

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

In the Matter of)
)
U.S. GPS Industry Council, American Airlines)
and United Airlines, Consolidated Petition for)
Reconsideration of Waivers Issued under)
Delegated Authority by the Chief, Office of)
Engineering and Technology)

ORDER

Adopted: February 2, 2000

Released: July 14, 2000

By the Commission: Chairman Kennard and Commissioners Ness and Furchtgott-Roth issuing separate statements.

Introduction

1. The U.S. GPS Industry Council, American Airlines, and United Airlines (“the Petitioners”)¹ filed a consolidated petition for reconsideration of three waivers granted under delegated authority by the Chief, Office of Engineering and Technology (OET). These waivers of Part 15 of the Commission’s rules were granted to U.S. Radar Inc. (“U.S. Radar”), Time Domain Corporation (“Time Domain”), and Zircon Corporation (“Zircon”) to allow the limited marketing of ultra-wideband (UWB) devices.² For reasons set forth below the Commission denies the consolidated petition for reconsideration.

Background

2. Each of the three waiver petitions stressed the unique attributes of UWB that could lead to a variety of new beneficial uses that would serve the public interest. U.S. Radar sought a waiver to allow it to market a radar system to detect buried objects such as plastic gas pipes or reveal hidden flaws in roads,

¹ Alaska Airlines joined with the petitioners in their reply to the opposing comments. Associate Professor Per Enge of Stanford University, Department of Aeronautics and Astronautics, also filed objections to the waivers; however, those objections were withdrawn by letter dated September 2, 1999. As the latter letter contained comments relative to the *Notice of Inquiry* in ET Docket No. 98-153, it will be treated as late filed comments and placed in that proceeding.

² The petitions for waiver were filed by U.S. Radar, Time Domain and Zircon on January 28, 1998, February 2, 1998, and April 14, 1998, respectively. The U.S. Radar and Time Domain waiver petitions were placed on public notice as “permit but disclose” proceedings for *ex parte* purposes on February 6, 1998. The Zircon waiver petition was placed on public notice May 18, 1998.

bridges, or airport runways. Time Domain proposed a communications system to provide law enforcement officers with a means of covert communication and to provide radar systems that will enable fire and rescue personnel to determine the location of persons inside damaged, burning, or smoke-filled buildings. Zircon requested a waiver for a radar system that would be capable of detecting objects, such as rebar, electrical wiring conduit, water pipes, and gas lines, behind walls and other surfaces.

3. It was necessary for U.S. Radar, Time Domain and Zircon to obtain waivers of the Part 15 rules in order to allow limited commercial marketing of their products. The Part 15 rules pose two primary obstacles to the implementation of UWB technology. First, UWB devices typically use extremely narrow pulse (impulse) modulation that can produce emission bandwidths of one gigahertz or greater. The wide bandwidth can result in emissions being transmitted into the TV broadcast bands and in restricted frequency bands. Such transmissions are prohibited under the Part 15 rules.³ Second, the current emission measurement procedures specified in Part 15 of the rules require the application of a pulse desensitization correction factor to the measured results in order to determine total output power. The pulse desensitization factor, if applied to UWB signals, would severely limit emissions such that the devices would be unusable.

4. Because the Part 15 restricted frequency bands include those allocated to the U.S. Government, these waiver requests were coordinated with the National Telecommunications and Information Administration (“NTIA”). NTIA informed the Commission, by letter dated June 15, 1999, that the waivers could be granted with conditions that, among other things, required that: all UWB operations must be fully coordinated with the Frequency Assignment Subcommittee (FAS) of the Interdepartment Radio Advisory Committee (IRAC); there will be limited distribution of the UWB equipment; and records will be maintained for all users to whom the manufacturers sell, lease or otherwise distribute UWB equipment. As a result of the conditions specified by NTIA and OET and the evaluation of the comments received,⁴ OET staff concluded that granting the waiver requests could provide potential benefits to the public while decreasing the potential of interference to Global Positioning System (GPS) users. The waivers were granted on June 29, 1999.

