Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
Revision of Part 15 of the Commission's	)	ET Docket 98-153
Rules Regarding Ultra-Wideband	)	
Transmission Systems	)	
	)	

SUPPLEMENTAL REPLY COMMENTS OF SIRIUS SATELLITE RADIO INC.

Sirius Satellite Radio Inc. ("*Sirius*") hereby replies to the comments submitted in response to the Commission's January 24, 2001 Public Notice[1] that requested comment on the non-GPS test data submitted by the National Telecommunications and Information Administration in the above-captioned docket.

At the outset, Sirius notes that the majority of the comments, including those filed by one of the UWB proponents, filed in response to the Commission's call for comment on NTIA's testing results agree on a significant number of points. The majority of the commenters laud NTIA's significant efforts and agree with Sirius that NTIA's testing results provide important threshold data for use in evaluating the interference impacts that UWB devices would have on licensed users of the spectrum.[2] These commenters also agree that NTIA's testing

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1 *Comments Requested on Test Data Submitted by the National Telecommunications and Information Administration Regarding Potential Interference from Ultra-Wideband Transmission Systems*, DA 01-171 (rel. January 24, 2001)

2 *See e.g.*, Reply Comments of Multispectral Solutions, Inc. at 1, ET Docket 98-153 (filed February 22, 2001) ("*MSSI Comments*"); Sprint Supplemental Comments Regarding NTIA's UWB Analyses Reports at 2, ET Docket 98-153 (filed February 23, 2001) ("*Sprint Comments*"); Supplemental Comments of Rockwell Collins, Inc. Regarding NTIA's UWB Analyses Reports at 2, ET Docket 98-153 (filed March 1, 2001) ("*Rockwell Collins*

program represents only an initial inquiry, with further testing, including testing on aggregate effects, to be completed, and that NTIA's testing program is as complete as possible in view of the limited number of UWB devices available and NTIA's focus on receivers used by federal agencies.[3]

Most importantly, the majority of the commenters agree that NTIA's results, though focused on selected federal receivers, confirm that deployment of UWB devices below 3.1 GHz would present significant interference issues for both government and licensed, commercial users of spectrum below 3.1 GHz.[4] In this way, these comments, as well as NTIA's findings, support Sirius' position that the Commission should prohibit deployment of all UWB applications, with the possible exception ground-penetrating radars and wall-imaging devices,

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Comments"); Comments of Lockheed Martin Corporation at 3, ET Docket 98-153 (filed February 23, 2001) ("*Lockheed Martin Comments*").

[3] *See* Comments of Federal Law Enforcement Wireless Users Group to National Telecommunication and Information Administration Assessment of Compatibility Between Ultrawideband Devices and Selected Federal Systems at 4, ET Docket 98-153 (filed February 23, 2001) ("*FLEWUG Comments*"); Lockheed Martin Comments at 3 (additional testing required); Comments of AT&T Wireless Services, Inc. at 2, 3-4, ET Docket 98-153 (filed February 23, 2001) (NTIA test results are indicative of likely interference to commercial systems, but more sensitive methodologies are needed to determine impact on mobile systems); Comments of Aeronautical Radio, Inc. and the Air Transport Association of America, Inc. in Response to NTIA's Special Publication 01-43 and Report 01-383 at 3, ET Docket 98-153 (filed February 23, 2001) ("*ARINC and ATA Comments*") (better understanding of interference potential of UWB devices below 5 GHz is needed).

[4] *See* MSSI Comments at 1; Comments of the National Broadcasters Association at 4, ET Docket 98-153 (filed February 23, 2001) ("*NAB Comments*"); Lockheed Martin Comments at 3; Sprint Comments at 10-11; Comments of the U.S. GPS Industry Council on Test Data Submitted by the National Telecommunications and Information Administration Regarding Potential Interference from Ultra-Wideband Transmission Systems at 3, ET Docket 98-153 (filed February 23, 2001) ("*U.S. GPS Industry Council Comments*") (preclude transmissions below 3.1 GHz and in restricted bands above 3.1 GHz); Comments of Cingular Wireless LLC to NTIA Reports at 2, ET Docket 98-153 (filed February 23, 2001) ("*Cingular Comments*") (interference likely to cellular and PCS networks); FLEWUG Comments at 4 (Commission must take full account of NTIA's assessment as to UWB operations below 3.1 GHz); ARINC and ATA Comments at 3 (interference likely below 5 GHz); Rockwell Collins Comments at 5 (restrict UWB operation below 6 GHz).

from radiating below 3.1 GHz. These comments also support Sirius' view[5] that the proper approach for investigating the deployment of UWB devices is a staged investigation that focuses, in each step, on specific classes of UWB applications as they develop and are capable of definitive description, that permits adequate time for thorough testing and that culminates in a licensing procedure for UWB applications with similar interference characteristics. In this regard, Sirius supports the comment put forth by several parties[6] that the Commission should issue a further notice of proposed rulemaking before issuing a report and order in this proceeding. It would be in the Commission's interest to solicit comment on the regulatory framework that the Commission is developing internally in response to the testing results that have been submitted in this proceeding.

