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OFFICE OF THE SECRETARY

September 17, 2001

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Department of Commerce
The Herbert Hoover Building
14th Street & Constitution Avenue, NW
Washington, DC 20230

The Honorable Donald H. Rumsfeld
Secretary of Defense
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The Pentagon
Washington, DC 20301

The Honorable Norman Y. Mineta
Secretary of Transportation
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The Honorable Daniel S. Goldin
Administrator
National Aeronautics and Space Administration
Two Independence Square
300 E Street, SW
Washington, DC 20546

Re: Pending FCC Rulemaking (ET Docket No. 98-153) on Ultra-Wideband Transmission Systems

Dear Secretary Evans, Secretary Rumsfeld, Secretary Mineta, and Administrator Goldin:

XtremeSpectrum, Inc. is writing in response to the letter Sprint PCS sent to you on September 10, 2001 (September 10 Letter) concerning ultra-wideband (UWB) technology.[1] XtremeSpectrum conducts research on UWB communications systems, and expects to become a manufacturer upon FCC approval. XtremeSpectrum takes no position on UWB radar systems.

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[1] Sprint PCS served copies of its letter on the FCC Commissioners without also filing one in the docket, as required under FCC *ex parte* rules. By copy of this letter, we ask Sprint PCS to correct that omission.

Sprint PCS claims UWB devices will interfere with PCS wireless phones.[2] XtremeSpectrum respectfully but emphatically disagrees. We are writing to explain that Sprint PCS has mischaracterized key facts, and to set the record straight.

1. **UWB OPERATES OVER AN EXTREMELY SHORT DISTANCE.** As a background matter, UWB communications technology operates at extremely low power over an extremely short range. XtremeSpectrum's products will have a useful reach of only 10 meters (33 feet).

2. **UWB WILL NOT INTERFERE WITH PCS PHONES.** Interference questions are resolved by engineering studies, not lawyers' rhetoric. XtremeSpectrum has given the FCC two technical analyses that show UWB will not interfere with PCS.[3] Sprint PCS has not attempted to challenge those submissions. To the contrary, a recent Sprint PCS filing with the FCC concedes several of XtremeSpectrum's main points, and ignores the rest, while continuing to assert interference without any new support.[4]

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[2] September 10 Letter at 1-2.

[3] *Reply Comments of XtremeSpectrum, Inc. on Issues of Interference Into GPS and PCS*, ET Docket No. 98-153 (filed May 10, 2001); *Comments of XtremeSpectrum, Inc. on UWB/PCS Interference*, ET Docket No. 98-153 (filed April 25, 2001). Those studies pointed out errors in earlier filings that purported to show such interference. *Report of Qualcomm Incorporated*, ET Docket No. 98-153 (filed March 5, 2001); Letter from Charles W. McKee, Sprint PCS, to Magalie Roman Salas, Secretary, FCC, ET Docket No. 98-153 (dated Sept. 12, 2000).

[4] Technical note: Sprint PCS concedes that its "model and tests were never designed to exhaustively study the CDMA/UWB interference issue," that its model did not take into account multipath fading, that its tests outside an anechoic chamber "certainly were not exhaustive," and that the tests "admittedly . . . did not evaluate the strength of the UWB signal in a cluttered environment." Letter from Luisa L. Lancetti, Counsel for Sprint PCS, to Julius Knapp *et al.*, FCC, ET Docket No. 98-153 at 2 (filed Sept. 10, 2001). Sprint PCS also ignores XtremeSpectrum's objections that its model set the interference threshold *6 dB below the thermal noise floor*. This is tantamount to assuming a complete absence of all other radio-frequency sources -- not only personal computers and other digital devices, but even other base stations operated by the same PCS provider! The one test that Sprint PCS reported outside the artificial environment of an anechoic chamber showed an *absence* of interference, even with the UWB emitter less

XtremeSpectrum generates its signal in exactly the same way that radio noise arises in conventional digital devices such as laptops, Palm organizers, CD players, etc. That gives XtremeSpectrum's signal the same interference characteristics as that noise -- with one important difference: at PCS frequencies, the FCC proposes to hold UWB emissions to levels *94 percent lower* than consumer digital devices.[5] If PCS calls are safe from ubiquitous consumer digital products, as they certainly seem to be, they will be just as safe from UWB devices.