Petition for Reconsideration

5. The Petitioners contend that OET did not adequately take into account the impact of UWB devices on GPS operations and that it failed to perform the technical studies necessary to assess the safety risks to GPS.⁵ The Petitioners also state that the Commission must recognize that “coherent” spectrum management is necessary to protect GPS from interference resulting from in-band emissions, including the

³ See 47 CFR Sections 15.205 and 15.209. The restricted bands are frequency bands allocated for safety-related purposes or bands that are employed by radio services that must function, as a nature of their operation, using extremely low received signal levels. These latter systems may be passive, such as radio astronomy, or active, such as satellite down links and wildlife tracking systems.

⁴ Eleven comments were filed in response to the *ex parte* Public Notices. Most supported the waiver requests. The Petitioners did not file comments in response to these Public Notices.

⁵ The GPS operates between 1559-1610 MHz and is one of the restricted bands under Part 15.

cumulative effect that would occur from multiple transmitters operating within the GPS band. The Petitioners claim that to prevent interference to GPS the Commission must explicitly prohibit any emissions in the GPS frequency bands from UWB transmitters, that it must require the use of notch filters on UWB transmitters, and that it must require that residual emissions falling within the GPS band be less than -100 dBW/MHz averaged over one millisecond. The Petitioners further argue that OET exceeded its delegated authority contained in 47 CFR Section 0.241(a)(4). According to the Petitioners, these waivers call for changes in Commission policy and involve novel spectrum management and technical issues. Finally, the Petitioners contend that in issuing the grant of the waivers, OET used vague and imprecise language instead of explicit conditional language to limit the proliferation of UWB applications and prevent interference to GPS. In particular, the Petitioners express concern that the OET waivers state that the applicants “should” comply with the conditions in NTIA’s letter of June 15, 1999.

6. Oppositions to the consolidated petition for reconsideration were filed by each of the UWB waiver grantees. Time Domain argues that the -100 dBW/MHz figure proposed by the Petitioners would reduce by a factor of 1000 the amount of power that the Commission and NTIA currently allow within the GPS spectrum from other existing radio devices. Time Domain states that virtually all computers, incidental radiators, PCS, cellular, amateur, land mobile radio systems, microwave links, and television stations would be unable to meet this level. Time Domain argues that the Petitioners are asking the Commission to engage in an abrupt change of policy to accord GPS a level of protection that would be virtually unprecedented. Time Domain further argues that the limits on the number of devices and the duration of its waiver, as well as the stringent record keeping requirements imposed by OET, are more than adequate to ensure that the GPS band is adequately protected from harmful interference.

7. Zircon, in its opposition to the consolidated petition, argues that that the Petitioners offer general observations concerning GPS susceptibility that would be more appropriate to consider in the Commission’s UWB Notice of Inquiry.⁶ Zircon further points out that one of OET’s stated goals in the UWB waivers is for the Commission and other spectrum users to analyze the real-world operational characteristics of UWB devices to develop appropriate conditions to provide needed protections to authorized radio services. Zircon also emphasizes the interference safeguards that OET built into the waivers. In its opposition, U.S. Radar points out that there are many other devices such as automobile ignition systems and household electrical devices that typically produce RF energy in the GPS band that are currently unregulated. U.S. Radar argues that the aggregate potential of all the UWB devices allowed under the waivers operating in unison and co-located would produce essentially the same noise power in the GPS band as one Part 90 transmitter operating legally under the Commission’s Rules.

8. The Petitioners filed consolidated reply comments on September 3, 1999. The Petitioners state that it is not sufficient for UWB proponents to argue that because other radio services produce unwanted emissions which may impact the GPS noise floor that a single UWB device should also be permitted to do so even if it does not impair GPS. The Petitioners state that any increase in the noise floor in the GPS band must be viewed as intolerable.

⁶ See *Notice of Inquiry* in ET Docket No. 98-153, 63 Fed. Reg. 50184, September 21, 1998.

