Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Time Domain Corporation Application for Equipment Authorization	)	File No.: NUF-200SGT-0702
	)	
	)	
	)	

APPLICATION FOR REVIEW

I. INTRODUCTION

On September 18, 2002, the Commission's Office of Engineering and Technology ("OET") granted the above-referenced Equipment Authorization to Time Domain Corporation ("TDC") for an Ultra-Wideband ("UWB") transmitter. This decision has significant precedential value as the device is the first UWB device to be certified, and the equipment authorization is the first UWB equipment authorization to be granted, since the Commission's adoption on February 14, 2002 of its Part 15 Rules permitting the marketing and operation of UWB devices.[1] By this Application for Review ("Application"),[2] the companies and associations who have signed this Application ("Petitioners")[3] request that the grant of authorization be reversed and TDC's application for equipment authorization be denied.

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[1] *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, ET Docket No. 98-153, First Report and Order, 17 FCC Rcd 7435 (2002) ("*First Report and Order*").

[2] Petitioners make this filing pursuant to 47 C.F.R. § 1.115, which governs applications for review of action taken pursuant to delegated authority.

[3] The coalition filing this Application consists of: Air Transport Association of America, Inc.; American Airlines; American Congress on Surveying and Mapping; ARINC; AT&T Wireless Services, Inc.; The Boeing Company; Delta Air Lines, Inc.; Garmin International, Inc.; General Aviation Manufacturers Association; Multispectral Solutions, Inc.; National Business Aviation Association, Inc.; NavCom

Petitioners request that the Commission find that the authorization should not have been granted because it sanctions higher emissions from TDC's UWB device in frequencies below 3.1 GHz than are permitted to be emitted by UWB devices under the *First Report and Order*. The Commission should review and reverse the grant of TDC's equipment authorization because this authorization contradicts the specific UWB limits established by the Commission in its *First Report and Order* and because of defects in the certification process.

II. BACKGROUND

A. *First Report and Order* and UWB Emission Limits

In its *First Report and Order*, the Commission permitted the marketing and operation of certain types of products incorporating UWB technology. In doing so, the Commission indicated that it was "proceeding cautiously" and implemented standards designed to protect authorized and licensed services, including bands restricted for safety-of-life services, and other important radio operations from interference generated by UWB devices. The Commission determined that "UWB devices can be permitted to operate without causing harmful interference if appropriate technical standards and operational restrictions are applied to their use. In this regard, [the Commission established] different technical standards and operating restrictions for different types of UWB equipment based on their potential to cause interference."[4] The Commission required UWB devices to operate at power levels substantially below the general out of band emission limits of Part 15.[5] The Commission indicated that only

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Technology, Inc.; Nortel Networks, Inc.; Northwest Airlines, Inc.; NovAtel Inc.; PanAmSat Corporation; QUALCOMM Incorporated; Raytheon Company; Rockwell Collins, Inc.; Satellite Industry Association; Sirius Satellite Radio Inc.; Spatial Technologies Industry Association; Sprint Corporation; Tendler Cellular, Inc.; Trimble Navigation Ltd.; United Airlines; United States GPS Industry Council; and XM Radio Inc.

[4] *First Report and Order* at ¶ 18.

[5] *Id*. at ¶¶ 18, 19.

after there is additional experience with UWB operation would it consider more flexible standards.[6]

The Part 15 Rules governing UWB devices specifically were designed to protect users in the 1-3 GHz frequency band. For instance, the Commission implemented considerable restraints on the technical and operational standards for UWB equipment in part to ensure that "cumulative" interference will not occur.[7] Additionally, the *First Report and Order* specifies that UWB devices are required to operate at reduced emission levels between 0.960 GHz and 3.1 GHz in order to reduce significantly the range over which the UWB emissions in this band can cause interference.[8] Given the Commission's adoption of these standards, it is abundantly clear that the Commission intended to constrain RF emissions of UWB devices at levels far below general Part 15 out of band emission limits.

B. Time Domain's UWB Device

TDC represents in its application for equipment authorization that its UWB device intends to operate in the 3420-6950 MHz band. In order to attempt to comply with the Commission's UWB requirements, the device contains a filter between the RF signal generating circuitry and the antenna attached to the device. TDC takes the position in its application that because the filter establishes a 10 dB bandwidth (3420-6950 MHz) that is entirely contained between 3.1 and 10.6 GHz, in accordance with Section 15.517(b) of the Commission's Rules, any other emissions are purely unintentional, and thus subject to less restrictive constraints than

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[6] *Id*. at ¶ 21.

[7] *Id*. at ¶ 234.

[8] *Id*. at ¶ 234.

required by the *First Report and Order*. We strongly disagree with this position because such out of band emissions will cause harmful interference.[9]

Many transmitters employ some form of band pass filter at their output to lessen or eliminate harmonics and other spurious emissions. These emissions are not intended to be radiated from the transmitter's antenna, yet they are clearly not unintentional, merely unwanted, but still intentional. The Commission typically has applied the transmitter's emission limits to these emissions.

