

**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of )  
 )  
Revision of Part 15 of the Commission's ) ET Docket No. 98-153  
Rules Regarding Ultra-Wideband )  
Transmission Systems )

**REPLY COMMENTS OF AERONAUTICAL RADIO, INC. AND THE AIR  
TRANSPORT ASSOCIATION OF AMERICA, INC. REGARDING TEST  
REPORTS ADDRESSING POTENTIAL INTERFERENCE FROM ULTRA-  
WIDEBAND TRANSMISSION SYSTEMS**

Aeronautical Radio, Inc. ("ARINC") and the Air Transport Association of America, Inc. ("ATA"), by their attorneys, hereby reply to the comments filed in response to the Federal Communications Commission's ("Commission" or "FCC") Public Notice of March 26, 2001.<sup>1</sup>

In their comments filed in this proceeding last year, ARINC and ATA expressed concern about the potential for UWB devices to cause harmful interference to GPS, safety-of-life communications, and other existing operations, including those operating in restricted bands.

ARINC and ATA were joined by many other commenters in urging the FCC to act with caution.

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<sup>1</sup> *Comments Requested on Reports Addressing Potential Interference from Ultra-Wideband Transmission Systems*, Public Notice, ET Docket No. 98-153, DA 01-753 (March 26, 2001)("Public Notice"). The *Public Notice* sought comment on five test reports the Commission received regarding the potential for ultra-wideband ("UWB") devices to cause harmful interference to the Global Positioning System ("GPS") and other existing radio operations.

Initial analysis of the test reports submitted in this docket have led ARINC and ATA to conclude that their initial concerns were well-founded. The test reports demonstrate that UWB devices cannot co-exist on a non-interference basis with GPS, safety-of-life services, or operations in restricted bands. Therefore, ARINC and ATA, like several other commenters, urged the Commission to maintain the integrity of these vital systems by prohibiting the operation of UWB devices below a certain frequency threshold.<sup>2</sup> Further testing is not necessary and will not alter this conclusion. ARINC and ATA believe that threshold should be 5.5 GHz, for the reasons set forth in their April 25, 2001, and October 27, 2000, filings.<sup>3</sup> Similarly, ARINC and ATA urged the Commission to consider, with an adequate showing, only allowing UWB devices in non-restricted bands above that threshold, and then only on a licensed basis, a position consistent with that taken by other interested parties.<sup>4</sup>

In order to expand upon their position, ARINC and ATA are currently in the process of thoroughly reviewing the test reports and the publicly available measurement data underlying

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<sup>2</sup> See e.g., Comments of ARRL, ET Docket No. 98-153, at 5 (filed April 25, 2001)(arguing the threshold should be no lower than 6 GHz); Comments of U.S. GPS Industry Council, ET Docket No. 98-153, at 7 (filed April 25, 2001)(arguing the threshold should be no lower than 3.1 GHz); Comments of Sprint Corporation, ET Docket No. 98-153, at 7 (filed Apr. 25, 2001) (same); see also Comments of Multispectral Solutions, Inc., ET Docket No. 98.153 at 17 (filed September 20, 2000)(arguing for UWB above 3.1 GHz, “or as a minimum in the 5.46 to 7.25 (unrestricted) band . . .”).

<sup>3</sup> See Comments of ARINC and ATA, ET Docket No. 98-153, at 4 (filed April 25, 2001)(“ARINC and ATA April 25, 2001, Comments”); Reply Comments of ARINC and ATA, ET Docket No. 98-153, at 6-7 (filed October 27, 2000)(“ARINC and ATA Oct. 27, 2000, Reply Comments”).