Commission Finding

9. The Commission rejects the arguments of the Petitioners that OET did not consider the GPS spectrum or, in particular, that it did not adequately investigate the potential for harmful interference could be caused to GPS operations.⁷ Transmitters being manufactured under these waivers are required to comply with limits on radiated emissions that are similar to those currently applied to millions of other unlicensed devices, such as personal computers. Those limits have already been proven successful in controlling harmful interference. Also, the emission levels produced by equipment authorized under the UWB waivers are considerably lower than those produced by present land mobile transmitters and broadcast television stations. Thus, the Commission believes that the emission limits along with the other conditions established under the waivers are sufficient to prevent or control harmful interference to GPS operations for purposes of the waivers. We recognize that the limits to protect GPS operations from UWB operations generally will need to be addressed in a rule making proceeding.

10. The Commission finds that the conditions in the waiver grants placed on the use of the UWB equipment will decrease the interference potential to GPS users. For example, U.S. Radar is limited to marketing only 25 units per year; Time Domain is limited to marketing only 2500 units over the four year waiver period; and Zircon is limited to marketing only 5000 units over the four year waiver period. Further, the Time Domain units may be marketed only to fire fighting/emergency rescue and law enforcement entities eligible for licensing on the public safety pool frequencies set forth in Part 90 of the rules. In addition, UWB transmitters authorized under the waivers may not be employed for airborne operations. Finally, U.S. Radar and Time Domain along with the operators of these transmitters are required to coordinate the operational areas of the equipment with the NTIA and, in so doing, avoid operating within close proximity to airports and other areas that could be impacted by the UWB emissions.

11. The Commission believes that the language contained in the letters granting the waivers fully supports the conditions stipulated by the NTIA in its June 15, 1999 letter. The parties receiving these waivers will be required to meet all of the conditions set forth by the FCC, including the conditions contained in the NTIA letter to the FCC, dated June 15, 1999. In particular, all ultra-wideband operations will be fully coordinated with the FAS of the IRAC of NTIA. Further, the Commission staff is working closely with NTIA personnel in the testing and authorization of the subject equipment.⁸

12. Based on the above, the Commission finds that no new information has been submitted by the Petitioners that would cause it to reconsider the waivers issued to U.S. Radar, Time Domain or Zircon. The Commission concludes that the standards and operating conditions specified by OET and by NTIA are appropriate to reduce the probability that UWB equipment operated under the waivers will cause harmful interference to GPS operations. The Commission also concludes that granting these waivers will not prejudice the outcome of the rule making proceeding in ET Docket No. 98-153. The Commission will continue to address the standards necessary to protect GPS and other radio operations from UWB devices

⁷ A waiver, due to its narrower focus, is not the proper place to address "coherent spectrum management" for the GPS band, *i.e.*, the impact to the GPS band due to the emissions from all other types of radio frequency devices. That is an issue that must be investigated through a full rule making proceeding.

⁸ A grant of equipment authorization was issued on October, 15, 1999, for Time Domain's device under FCC ID NUF-CW.

in this latter rule making proceeding.

13. Accordingly, IT IS ORDERED that the Consolidated Petition for Reconsideration from U.S. GPS Council, Alaska Airlines, American Airlines, and United Airlines IS DENIED. IT IS FURTHER ORDERED that the earlier rulings by the Chief, Office of Engineering and Technology granting the waivers to U.S. Radar, Time Domain, and Zircon are AFFIRMED. Based on this action, the question raised by the Petitioners regarding the OET delegated authority is moot.⁹

14. Questions concerning this order should be directed to John Reed at the Office of Engineering and Technology, jreed@fcc.gov, 202-418-2455.

FEDERAL COMMUNICATIONS COMMISSION

Magalie Roman Salas
Secretary

⁹ See, e.g., *Beehive Telephone, Inc. v. Bell Operating Cos.*, *Memorandum Opinion and Order*, 12 FCC Rcd 17,930, 17,938-39 (1997) (Commission decision affirming staff decision effectively moots delegated authority argument).

July 14, 2000

SEPARATE STATEMENT OF CHAIRMAN WILLIAM E. KENNARD

Re: U.S. GPS Industry Council, American Airlines and United Airlines, Consolidated Petition for Reconsideration of Waivers Issued under Delegated Authority by the Chief, Office of Engineering and Technology, Order (rel. July 14, 2000).

Ultra-wideband (UWB) technology may offer us a wonderful opportunity to use spectrum more efficiently. This technology appears to be able to operate on spectrum already occupied by existing radio services without causing interference.

