

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

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<i>In the Matter of</i>	)	
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Revision of Part 15 of the FCC's Rules Regarding	)	ET Docket No. 98-153
Ultra-Wideband Transmission Systems	)	
	)	

**COMMENTS OF 3COM CORPORATION  
CONCERNING NTIA'S COMPATIBILITY REPORT**

3Com is a leading developer and manufacturer of wireless LANs and networking devices using a variety of innovative technologies – including both Bluetooth and direct sequence spread spectrum technology. It makes equipment providing high-speed wireless connections among notebook and desktop PCs, handheld computers, mobile phones, LAN Access Points, and a host of other devices.

3Com believes that Ultrawide Band (UWB) technology has the potential to revolutionize this segment of the communications industry, and to push high-speed wireless networking to an entirely new level. And it has the potential to do it while making the interference environment *less* challenging. The potential public benefits from such a development are enormous.

Thus 3Com eagerly looked forward to NTIA's study of compatibility between UWB devices and selected government radiofrequency systems.<sup>1</sup> Unfortunately, the

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<sup>1</sup> See Public Notice, DA 01-171 (Off. Eng. & Tech. rel. Jan. 24, 2001) (“*Public Notice*”); *Assessment of Compatibility Between Ultrawideband Devices and Selected Federal Systems*, NTIA Special Pub. No. 01-43 (rel. Jan. 2001) (“*NTIA Report*”);

NTIA study is an enormous disappointment to anyone who sought sound analysis and wise counsel.

Bluntly put, NTIA used an interference test methodology that was largely irrelevant to the question that needed to be answered. NTIA should have provided guidance about whether and under what operating parameters UWB devices will cause *harmful interference* to certain federal systems. NTIA instead appears to have simply taken certain test geometries and measured whether noise from UWB devices could be detected *at all* at the intermediate frequency (IF) stage output of the receivers in question. After finding that UWB devices raised noise levels under these circumstances, NTIA concluded that UWB operations will be “quite challenging.”<sup>2</sup>

Under NTIA’s analysis, however, the operation of all electronic devices – computers, Palm Pilots, baby monitors – would be “quite challenging.” Indeed, the NTIA analysis, if universally applied to limit unlicensed devices, would literally shut down our electronic society. For the Commission to use such an analysis in its consideration of UWB would, in 3Com’s view, constitute a grave disservice to the public.

## **I. THE POTENTIAL OF UWB TECHNOLOGY**

It is now widely understood that UWB devices have the potential to provide a host of benefits to the public. Because UWB involves the use of extremely narrow pulse modulation over a wide bandwidth, it can potentially provide emission bandwidths of up

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Continued . . .

*Revision of Part 15 of the Commission’s Rules Regarding Ultra-Wideband Transmission Systems, Notice of Proposed Rule Making, 15 FCC Rcd, 12086 (2000) (“NPRM”).*

<sup>2</sup> *NTIA Report* at x.

to 10 gigahertz without multi-path interference. The Commission has said UWB “can be used . . . for short-range high-speed data transmissions suitable for broadband access to the Internet.”<sup>3</sup> Others have been more expansive:

- “The potential impact is astounding. If the technology lives up to its promise, it would be like the leap from vacuum tubes to the transistor or from oil lamps to light bulbs, touching every home and workplace. Wireless communicators could get down to the size of a quarter.”<sup>4</sup>
- “UWB . . . seems to be a breakthrough in wireless. . . . UWB is to today’s cell phones and radar what the microprocessor was to yesterday’s mainframes. It could launch another revolution.”<sup>5</sup>
- “According to Paul Turner, a Silicon Valley veteran and currently chief technology officer with AMS Consulting, ‘[UWB represents] technology with the potential to achieve what no other technology on earth can do. . . .’ An innovative technology such as [UWB] will make possible a variety of useful applications, not least telecommunication devices beyond the forthcoming third-generation technology, he says.”<sup>6</sup>
- “[UWB] could open up capacity for radio communication. Today, there’s a wireless traffic jam . . . . But it’s unlikely [UWB] pulses would interfere with each other or with conventional radio waves, so the pulses would open up vast new radio real estate.”<sup>7</sup>
- “[UWB] technology could be perfect for the blossoming industry of home computer networking. The single biggest obstacle to home networking is the wiring: Who wants to string another set of wires to every computer, printer, TV, and other device around the house?”<sup>8</sup>

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<sup>3</sup> *NPRM*, 15 FCC Rcd. at 12087.

<sup>4</sup> Kevin Maney, “Pulsing With Promise: New Digital Technology Likely to Revolutionize How We Live,” *USA Today*, Apr. 9-11, 1999 at 1B.

<sup>5</sup> Kevin Maney, “Ultra-Wideband Technology Gets Stuck in Fed’s Red Tape,” *USA Today*, Oct. 6, 1999 at 3B.

<sup>6</sup> Paula di Maio, “Escape from the Bandwidth Cul-de-sac,” *Financial Times*, Sept. 20, 2000.

<sup>7</sup> Maney, “Pulsing With Promise,” *supra*.

<sup>8</sup> *Id.* at 2B.

Given the sheer potential of UWB technology, 3Com thinks it imperative that the Commission do all in its power to properly assess UWB compatibility with other services, thus enabling the rapid rollout of these devices to the greatest extent possible.

