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October 27, 2000

Ms. Magalie Roman Salas
Office of the Secretary
Federal Communications Commission
445 12th Street, S.W.
TW-A325
Washington, D.C. 20554

RE: Notice of Proposed Rule Making; FCC 00-163; ET Docket 98-153
Revision of Part 15 of the Commission's Rules
Regarding Ultra-Wideband Transmission Systems

To the Commission:

For over fifty years the National Business Aviation Association (NBAA) has represented business aviation in the U.S. and is supported by over 6,000 member companies that operate more than 8,000 aircraft, three quarters of which are turbine powered. They provide US industry with air transportation services. Nearly 100 percent of the Fortune 500 industrial companies operating business aircraft are members of the Association. The Membership generates nearly \$5 trillion US in annual revenues, a bit more than one half of the total US GDP, and employs over 19 million people worldwide. A significant number of the Membership operate internationally to the benefit of worldwide commerce and trade.

The NBAA has reviewed many of the more than 140 comments responding to the subject NPRM, and offers the attached Reply Comments in amplification of its own earlier comments on the NPRM.

The NBAA strongly urges the Commission to allow adequate time for needed testing and analysis before consideration of any rulemaking and not rush to accommodate a new, enticing technology whose interference characteristics are not well understood. Indeed, it is not clear at this time that Part 15 is the appropriate vehicle for regulation of the potential interference effects of the new UWB technology. Delaying any action will help ensure the security of the safety of life that depends on GPS and other critical aeronautical services requiring special measures of allocated spectrum protection, and of the billions of dollars invested in these systems.

Sincerely,

A handwritten signature in black ink, appearing to read "W. Stine II", with a long horizontal flourish extending to the right.

William H. Stine II
Director, International Operations

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of

October 27, 2000

Notice of Proposed Rule Making

FCC 00-163

Revision of Part 15 of the Commission's Rules
Regarding Ultra-Wideband Transmission
Systems

ET Docket 98-153

**REPLY COMMENTS OF THE
NATIONAL BUSINESS AVIATION ASSOCIATION**

For over fifty years the National Business Aviation Association (NBAA) has represented business aviation in the U.S. and is supported by over 6,000 member companies that operate more than 8,000 aircraft, three quarters of which are turbine powered. They provide US industry with air transportation services. Nearly 100 percent of the Fortune 500 industrial companies operating business aircraft are members of the Association. The Membership generates nearly \$5 trillion US in annual revenues, a bit more than one half of the total US GDP, and employs over 19 million people worldwide. A significant number of the Membership operate internationally to the benefit of worldwide commerce and trade.

The NBAA has reviewed many of the more than 140 comments responding to the NPRM, and offers the following points in amplification of its own earlier comments on the NPRM.

1. NBAA agrees UWB technology holds promise and the potential to provide many safety and economic benefits.

In fact, the aviation community may benefit from some of the proposed applications. However, Most importantly, there is still much that is not known about the interference potential of UWB technology, and further study is warranted and currently under way. It is imperative that no rulemaking be promulgated until those studies are concluded and enough is known about UWB signal characteristics to draft appropriate rulemaking or exemptions thereto. Among the key technical issues yet to be addressed are the many questions posed in the NPRM.

- 2. The Commission must not permit UWB to impinge upon aeronautical safety service and other restricted frequency bands unless tests and corresponding analyses prove there will not be interference.**

The Global Positioning System (GPS) has become a critical safety-of-life service for aviation, search and rescue and various other applications. GPS signal strength is very weak at the receiver and consequently very susceptible to interference. Other aeronautical safety service systems, such as radar and satellite communications, have similar characteristics of high sensitivity and large-bandwidth receivers. Therefore, extreme caution is needed when considering any rulemaking that could compromise that service and the safety, operational and economic benefits it provides on a global basis. We agree completely with the Commission's statement in NPRM ¶ 21, "Until more experience is gained, we believe that our initial rule making proposals should reflect a conservative approach." Allowing unrestricted operation of UWB devices at this stage, prior to obtaining test data and their interpretations, is clearly not a conservative approach.

- 3. The comments on the NPRM reveal major differences among the several approaches to design, manufacture and use of UWB devices, such that the NPRM's proposed general UWB definitions and regulatory criteria may be even less applicable across the board.**

The AOPA and NBAA comments discussed the proposed definitions and regulatory criteria in the context of UWB technology as implemented by Time Domain and some others. Comments by, for example, MSSSI, TDC and XtremeSpectrum illustrate substantial differences with respect to absolute and relative bandwidth necessary, peak-to-average power ratio, coding methodology, filtering, and susceptibility of device emission characteristics to external influences such as environment and accidental or intentional antenna modifications.

- 4. The support voiced for UWB in a large number of the comments appears to have resulted from lobbying by at least one of the UWB proponents and focuses solely on the potential benefits marketed by these proponents.**

Such benefits can be realized by means other than the unrestricted authorization of UWB devices, and in most cases are not limited only to UWB devices. A large percentage of these comments were submitted by public service offices such as fire, police, hospitals and health-care officials that were not aware of all the facts. Most of these offices already rely on GPS for emergency services; had they known there was a threat to GPS by UWB devices, their support for UWB would likely have been much more conditional.