I am pleased that the Commission has unanimously ruled to deny a petition for reconsideration of the Commission's decision to grant waivers to permit early operations of UWB technology¹⁰. These waivers will allow the Commission to gain valuable experience with ultrawideband prior to adopting final rules.

Some opponents of UWB technology are concerned about potential harmful effects from UWB emissions into the Global Positioning Service (GPS) band. The Commission has committed to ensuring that safety services, such as GPS, are protected against harmful interference. To ensure this protection, the Commission noted that further testing and analysis would be required before final technical rules for UWB operations could be established.

Release of this item was delayed for approximately five months after its adoption by a vote of the Commissioners. This inordinate delay should never happen again. Indeed, the Commission has worked hard in recent years to improve the timeliness of the release of documents and have generally corrected the problem of delayed release of items after adoption.

The anomaly is due in large measure to coordination efforts between the FCC staff and the staff of the National Telecommunications and Information Administration, which shares jurisdiction with the Commission on spectrum issues. Coordination was further complicated by inter-agency discussions related to the Notice of Proposed Rulemaking on UWB issued in May of this year. NTIA's assistance on Ultra-wideband is invaluable and indeed necessary because of the intentional emissions from UWB technology into frequencies designated for Government use. It is vital that the FCC and NTIA maintain a positive working relationship on this and similar spectrum management issues. However, we can do so only insofar as we remain sensitive to the Commission's responsibilities as an independent regulatory agency, charged with developing a full and public record of its decision making and the need to come to closure once the Commissioners have stated their views by voting an item. This item is far from a model of interagency coordination and we must strive to do better in the future. UWB is too promising a technology for it to be delayed by interagency coordination.

¹⁰ In June of 1999, the Office of Engineering and Technology granted three waivers of Part 15 of the Commission's rules to allow the limited marketing of ultra-wideband devices. See letters dated June 29, 1999, to Time Domain, U.S. Radar and Zircon, from the Chief, Office of Engineering and Technology.

July 14, 2000

SEPARATE STATEMENT OF COMMISSIONER SUSAN NESS

Re: U.S. GPS Industry Council, American Airlines and United Airlines, Consolidated Petition for Reconsideration of Waivers Issued under Delegated Authority by the Chief, Office of Engineering and Technology, Order (rel. July 14, 2000).

As is apparent from the face of this item, we adopted this order five months ago. My colleagues and I only recently were advised that the release of this order had been delayed, apparently due to efforts to coordinate with NTIA. While the Commission has taken steps to ensure the timely release of its rulings, this case demonstrates that we need to refine our procedures further. Orders adopted by the Commission should be released within seven days of their adoption. I have suggested one procedure that I hope will assist in preventing such delays in the future.

In addition, where NTIA has jurisdiction for government-owned spectrum, we need to develop a better process for coordination. Such a process clearly is needed to ensure that the Commission and NTIA can discharge their respective responsibilities in a manner that permits the FCC to issue prompt decisions that best serve the public interest. NTIA's consultation should be obtained promptly on policies that impact government spectrum, but this must not include the review and editing of items that have been adopted but not yet released by the Commission.

This is particularly important at the time we are evaluating the possible authorization of ultra-wideband (UWB) technology. This technology has great promise but, as responsible spectrum managers, we must be sure that it can be deployed without causing unacceptable interference to existing services, especially GPS.

This issue will be addressed as part of the rulemaking process that we recently initiated to consider permitting UWB devices to operate on an unlicensed basis under Part 15 of our rules. I have already expressed my strong support for the joint testing of this technology by NTIA and other interested parties so that we may best evaluate the effects of UWB operation. I look forward to receiving reliable test data from NTIA's labs based on objective test parameters that will assist us in our deliberations.

