

Before the  
Federal Communications Commission  
Washington, DC 20554

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

ET Docket No. 98-153

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

To: The Commission

**REPLY COMMENTS OF ARRL, THE NATIONAL  
ASSOCIATION FOR AMATEUR RADIO**

ARRL, The National Association for Amateur Radio (also known as the American Radio Relay League, Incorporated) ("ARRL"), by counsel and pursuant to the *Public Notice* DA 01-753, released March 26, 2001 (the Public Notice), requesting comments on reports addressing potential interference from ultra-wideband (UWB) transmission systems, hereby respectfully submits its reply comments.

**I. UWB Interference is Dependent on Signal Structure**

1. Many of the comments filed in response to the *Public Notice* reiterate that UWB interference to licensed radio services is highly dependent on signal structure, and that therefore the tests conducted to date are anecdotal, rather than determinative, in view of the undefined characteristics of UWB devices, and the lack of specificity in the Commission's Notice of Proposed Rule Making in this proceeding defining UWB.

2. In its Comments at page 5, Time Domain Corporation (TDC) states as follows:

In its development of recommended power levels for UWB devices operating in various GPS operational scenarios, NTIA chose a testing procedure that is very similar to a criterion that was recently rejected by

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the Commission in the *700 MHz Report and Order*. In that proceeding, the FCC rejected an assertion from Motorola that harmful interference will result from a 1 dB increase in the noise floor. Very few systems operate at the thermal noise floor limit and for the scenarios used by the NTIA, thermal noise is not the proper limit. The NTIA analysis does not create estimates of the baseline performance of GPS receivers in scenarios and then estimate the marginal impact of UWB on those baselines. By ignoring the fact that GPS will not work at all in many places and will work poorly in many more places, the NTIA report does not state the fact that GPS cannot be reliably applied to every possible geo-location requirement, and overestimates the impact of UWB.

Thus, TDC states that a 1 dB rise in the noise floor should not be the determinant of when harmful interference occurs. Raising the noise floor, however, is not without adverse consequences. For example, it reduces the fade margin of the systems operating in accordance with the terms of their licenses. TDC's rather cavalier dismissal of this potential adverse impact on incumbent licensees is disquieting.

3. While ARRL leaves to those more directly affected the issue of potential interference from UWB to GPS receivers, it is fair to note that the broadband emissions of UWB devices can present the same RF energy in both GPS bands and Amateur Service allocations. Amateurs use extremely sensitive receivers with state-of-the-art low-noise antenna preamplifiers. Amateurs employ a number of different emission types, both analog and digital, and it is difficult to assess the interference effects on amateur systems without knowing the signal characteristics of the UWB device -- something that has not been defined in this proceeding to date. However, due to the low received signal strengths, it is reasonable to conclude that if UWB devices will interfere with GPS receivers, there is at least the same degree of interference potential to Amateur receivers.

4. The real problem with the tests to date, and with any conclusions that TDC wishes to derive from them, is that they are of necessity anecdotal; there are no specific rules

proposed, and therefore it is not possible to determine when a UWB signal would exceed the interference threshold relative to a licensed radio service; how often; or for how long.

5. As an example of the definitional problem, TDC's comments refer to "Part 15 levels" of radiated emissions. However, those levels of radio frequency emissions are premised on exclusion of intentional radiators from the restricted bands, which TDC would argue is inapplicable to UWB devices. The analyses to date therefore are insufficient because they are not determinative of the interference potential of devices which will in fact be deployed.

## **II. The Comments of XtremeSpectrum, Inc.**

6. XtremeSpectrum, Inc. addresses interference issues relative to GPS receivers. At page 4 of its comments, XtremeSpectrum states as follows:

*GPS-band energy.* XtremeSpectrum has proposed a spectrum mask that offers GPS 18 dB of protection below Section 15.209 levels. Specifically, XtremeSpectrum proposes reducing permitted power by 6 dB below 2.7 GHz, by 12 dB below 2.0 GHz, and by 18 dB below 1.6 GHz. This mask can be readily achieved by appropriately shaping the UWB signal. Manufacturers may wish to use other techniques.

Page 3 of the Technical Statement provides a mask consistent with the above values and showing the levels at maximum around 4 GHz while showing high levels at 3 GHz (where there are restricted Part 15 bands) and at 5 GHz.

7. This would indicate an admission that permitting UWB devices to radiate at current Part 15 radiated emission levels would create the potential for interference with GPS receivers, and that the proposed mask would fix the problem. In any case, specifying a spectrum mask for UWB is an absolute necessity and whether or not such is sufficient as a means of controlling interference potential, XtremeSpectrum's proposals are a step in the right direction. The rolloff characteristics of the mask discussed by XtremeSpectrum indicate

the broad nature of UWB. The reduction of interference to GPS by rules yet to be proposed might offer some interference protection to Amateur Service allocations at 1240-1300 MHz, 2300-2310 MHz, and the primary allocations at 2390-2400 and 2402-2417 MHz. The mask noted by XtremeSpectrum would not, however, provide any relief from UWB interference to Amateur bands at 3400-3500 MHz or 5650-5925 MHz, shared with the Radiolocation Service.

### **III. Conclusions**

8. From the comments filed in response to the *Public Notice*, it is fair to draw several conclusions. First, it is not reasonable to assume, as does TDC, that Part 15 rules can be applied to UWB devices, due to their unique transmission characteristics. Second, tests that have been completed and filed to date reveal a significant potential for harmful interference to at least some licensed services, including GPS and the Amateur Service. Third, more specific and targeted tests, including those tests necessary to a determination of an appropriate emission mask for UWB devices (and as well average and peak power levels, pulse characteristics and duration, and frequency limitations), must be conducted before appropriate rules for UWB devices can be adopted. Tests of UWB devices to date are of necessity anecdotal, and there can be no resolution of interference potential in the environment created by the vague Notice of Proposed Rule Making. Nor can the aggregate interference potential of UWB devices be determined on the current record. Specific definitions, including classes of UWB devices, should be established in a further Notice of Proposed Rule Making.

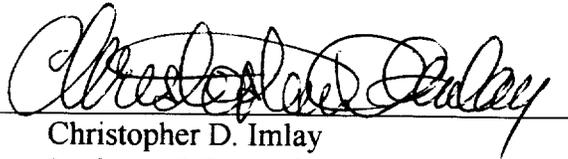
Therefore, the foregoing considered, ARRL, the National Association for Amateur Radio respectfully requests that the Commission take no action in this proceeding unless it is consistent with these comments.

Respectfully submitted,

ARRL, THE NATIONAL ASSOCIATION  
FOR AMATEUR RADIO

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By:

A handwritten signature in black ink, appearing to read "Christopher D. Imlay", written over a horizontal line.

Christopher D. Imlay  
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May 10, 2001

CERTIFICATE OF SERVICE

I, Christopher D. Imlay, do hereby certify under penalty of perjury that I caused to be served, this 10th day of May, 2001, via United States Mail, postage prepaid, a copy of the "REPLY COMMENTS OF ARRL, THE NATIONAL ASSOCIATION FOR AMATEUR RADIO" on the following:

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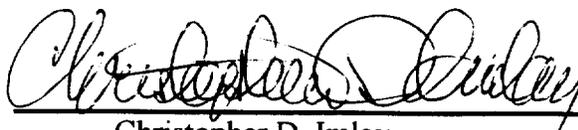
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