## II. NTIA'S REPORT IS LARGELY IRRELEVANT

Before authorizing UWB devices, the Commission must, of course, ensure that such devices not cause harmful interference to other radio services. It would have been entirely appropriate, and entirely consistent with past government policy with respect to new technologies, for NTIA to study the potential for such harmful interference.<sup>9</sup>

NTIA, however, pointedly did not do this. It instead “undertook a comprehensive program consisting of measurements, analytical analysis, and simulations to characterize UWB transmissions and their potential to *interact* with federal telecommunications systems.”<sup>10</sup> It then, without regard to whether potential “interaction” would actually harm those systems, concluded that “[o]perations of UWB devices below 3.1 GHz will be quite challenging” simply because such devices increase the noise floor of government receivers under NTIA’s test geometries.<sup>11</sup>

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<sup>9</sup> See, e.g., *Amendment of Parts 2 and 5 of the Commission’s Rules Regarding Spread Spectrum Transmitters*, 12 FCC Rcd. 7488, 7494 (1997) (eliminating transmitter output power penalty for Part 15 spread spectrum systems operating with high gain directional antennas in certain bands because “[d]irectional antennas can significantly reduce the potential for *harmful interference* to other radio operators in [certain circumstances]”) (emphasis added).

<sup>10</sup> *NTIA Report* at 1-3 (emphasis added). NTIA also claimed to “identify under what conditions UWB devices can operate without causing *unacceptable* interference to authorized and licensed radio services.” *Id.* at v (emphasis added). Nowhere did NTIA define what “unacceptable” means. It appears to mean nothing more than “interaction” – in which case it means nothing at all.

<sup>11</sup> *NTIA Report* at x.

*Interaction* and *harmful interference* are, of course, two quite different concepts.<sup>12</sup> And, while the NTIA Report purports to show that UWB devices might interact with federal systems, it does not quantify this interaction in a way that would allow the Commission to determine whether the systems tested would suffer serious performance degradation. In other words, NTIA made no attempt to determine what constitutes harmful interference, which therefore makes it impossible to understand the consequences of any predicted interaction. By failing to specify the maximum amount of interference receivers can tolerate before performance is degraded, NTIA rendered its Report largely irrelevant to this proceeding.

Nor did the Report take into account the technical characteristics of the receiving systems – a critical component of any harmful interference analysis. For example, NTIA did not specify whether radar systems employ any means of rejecting unwanted signals. (If radar systems can compensate for noise from UWB devices, such noise cannot be considered *harmful* interference.) Radars can be equipped with software that averages away stationary objects. In addition, receivers can be equipped with digital signal processing that would likely improve the signal-to-noise ratio. In the NTIA Report, measurements are made only at the IF stage output.

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<sup>12</sup> The Commission's rules define "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. . . ." 47 C.F.R. § 2.1. NTIA's own definition closely tracks the Commission definition. See NTIA Manual § 6.1.1. Indeed, NTIA's website further defines harmful interference as "caus[ing] 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." See [http://www.its.bldrdoc.gov/fs-1037/dir-017/\\_2541.htm](http://www.its.bldrdoc.gov/fs-1037/dir-017/_2541.htm). (This glossary is set to be approved in March 2001 by the American National Standards Institute.)

Indeed, even with respect to its prediction of UWB/radar *interaction*, NTIA's Report appears to contain a number of assumptions that do not reflect likely practical UWB implementations, among them:

- It did not evaluate the impact of the noise signal on the probability of a false alarm.
- It ignored significant sources of noise that can be found within any radar systems, noises that would not be present in the "static testing" conducted by NTIA.
- It assumed that the beam of radar antennas are always stationary (and aimed directly at UWB devices), when in fact such antennas are scanning and integrating signals over the curve of the beam.
- It failed to account for the fact that nearly all proposed applications of UWB devices are for indoor usage, thereby ignoring approximately 9dB of building attenuation.
- It assumed omnidirectional UWB radiation, whereas many applications will be directional.
- It used a "main beam-to-main beam" interference scenario that, given the nature of radar systems, would rarely occur.
- It assumed that, to determine the aggregate interference from UWB devices, their signals add linearly.
- It used an extremely conservative free space propagation model, while admitting that more realistic propagation models exist.

In other words, even the Report's discussion of potential interaction between UWB and federal systems is unrealistic and, therefore, incomplete.

The Commission normally bases its decisions on whether new devices can be shown to not cause harmful interference.<sup>13</sup> But NTIA seems to suggest that the

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<sup>13</sup> See, e.g., 47 C.F.R. § 15.5(b) ("Operation of an intentional, unintentional, or incidental radiator is subject to the condition that no *harmful interference* is caused . . . .") (emphasis added).

Commission should not allow unlicensed operation of UWB devices simply because its test methodology predicts that they might interact with certain federal systems.

This would be an astounding change in Commission policy. *Every* electric device causes RF noise. Computers, Palm Pilots, baby monitors, cordless phones, keyless car door locks, and garage door openers all might be predicted to interact with radar systems under NTIA's test methodology. Were this methodology a prerequisite for the authorization of new devices, our electronic society would literally grind to a halt. NTIA's Report – at least without the addition of more realistic testing of harmful interference – cannot form the basis for sound public policy.

## **CONCLUSION**

The NTIA report has provided no useful guidance to the Commission on whether or how to authorize UWB devices. Surely it provides no useful evidence that UWB systems are likely to cause harmful interference to government RF systems.

The Commission, therefore, must rely on the other evidence in the record of this proceeding. That evidence overwhelmingly demonstrates that UWB technology will provide rather astonishing benefits to the public safety community, the business community, and to consumers. 3Com is confident that UWB will have a profound impact on the development of high-speed wireless networking, which in turn will have an important impact on productivity in businesses, on campuses, and in homes across this country. Moreover, because of its low power output, UWB technology is likely to reduce – not increase – interference problems. Thus the Commission should promptly move forward with authorizing the use of UWB technology.

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