July 14, 2000

SEPARATE STATEMENT OF COMMISSIONER HAROLD FURCHTGOTT-ROTH

Re U.S. GPS Industry Council, American Airlines and United Airlines, Consolidated Petition for Reconsideration of Waivers Issued under Delegated Authority by the Chief, Office of Engineering and Technology, Order (rel. July 14, 2000)

This item should have been released five months ago when it was adopted. It appears that post-adoption review of our Order by NTIA was largely responsible for this delay. My colleagues and I had no knowledge of the delayed release or NTIA's extensive review until last week. Upon learning of the delay, the Commission has decided to release the item as originally voted back in February. However, this process and the disturbing gap between adoption and release compels me to describe the events that led to this delay.

The facts speak for themselves. The item was first circulated to the Commissioners in early January and was submitted to NTIA for coordination at that time pursuant to their shared jurisdiction over the bands at issue.¹¹ In mid-January, NTIA proposed various edits to the draft item. In response to NTIA's requests, the item was pulled from circulation, revised, and then re-circulated. On February 2, the Commission adopted the revised Order.

After being provided with a copy of the adopted Order, NTIA objected and requested additional changes. In response, another draft of the item circulated to the Commission with responsive changes. In late February, all of the Commissioners' offices signed off on the revised draft and assumed it would be released to the public in short order. This assumption proved to be incorrect. Remarkably, after adoption of this second revised version, NTIA received a copy and objected yet again. The ensuing months were consumed with staff negotiations with NTIA over revised language. The Commissioners' offices were never advised of NTIA's further review of the second revised Order. Nor were we aware that the item had not been released. Only on July 6, 2000, were the Commissioners' offices advised of the events set out above: the sharing of post-adoption drafts with NTIA, the prolonged negotiated editing process, and the failure to release the item.

I am confident this process was conducted with the best of intentions, but the outcome is an unacceptable distortion of the appropriate consultative role that NTIA should play in our decision making. Although the FCC and NTIA have a legitimate obligation to coordinate their activities regarding shared spectrum, NTIA's intrusive role in this proceeding is a source of concern for all of us who value the independence of this Commission. Repeated NTIA editing of orders after adoption undermines our

¹¹ I believe pre-circulation consultation with NTIA is perfectly appropriate and necessary based on their statutory responsibility for government owned spectrum pursuant to 47 U.S.C. § 902. However, I am not convinced that it is necessary to share actual item drafts. The staff believes that the sharing of drafts is legally permissible pursuant to 47 CFR 1.1204(a)(5) and the Commission decision *In re Amendment of Support H, Part 1 of the Commission's Rules and Regulations Concerning Ex Parte Communications and Presentations in Commission Proceedings*, 2 FCC Rcd 3031, n. 37 (emphasizing that the prohibition against disclosure of information contained in agenda items and other staff papers with outside parties is inapplicable to "presentations...[that] are made to other agencies with whom [the FCC] share jurisdiction.")

independence and the integrity of our processes. No other entity had repeated opportunities to review drafts of our decision. No other entity was able to “sign off” on edits from Commissioner offices. Equally important, neither the public, the parties, nor many of the Commissioners were aware that this “process” was even going on. The process was not transparent or even discernible. Those regulated by the Commission have a right to know that FCC decisions are truly FCC decisions. When an item sits for five months after adoption, it turns our voting process into a sham.

Going forward, I believe it is important that the FCC consult with NTIA regarding regulatory policy that may impact government bands. Once the staff has a complete record and develops its final recommendation for the Commission, NTIA should not be provided with additional drafts or have “sign off” authority on revisions. The circulated Order should be the sole province of the Commissioners and the staff. NTIA has every right to be heard, but no right to edit every word.

As for the merits of this Order, I continue to support our efforts to explore the viability of ultra-wideband technologies in all bands. As set forth in our recent NPRM, and seemingly of primary interest to NTIA, the Commission is committed to the protection of GPS in this process.¹² I look forward to developing a full record on these issues, including comprehensive, independent and objective test data from NTIA’s labs. Throughout this process the staff has done a remarkable job balancing the difficult issues presented here; the fate of ultra-wideband should not be impacted by its’ unfortunate procedural path.

¹² See Notice of Proposed Rulemaking *In the Matter of Part 15 of the Commission’s Rules Regarding Ultra-Wideband Transmission Systems* ET Docket 98-153, FCC 00-163, 2000 WL 571984, (Adopted May 10, 2000) (Released May 11, 2000).