In contrast to the majority of the commenters, three UWB proponents, Time Domain Corporation, Fantasma Networks, Inc. and 3Com Corporation, attempt to blunt the impact of NTIA's findings by criticizing certain assumptions and characteristics of the NTIA testing program. These criticisms are ultimately unavailing. All three parties argue that NTIA did not properly consider certain factors that might mitigate the impact of interfering UWB signals on certain of the federal receivers that NTIA examined. Time Domain and 3Com also fault NTIA for focusing in its initial inquiry on conducted testing rather than operational testing, including operational service outages.

As a threshold matter, the arguments from these UWB proponents inappropriately seek to shift the burden in this proceeding to primary, licensed users of the spectrum. As Sirius

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5 *See, e.g.*, Reply Comments of Sirius Satellite Radio Inc. at 4, ET Docket 98-153 (filed October 27, 2000) ("*Sirius Reply Comments*").

6 *See* Lockheed Martin Comments at 5; U.S. GPS Industry Council Comments at 8; Cingular Comments at 1.

has explained,[7] the Commission's rules and precedent are clear that spectrum users proposing to operate on a non-interference basis, like the UWB proponents, bear the burden of demonstrating the non-interfering character of their proposed operations before the Commission will authorize those operations. Thus, it is not the burden of the Commission, NTIA or any primary, licensed spectrum user to prove that UWB devices will interfere with primary operations. Instead, it is the burden of the UWB proponents to prove that their devices will *not* interfere with primary operations. For example, no UWB proponent has yet demonstrated in the record of this proceeding that it can meet the power flux density limit[8] necessary to protect Sirius' licensed receivers from harmful interference. Thus, although Time Domain complains that NTIA "conducted no testing to measure any operational impacts,"[9] all Time Domain offers in response is its "view" that "properly conducted operational test[s]" would show that NTIA's testing approach was too conservative.[10] Similarly, 3Com argues that the NTIA results provide "no useful guidance to the Commission,"[11] but 3Com itself provides no quantitative analysis of any kind. As Sirius has stated before,[12] while Time Domain and 3Com are no doubt genuine in their views, what is needed is a technical showing that demonstrates non-interference, not a "view."

Furthermore, even assuming for the sake of argument that these criticisms of the NTIA methodology are valid, the criticisms ultimately prove too much, and further demonstrate

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7 Sirius Reply Comments at 13-15.

8 *See* Comments of Sirius Satellite Radio Inc. at 16, ET Docket 98-153 (filed September 12, 2000) ("*Sirius Comments*").

9 Comments of Time Domain Corporation at 10, ET Docket 98-153 (filed February 23, 2001) ("*Time Domain Comments*").

10 *Id.*

11 Comments of 3Com Corporation Concerning NTIA's Compatibility Report at 7, ET Docket 98-153 (filed February 23, 2001) ("*3Com Comments*").

12 Sirius Reply Comments at 15-16.

that the approach that Sirius has advocated in this proceeding -- a staged investigation with adequate time for thorough testing, culminating in a licensing procedure -- is the correct one. For example, Time Domain and 3Com chide NTIA for not conducting what Time Domain and 3Com view as sufficient operational testing.[13] However, NTIA should be commended for undertaking its threshold inquiry, which provided important baseline data on interference from UWB transmission methods. Although Sirius believes that the NTIA tests are sufficient to preclude UWB emissions below 3.1 GHz, Sirius has maintained throughout this proceeding that several phases of testing would likely be required and Sirius would certainly not stand in the way of any appropriate operational testing that Time Domain and 3Com wish to undertake.

The UWB proponents' complaint that NTIA did properly consider certain mitigating factors also support Sirius' view that a one-size-fits-all rule that covers all UWB devices and protects all licensed, primary spectrum users will serve neither UWB proponents nor licensed spectrum users. Sirius has consistently maintained in this proceeding that the Commission would be better off separately considering classes of UWB devices with similar interference characteristics.[14] In reciting the litany of mitigating factors that NTIA supposedly should have considered, the UWB proponents fail to acknowledge that even if some of these mitigating factors should be considered with respect to certain UWB applications and certain victim receivers, these mitigating factors would not appropriately be considered for *all* UWB applications and *all* victim receivers.