<sup>4</sup> See ARINC and ATA April 25, 2001, Comments at 4; ARINC and ATA October 27, 2000, Reply Comments at 2-3, 6-7, 17; see also Supplemental Comments of the Boeing Company, ET Docket No. 98-153 at 10-11 (filed April 23, 2001)(“[A] final rule should not be issued that permits authorization of any UWB devices under Part 15. Instead, if the Commission does determine that it is feasible to authorize the use of UWB technology, then a new conditional licensing structure should be developed only after a careful review of additional testing and studies (and potentially the issuing of a further NPRM) . . .”).

them. At least one new report has been submitted in the past few days.<sup>5</sup> ARINC and ATA also anticipate the submission into the record of additional analyses from the Department of Defense Joint Spectrum Center, NTIA, DOT, and others.<sup>6</sup> Accordingly, a comprehensive review of the relevant analyses is not yet possible. When ARINC and ATA finish their more-detailed evaluation of these different studies, ARINC and ATA intend to submit their findings and recommendations to the Commission in the form of an *ex parte* filing.

Nevertheless, there is one critical point that must be addressed at this time: Time Domain's misinterpretation of the harmful interference standard. In its April 25, 2001, comments, Time Domain attempts to collapse the Commission's two-tiered definition of harmful interference, urging a "one size fits all" harmful interference standard that would be detrimental to radionavigation and safety-of-life services.<sup>7</sup> Time Domain ignores the fact that the Commission's definition clearly specifies two different standards, one for radionavigation and safety services, and a second, more lenient standard for all other radiocommunication services. Specifically, Section 2.1 of the Commission's rules defines "harmful interference" as:

Interference which endangers the functioning of a radionavigation service or of other safety services *or* seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these [international] Radio Regulations.<sup>8</sup>

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<sup>5</sup> RTCA Special Committee 159, Second Interim Report to the Department of Transportation, ET Docket No 98-153 (filed May 7, 2001)(filed by NTIA).

<sup>6</sup> *See, e.g.*, Comments of Motorola, Inc., ET Docket No. 98-153, at 2 (filed Apr. 25, 2001)(Motorola is conducting simulations to evaluate various UWB deployments and interference into PCS and GPS receivers).

<sup>7</sup> Comments of Time Domain, ET Docket No. 98-153 at 4-5 (filed April 26, 2001)("Time Domain, April 26, 2001, Comments").

<sup>8</sup> 47 C. F. R. § 2.1 (emphasis added). Time Domain also claims that "the NTIA/ITS website glossary adds that harmful interference 'must cause serious detrimental effects, such as circuit outages and message losses, as opposed to interference that is merely a nuisance or annoyance that can be overcome by appropriate measures.'" Time Domain, April 26, 2001,

Despite the higher protection afforded radionavigation and safety services, Time Domain continues to argue that the Commission “has made clear that harmful interference must result in *serious degradation* of service.”<sup>9</sup> Essentially, Time Domain contends that the Commission should ignore the standard that actually applies to radionavigation and safety services – and the additional protection warranted for such services – and instead use only the “seriously degrades, obstructs, or repeatedly interrupts” standard that applies to other radiocommunications.<sup>10</sup> Time Domain’s review of the test reports and its conclusions are based on this much more lenient standard, thereby discounting interference short of “serious degradation” that can endanger the functioning of GPS equipment – with serious potential consequences for safety-of-life services.

Analyzing the measurement data using the wrong standard for harmful interference leads to unreliable conclusions. For example, in the Executive Summary of the Time Domain-

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Comments at 3. Time Domain’s “interpretation” of NTIA’s definition is incorrect at best and misleading at worst. NTIA’s definition does include the language quoted by Time Domain, however, Time Domain fails to mention that the second part of the NTIA definition closely tracks the FCC’s standard of harmful interference for radionavigation and safety services: “Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these [*Radio*] *Regulations*.” NTIA, NTIA website at [http://www.its.bldrdoc.gov/fs-1037/dir-017/\\_2541.htm](http://www.its.bldrdoc.gov/fs-1037/dir-017/_2541.htm) (last visited May 8, 2001). Therefore, NTIA’s harmful interference standard for radionavigation and safety services is almost identical to the Commission’s definition, not the lower interference standard threshold of “serious degradation” that Time Domain would have the Commission apply to such services.

<sup>9</sup> Time Domain April 26, 2001, Comments at 3 (emphasis added).