III. ARGUMENT

A. The Grant of Equipment Authorization Undermines The Emission Limits In The *First Report and Order*

The grant of TDC's equipment authorization warrants review and reversal by the Commission because it involves an erroneous finding as to an important or material question of fact,[10] as well as a question of law which has not previously been resolved by the Commission.[11] This decision has potentially significant precedential value for future equipment authorizations.

The following Figure illustrates (i) the out of band emission limits for indoor systems adopted in the *First Report and Order*, and (ii) the power levels which UWB devices could radiate out of band as a result of this grant of authorization. As shown in the Figure, the UWB devices in question are allowed to radiate in the shaded area at tremendously higher-power out of band levels than established by the Commission in the *First Report and Order*.

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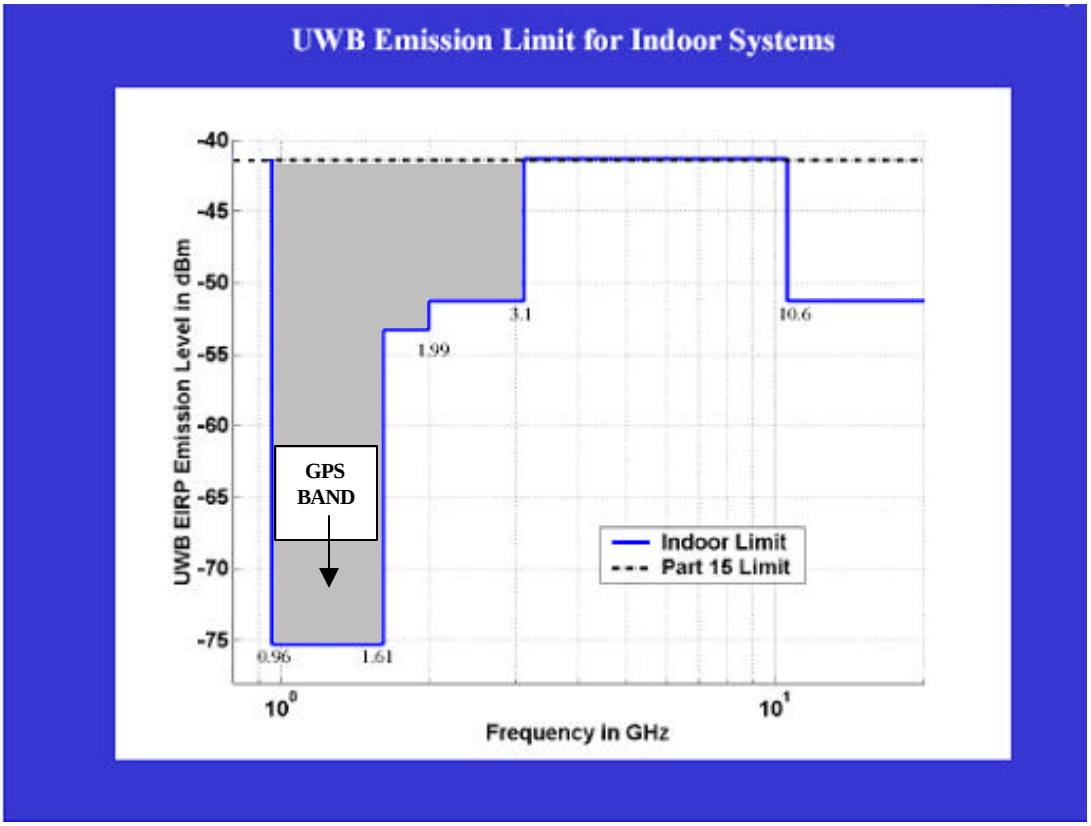
[9] In fact, in the Spring of 2002, NASA conducted tests on airplanes of UWB devices operating at the Part 15, Section 209 limits. The results were that these UWB devices knocked out essential aviation safety systems (the instrument landing system and the collision avoidance system) when the UWB devices were powered up. NASA FACT SHEET, "Aviation Safety at Issue, NASA tests for electro-magnetic interference in aircraft."

[10] 47 C.F.R. § 1.115(b)(2)(iv).

[11] 47 C.F.R. § 1.115(b)(2)(ii).



The Commission clearly intended in its *First Report and Order* to establish out of band emission limits in specified frequency bands in order to protect authorized and licensed services in those bands, for example, but not limited to, GPS, PCS and SDARS, from UWB interference. The Commission adopted the UWB Rules to ensure that out of band UWB emissions remain below the limits specified, whether such out of band emissions are "intentional" or "unintentional," to prevent harmful interference to licensed or authorized services. Any other result would undermine the emission limits adopted by the Commission.

