand held rule.

D. Waiver conditions

19. We find good cause to grant the Zebra waiver request. Zebra's request is narrowly tailored, can be granted without raising the potential for introducing harmful interference to authorized services, and can help realize important asset tracking and management benefits. We further note that Zebra is not requesting a relaxation of the restrictive emission limits that are an integral part of our UWB rules, and which we have acknowledged to be conservative and extremely protective of incumbent services.³⁰ Because the DartTag devices must comply with these rules, and because they can operate under a waiver of the rules and restrictions we have identified in a manner consistent with the use characteristics associated with other UWB applications with no perceivable increase in the potential for harmful interference to authorized users, we conditionally grant the Zebra waiver.

20. Accordingly, pursuant to the delegated authority in Sections 0.31 and 0.241 of the Commission's rules, we waive the definition of Section 15.503(m) and the requirements of Sections 15.519(a) and (a)(1), of our rules to permit the certification and marketing of the Dart System. This waiver is subject to the following conditions:

- 1) The Dart System shall be certified by the Commission and must comply with the technical specifications applicable to operation under Part 15 of 47 CFR, except as permitted below:³¹
 - (a) The 10 second receiver acknowledgement requirement in 47 CFR § 15.519(a)(1) is waived to permit the operation of the Dart UWB real-time location system.
 - (b) Zebra shall ensure that the UWB bandwidth of the Dart system is fully contained within the 7125-7900 MHz frequency band.
- 2) The width of the individual transmission pulses from a DART device shall not exceed 2.5 nanoseconds.
- 3) The total number of transmission pulses from an individual Dart device in any one second shall not exceed 4600.
- 4) The maximum EIRP of the Dart system shall not exceed -41.3 dBm/MHz.
- 5) The maximum number of active Dart tags in a designated sports venue shall not exceed 600.
- 6) Zebra shall inform its customers that all deployments of the Dart Systems must be activated prior to the beginning of the sports event or practice and shall be immediately deactivated after the sports event or practice has concluded.
- 7) The Dart System shall not be sold or marketed to consumers in the general public.
- 8) The Dart devices shall comply with all other technical and operational requirements applicable to UWB hand held devices under Part 15, Subpart F of the Commission's rules.
- 9) The locations where the Dart system is permitted to operate outdoors only under the conditions of this waiver order, are limited to NFL game venues, NFL practice venues, one Senior Bowl venue, and college sports venues as specified in Zebra's ex parte filed September 27, 2021. Any request by Zebra to modify or add to this list may be approved by the FCC in coordination with NTIA.

³⁰ See *UWB First R&O*, 17 FCC Rcd 7435 at 7437 para. 1 (stating that "we are concerned, however, that the standards we are adopting may be overprotective and could unnecessarily constrain the development of UWB technology").

³¹ A copy of this Order shall be provided with the application for certification of the device.

- 10) All transmissions from Dart devices must originate from the playing field or the confines of the designated sports venues as identified in condition nine.
- 11) The Dart system operating under this waiver shall be prohibited from continuous (non-pulsed) operation.
- 12) The waiver conditions granted herein are not transferable to any third party via §2.933 or any other means of technology transfer.
- 13) Zebra shall identify to the FCC and NTIA at least one point of contact capable of immediately addressing harmful interference concerns reported by an authorized user and shall keep this information current. The current point of contact identified by Zebra is:

Carl Mower
ZLS.NFL.CommandCenter@zebra.com
 phone: (855) 342-6781

- 14) This waiver shall only apply to the Dart System described herein and provided no changes are made to the transmitter that would increase the system’s EIRP.

- 15) Deployment within 20 km of the sites listed below shall be avoided:

Arecibo Observatory, PR.....	18° 20' 37" N, 66° 45' 11" W
Green Bank Telescope (GBT), WV.....	38° 25' 59" N, 79° 50' 23" W
Very Large Array (VLA), Socorro, NM....	34° 04' 44" N, 107° 37' 06" W

Very Long Baseline Array (VLBA) Stations:

Brewster, WA.....	48° 07' 52" N, 119° 41' 00" W
Fort Davis, TX.....	30° 38' 06" N, 103° 56' 41" W
Hancock, NH.....	42° 56' 01" N, 71° 59' 12" W
Kitt Peak, AZ.....	31° 57' 23" N, 111° 36' 45" W
Los Alamos, NM.....	35° 46' 30" N, 106° 14' 44" W
Mauna Kea, HI.....	19° 48' 05" N, 155° 27' 20" W
North Liberty, IA.....	41° 46' 17" N, 91° 34' 27" W
Owens Valley, CA.....	37° 13' 54" N, 118° 16' 37" W
Pie Town, NM.....	34° 18' 04" N, 108° 07' 09" W
St. Croix, VI.....	17° 45' 24" N, 64° 35' 01" W

Coordination is required for operations near the above referenced sites. The following points of contact must be notified for coordination (please cc esm@nsf.gov):

VLA/VLBA:
 Dan "Mert" Mertely
nrao-rfi@nrao.edu
 phone: (575) 835-7128

Arecibo:
 Angel Vazquez
angel@naic.edu phone: (787)
 878-2612 ext.304

Coordination is required for any operations within the National Radio Quiet Zone. The NRQZ PoC is:

Paulette Woody
nrqz@gb.nrao.edu

Phone: (304) 456-2107 (normal); (615) 796-6395 (Google voice) or 304-456-9951 (H)

Notification to esm@nsf.gov and the VLA/VLBA point of contact is required for any operation/deployment within the geographic area bounded by:

- 31.367224° N, 109.031505° W
- 31.367224° N, 103.077521° W
- 34.386150° N, 103.077521° W
- 34.386150° N, 109.031505° W

Except for within the city limits of Las Cruces, Alamogordo, Roswell, and Carlsbad in NM, and El Paso, TX. This would assist radio astronomy operations. NSF may request coordination of operations in the future, as the VLA does make use of the frequency range involved, and such coordination may assist with telescope scheduling.

16) Deployment shall be avoided within 10 km of the sites listed below:

- Newark, DE39° 41' 01" N, 75° 45' 18" W
- Tallahassee, FL30° 23' 10" N, 84° 13' 53" W
- South Point, HI19° 00' 50" N, 155° 39' 47" W
- Corvallis, OR44° 34' 04" N, 123° 16' 39" W
- Salt Lake City, UT40° 46' 00" N, 111° 53' 13" W

17) This waiver and its conditions shall apply only to the UWB devices described herein and are not to be considered to apply generally to any other UWB operations where further analysis would be necessary to assess the potential for impact to other authorized users.

18.) A copy of this Order shall be provided with the application for certification of the device.

ORDERING CLAUSES

21. Accordingly, pursuant to authority delegated in Sections 0.31 and 0.241 of the Commission's rules, 47 CFR §§ 0.31, 0.241, and Section 1.3 of the Commission's rules, 47 CFR § 1.3, IT IS ORDERED that the Request for Waiver filed by Zebra Technologies, On December 20, 2019 IS GRANTED consistent with the terms of this Order. This action is taken pursuant to Sections 4(i), 302, 303(e), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 302, 303(e), and 303(r). This action is effective upon release of this Order.

22. IT IS FURTHER ORDERED that, if no applications for review are timely filed, this proceeding SHALL BE TERMINATED and the docket CLOSED.

FEDERAL COMMUNICATIONS COMMISSION

Ronald T. Repasi
Acting Chief
Office of Engineering and Technology