<sup>10</sup> For example, in its recent comments, Time Domain criticizes the NTIA and Qualcomm test reports for using a standard allegedly rejected by the Commission in the 700 MHz proceeding. Time Domain April 25, 2001, Comments at 5-6, 83-84 (citing and quoting, respectively, Service Rules for the 746-764 and 776-794 MHz bands, and Revisions to Part 27 of the Commission’s Rules, *Second Memorandum Opinion and Order*, WT Docket No. 99-168 (rel. Jan. 12, 2001) (“700 MHz Order”). Comparing criteria applied in the markedly different circumstances of the 700 MHz Order with testing criteria for determining whether UWB devices endanger the functioning of GPS is inapt because GPS devices, in fact, operate very close to the noise floor, as demonstrated by the receiver protection criteria established for these devices.

sponsored JHU Report, the allegation is made that serious degradation (*i.e.*, “harmful interference”) to GPS receivers is found out to approximately 3 meters from the UWB transmissions, after which there is a “convergence to nominal levels.”<sup>11</sup> Time Domain quotes these findings extensively in its comments, endorsing the findings of the report it supported financially.<sup>12</sup> By focusing on “substantial degradation,” JHU’s analysis and Time Domain’s comments understate the potential for harmful interference: loss of satellite lock extends out to at least 25 meters,<sup>13</sup> and that the accuracy of the GPS ranging information is likely to be compromised at a distance well beyond that.<sup>14</sup> Both of these effects qualify as harmful interference under the appropriate standard applicable to GPS.

Time Domain’s tactics are further underscored by its misplaced criticism of the NTIA and Department of Transportation test reports for focusing on receiver protection criteria in analyzing the potential for harmful interference.<sup>15</sup> Such criteria are incorporated into GPS receiver certification standards (*e.g.*, RTCA DO-229, RTCA DO-235, and FAA SC-159) and are the accepted means by which to determine whether GPS receivers will suffer harmful interference and, conversely, how much protection they must be afforded.

Similarly, Time Domain and Xtreme Spectrum miss the mark when criticizing NTIA and DOT for employing worst-case operational scenarios.<sup>16</sup> Time Domain and Xtreme Spectrum

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<sup>11</sup> The Johns Hopkins University/Applied Physics Laboratory, *Final Report, UWB-GPS Compatibility Analysis Project*, ET Docket 98-153, at ES-1 (March 8, 2001)(“JHU Report”).

<sup>12</sup> See Time Domain April 26, 2001, Comments at 40-41.

<sup>13</sup> See ARINC and ATA April 25, 2001, Comments at 13 (citing JHU Report, Figure 6.2).

<sup>14</sup> ARINC and ATA April 25, 2001, Comments at 13.

<sup>15</sup> Time Domain April 26, 2001, Comments at 4, 44.

<sup>16</sup> *Id.* at 43-44; Comments of Xtreme Spectrum, ET Docket No. 98-153, at 2 (filed April 25, 2001).

appear to forget that GPS is used in the Radionavigation-Satellite Service, which is a safety service. In order to satisfy aviation safety standards, a manufacturer has to address the sort of “worst case” scenarios explored by NTIA in its report. Therefore, the scenarios NTIA studied are appropriate in light of aviation operational requirements, a consideration that Time Domain would have the Commission overlook.

In conclusion, the Commission should reject any attempt to relax the harmful interference standard applicable to GPS. "Serious degradation" is not the standard. Given this fundamental flaw in Time Domain's submission, its analysis of the test results and its conclusions regarding the extent of the potential for harmful interference to GPS must be discounted accordingly. The Commission should reject the UWB proponents' push to radically alter spectrum management principles and policies governing unlicensed intentional transmitters that are currently in place. Instead, the Commission should only consider allowing UWB devices to use non-restricted spectrum above 5.5 GHz, *if and when* the Commission has adequate information regarding potential interference to users of such spectrum and can develop rules that will ensure that UWB devices will not cause harmful interference to such users.

Respectfully submitted,

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