B. Defects in the Certification

1. The Commission Should Require Testing of All Emitted Noise Between 0.960 GHz and 3.1 GHz

The Commission should require testing for all emitted noise between 0.960 GHz and 3.1 GHz in accordance with its Rules, Sections 15.517 and 15.521 regarding UWB devices. TDC has not submitted data on either the filter characteristics below the pass band limit or the measured level of radiated emissions present, and it is therefore impossible to determine the amount of unwanted intended emissions that are residual in frequencies below 3.1 GHz without explicit measurement as required by Sections 15.517(c) and 15.517(d) of the Commission's Rules. The FCC should require applicants to demonstrate that unintended emissions below 3.1 GHz are indeed incidental emissions from the microprocessor and are completely uncorrelated with the intended transmit signal. The residual allowable noise under the unintended emissions provision should only be that which exists when all circuitry and software associated with the UWB transmitter have been removed.

If an applicant intends to invoke the unintentional emission exemption, a device should have all components and software associated with the UWB function removed or disabled, and the device then tested. There is no evidence that this was done. Absent such test, the Commission should not exempt emissions from UWB devices under Rule Section 15.521(c). The burden of proof for unintentional emissions should be on TDC, the manufacturer requesting the authorization.

2. The Well-Intended Exclusion for Digital Circuitry Is Misapplied By TDC

Section 15.521(c) distinguishes "digital circuitry that is used to enable the operation of a transmitter" from digital circuits that generate emissions "not intended to be

radiated from the transmitter's antenna."[12] The Commission intended that the two types of digital circuitry be treated differently. The underlying reasons for this different treatment are quite simple and very sensible: digital circuitry that is capable of being used for the communications function of the device are subject to the more stringent limits the Commission adopted in its *First Report and Orde*r. On the other hand, digital circuitry used for the internal operation of the device, such as digital clocks, or other "housekeeping" functions, are permitted to operate at the higher Section 15.209 limits; the Commission reasonably did not want to subject digital devices in UWB transmitters to be unduly burdened with standards stricter than would be applied to those same digital devices in non-UWB transmitters.

TDC asserts that any emissions falling outside a filter are unintentional if they are created by some form of digital device or chip, and thereby subject only to the Section 15.209 limits. Grant of authorization on this basis allows TDC to evade the limits adopted in the *First Report and Order* merely by placing a filter in one portion of the usable bandwidth generated by a device. The net effect of TDC's argument would be to allow UWB transmission at the -41 dBm level which has been shown by numerous tests to cause interference. There would be severe consequences in erroneously constructing an equivalency between UWB emissions and digital circuitry emissions from microprocessors. It strains credulity to say that a digital circuit in a UWB device, whose primary purpose in fact is to generate an RF signal, should somehow be regarded as an "unintentional" radiator, thereby evading the stricter emission limits in the *First Report and Order.*

[12] 47 C.F.R. § 15.521(c).

C. Harm to Petitioners And The Public Interest

The grant of equipment authorization of TDC's UWB device permits the device to radiate out of band emissions into authorized and licensed bands between 0.960 GHz and 3.1 GHz including restricted bands, such as GPS bands, at levels higher than the Commission specified for UWB devices to avoid harmful interference. The consequences of FCC acceptance of this new interpretation, despite long-standing FCC policy to the contrary, would have far-reaching consequences and set a precedent that subverts the spirit and intent of the *First Report and Order* on UWB. The practical effect of the grant of equipment authorization is that TDC may now manufacture and market these devices. TDC could potentially flood the market with devices, which the Commission intended to subject to a stricter limit than other transmitters due to lack of operational experience with actual devices and their cumulative effect.

Petitioners urge the Commission to uphold the integrity of its UWB out of band emission limits and its *First Report and Order* by granting this Application for Review and by reversing the grant of TDC's equipment authorization.

D. Application for review is filed in a timely manner

This Application for Review presents the first opportunity for Petitioners to challenge TDC's application for equipment authorization. Petitioners could not previously participate in the proceeding because the Commission's Part 15 Rules do not permit petitions to deny equipment authorization applications. There is no public notice of the filing of these applications, and the information in the application and related materials are not routinely available for public inspection prior to the effective date of the authorization.[13] The only prescribed procedure for challenging an erroneous grant of an equipment authorization before the

[13] 47 C.F.R. § 0.457(d)(ii).

full Commission is by filing an application for review.[14] Under Commission's Rule Section 1.115, applicants seeking review must file within 30 days of the date of grant. Therefore, Petitioners have filed this Application in a timely manner and in accordance with all the relevant procedural rules.

IV. CONCLUSION

For the foregoing reasons, the undersigned parties strongly urge the Commission to reverse the grant of equipment authorization to TDC's UWB transmitter. The Commission must take this action in order to prevent the establishment of a precedent that will nullify the emission limits established in the *First Report and Order* and that will facilitate interference from UWB devices into licensed services and that will have real potential to do harm.

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[14] *See* 47 C.F.R. § 2.923.

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October 18, 2002

CERTIFICATE OF SERVICE

I hereby certify that I have this 18th day of October, 2002, caused a true copy of the foregoing "Application for Review" to be deposited in the United States Mail, first-class, postage-paid, addressed to the following:

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