- 5. Most UWB manufactures advocate either tight controls or outright prohibition of UWB operation in the GPS frequency band.**

For example, TDC commented,

"TDC and others have repeatedly stated that this proceeding should ensure that UWB devices will not disrupt important safety of life systems, such as those operated by the FAA. If any UWB uses are found by the Commission to pose a credible risk of causing harmful interference to GPS by the FAA or the aviation industry, TDC fully expects that the Commission will not authorize those UWB uses."¹

XtremeSpectrum commented, "Concerns about interference into sensitive safety services such as GPS must be taken seriously...."² MSSSI commented, "Unfiltered UWB systems (i.e., those utilizing direct impulse or step excitation of an antenna) should not be permitted under Part 15"³, meaning high-powered devices should require licensing and mitigate potential interference to existing systems.

6. Nonetheless, some proponents have argued that UWB devices should be given the same leeway under Part 15 that is granted to unintentional radiators such as personal computers.

Boeing commented, "Choice of UWB technology strictly for ease of licensing or to minimize the expense of the user equipment may not be in the public interest. Other more spectrally efficient technologies may be able to provide equivalent service without the potential for interference inherent of the UWB technology due to the wide bandwidth used. It is [a] concern that if the UWB signal strategy becomes attractive because of 1) ease of licensing (or via Part 15 with no licensing at all), or 2) the potential for very low cost receiver equipment, then the possibility of aggregate spectral interference will become much larger and effectively uncontrollable."⁴

7. Despite assurances by some to the contrary, the issue of aggregated interference is a widespread concern within the aviation community who, along with the traveling public, are potential victims of combined interference from the eight or more UWB devices per person that has been projected.

We can find no record of the Commission's Technical Advisory Council (TAC) conclusion that a victim receiver's "noise floor would be set by the closest UWB transmitters." (NPRM at 46) The NPRM (at 47) continues, "This leads us to believe that only the closest transmitter placing an emission on the frequency of concern would be of importance, obviating the need for additional attenuation to compensate for cumulative effects." The referenced citation (#97) is a white paper submitted by an interested manufacturer, and is not a record of the TAC's (or its subgroup's) conclusions on the subject. Indeed, TAC reports have concluded

¹ TDC NPRM comments at p.4.

² XtremeSpectrum NPRM comments at p. 7.

³ MSSSI NPRM comments at p. 2.

⁴ Boeing NPRM comments at p.11.

that a study of prior science and effects of aggregation was needed⁵, and assumed that significant experimentation would be necessary -- "...it may be feasible to carve out a relatively large block of spectrum in some geographically remote location to proceed with the work. It may be possible to identify an isolated area where we can loosen controls and minimize collateral damage."⁶.

8. For these reasons, in addition to those discussed in our NPRM comments, the NBAA believes that the proposal to authorize UWB devices under Part 15 is neither the appropriate nor the rational path at this time.

The TAC reported, "There needs to be a clear delineation of benefits achievable only with UWB, and the costs to others of its deployment. It may be that the only way to move forward is by controlled experiment with real systems."⁷ In a similar vein, Boeing commented:

"Subject to the outcome of further analysis and testing, it may be spectrally efficient to authorize the limited use of certain very low power/low PRF UWB technologies to provide services that cannot be provided using conventional transmission/modulation techniques. For example, applications such as GPR can only be provided effectively using an ultra wideband signal structure and, as a result, the availability of this potentially beneficial service to public safety services and geologists is contingent on its authorization by the FCC.

In stark contrast, wireless communication services such as LANs are already commercially available to consumers using discrete spectrum allocations on both a licensed and unlicensed basis. The introduction of UWB-based wireless communication systems would not expand the types of services available to the public. It would simply provide a new, but not necessarily more spectrally efficient, means to provide an existing consumer service."⁸

As previously discussed, both above and in our original comments⁹, there is insufficient information currently available to reach considered conclusions regarding the definition and setting of quantitative criteria for authorizing UWB devices on an unlicensed basis. Further, the potential aggregate impact of ubiquitously deployed UWB systems is too significant for the Commission to authorize, using a regulatory structure that provides it with insufficient means to control the number and character of the UWB units in use. Carefully limited blanket licensing, subject to strictures such as earlier developed by the NTIA, appears to be the best

⁵ TAC Report, 24 March 2000.

⁶ TAC Report, 22 September 1999.

⁷ TAC Report, 13 Dec 1999.

⁸ Boeing NPRM comments at p. 11.

⁹ See, in particular, NBAA NPRM comments at 18/19.

approach. Even then, such licensing should follow the initial determination of criteria through the test and analysis programs underway, experiments such as envisioned by the TAC, and the scrutiny of the operational results of those units already waived under DA 99-1340.

In any case, if the "restricted frequencies" list of Part 15 is used as a reference point of frequencies where limitations on UWB emissions may be imposed in whatever form, that listing will require modification to include all frequency bands that are used for aeronautical safety purposes. The AOPA and NBAA comments on the NPRM at ¶ 23 discusses this issue, and the missing aeronautical safety frequency bands are identified in Attachment 1 to those comments.