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[13] Time Domain Comments at 7; 3Com Comments at 2.

[14] Sirius Reply Comments at 9-11; Sirius Comments at 19-20.

For example, Fantasma focuses its discussion on a UWB communications network with certain parameters, including a pulse repetition frequency of 10 MHz.[15] Yet, as a result, Fantasma's analysis has little applicability to other UWB applications (*e.g.*, automotive uses) or UWB communications networks with different parameters (*e.g.*, PRF of 100 MHz). Similarly, Time Domain argues that an activity factor propagation loss should be taken into account because not all UWB devices will be transmitting continuously.[16] However, under a one-size-fits-all approach, the appropriate limits must cover all types of UWB devices and, in order to protect existing services, an activity factor would not appropriately be considered because UWB devices can operate continuously.

Likewise, all three UWB proponents argue that certain characteristics of the selected government receivers included in NTIA's study make these receivers more immune to interference from UWB devices.[17] However, as the National Association of Broadcasters rightly noted,[18] under the Commission's current proposal, it is impossible to predict which type of receiver a UWB transmitter will encounter and different receivers have different characteristics. For example, Time Domain suggests that factors such as antenna alignments, beam-shaping loss, and localization of degradation should be taken into account in NTIA's interference analysis.[19] While these factors may or may not be present for certain of the selected federal systems that NTIA analyzed, they are clearly not present when addressing interference into Sirius receivers.

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15 Comments of Fantasma Networks, Inc. on NTIA Non-GPS Interference Study at 3, ET Docket 98-153 (filed February 23, 2001) ("*Fantasma Comments*").

16 Time Domain Comments at 19-20.

17 Fantasma Comments at 16-18; Time Domain Comments at 26-28; 3Com Comments at 5.

18 NAB Comments at 6.

19 Time Domain Comments at 26-28.

The Sirius antennas are near omni-directional, and, therefore, interference from any UWB device would enter the Sirius receiver through the mainbeam of the antenna.

Similarly, while Time Domain argues that certain characteristics of digitally modulated receivers make such systems more resistant to interference,[20] Time Domain failed to mention that there are other aspects of digitally modulated systems that can cause the interference effects to be worse. For example, as pointed out by the NTIA report, "bursts of errors can have a catastrophic effect on performance degradation."[21] These other factors need to be addressed before any conclusion on the interference effects to digitally-modulated systems can be made, and, in any event, these factors only apply to digitally-modulated systems.

In addition, certain of the mitigating factors suggested by the UWB proponents are not applicable to certain receivers because of the nature of the receivers. As Sprint and AT&T point out,[22] building penetration losses are not applicable for licensed, primary systems that are intended to be used indoors. Similarly, the argument that NTIA should have considered propagation losses due to irregular terrain and other obstructions[23] is inapplicable to the very realistic case of a UWB device being located near a victim receiver. As is clear from the record in this proceeding, UWB devices may be located anywhere, including in automobiles and other mobile environments. Therefore, a reasonable worst-case assumption, especially as to Sirius' receivers, which are a mobile, mass-marketed product, is to assume that UWB devices will be located near a victim receiver. Similarly, the suggestion that the Okumura-Hata propagation model would have be more appropriate to use in NTIA's analysis ignores that this model is

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[20] Time Domain Comments at 26 (mentioning error-control coding and bit interleaving).

[21] *Assessment of Compatibility Between Ultrawideband Devices and Selected Federal Systems*, at A-21 n.73, NTIA Special Publication 01-43 (January 2001) ("*OSM Report*").

[22] AT&T Comments at 3; Sprint Comments at 7-8.

applicable only at distances greater than 1 km.[24] In "real-world" scenarios where the UWB transmitter is close to the victim receiver, this model would not be applicable and no additional propagation loss would be expected.

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Thus, the majority of the comments filed in respect of NTIA's testing results agree that those test results are significant and important in this proceeding. The majority of the comments also agree that NTIA's test results confirm that UWB emissions below 3.1 GHz would present significant harmful interference issues for both government and licensed, commercial users of spectrum below 3.1 GHz. The complaints by three of the UWB proponents regarding NTIA's test results are largely unavailing, and, in fact, in some respects support Sirius' position that the Commission should not take a one-size-fits-all approach to authorizing UWB deployment. Finally, several commenters, including Sirius, agree that the Commission should issue a further notice of proposed rulemaking, with specific proposals and rule text, before issuing a report and order in this proceeding.

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[23] *See* Time Domain Comments at 16-17; Fantasma Comments at 10-11; 3Com Comments at 6.

[24] *See* OSM Report at 5-28.

Respectfully submitted,

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