Finally, XtremeSpectrum and the companies investing in it, including Motorola, Cisco Systems, and Texas Instruments, understand full well that they will be unable to sell a product that interferes with a popular and important service such as PCS. FCC rules aside, the market will demand full interference protection.

3. UWB DEVICES HAVE NO CUMULATIVE EFFECT. Sprint PCS and other UWB opponents routinely raise the specter that multiple UWB devices will "pile on" interference.[6] While these claims sound threatening, they have no engineering basis. The signal from a UWB transmitter drops off very quickly at short distances. Even assuming very dense deployment, the signals diminish much faster than they can add up. Surprisingly, perhaps, the combined signals from thousands of UWB transmitters, even in the same building, can be only slightly higher than the signal from the nearest UWB transmitter alone.

An analogy may help to explain this fact. Consider a large hotel, with thousands of rooms, and a TV playing in every room. A person in the hotel will hear the TV in his or her own room, of course, and may hear faint sounds from the TVs in immediately adjacent rooms, but will hear no others. And a person outside the hotel hears nothing from within. In just the same way, a PCS handset is potentially affected

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than half a meter from the PCS handset. *XtremeSpectrum, Inc., Technical Reply to Comments on Potential GPS and PCS Interference from UWB Transmitters* at 6, filed with *Reply Comments of XtremeSpectrum, Inc. on Issues of Interference Into GPS and PCS*, ET Docket No. 98-153 (filed May 10, 2001).

[5] A UWB device will be permitted to radiate only about *half a millionth of a watt* across all PCS frequencies. The impact on a single communications channel will be much less.

[6] *See, e.g.*, September 10 Letter at 2.

only by the nearest UWB emitters, and we have shown those do not cause interference. More distant UWB devices have no effect at all.

4. XTREMESPECTRUM DOES NOT RELY ON INDOOR-ONLY OPERATION TO AVOID PCS INTERFERENCE. XtremeSpectrum does not, as Sprint PCS says, propose to solve PCS interference issues by limiting UWB to indoor operation.[7] Although we asked the FCC for an indoor limitation, that is to help protect services that operate only outdoors, not PCS. Our technical analyses showing lack of interference into PCS begin with the assumption that the PCS handset and the UWB emitter are both indoors.[8]

5. XTREMESPECTRUM DOES NOT REQUIRE CHANGES IN THE PCS NETWORKS. Sprint PCS claims that XtremeSpectrum expects the PCS industry to expend "hundreds of millions of dollars" to overcome UWB interference.[9] This is simply wrong. We do not expect the PCS industry to spend anything on our account. We acknowledge that we must avoid interfering with the PCS network as we find it, and have met that responsibility.

6. UWB WILL NOT COMPETE WITH PCS. Sprint PCS complains that UWB providers want to use PCS spectrum to provide services "in competition with Sprint PCS and other PCS carriers."[10] We do not understand what Sprint PCS means by this. PCS is a voice grade phone service whose range extends from city blocks to miles. UWB is a high-rate data product with a maximum range into the next room. UWB would compete in the PCS market about as well as grocery-store carts compete with long-haul trucks. Consumers will not use UWB for phone calls, but for short-range, high-capacity tasks such as downloading digital cameras, synchronizing Palm organizers, and distributing TV signals in the home.

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[7] *See* September 10 Letter at 2-3.

[8] *See Comments of XtremeSpectrum, Inc. on UWB/PCS Interference Issues*, ET Docket No. 98-153 at 2-3 (filed April 25, 2001) and attached *XtremeSpectrum, Inc,. Technical Statement on Reports Addressing Potential PCS Interference from UWB Transmitters. See also Reply Comments of XtremeSpectrum, Inc. on Issues of Interference Into GPS and PCS*, ET Docket No. 98-153 (filed May 10, 2001).

[9] September 10 Letter at 3.

[10] September 10 Letter at 3.

None of these applications can use PCS. Indeed, we cannot think of a single application for which UWB and PCS might compete in the same market.

7. **UWB WILL BRING NEEDED PRODUCTS TO THE CONSUMER, AND WILL ADD VALUE TO THE U.S. ECONOMY.** Different wireless technologies offer various combinations of data rate, cost, battery consumption, and range. UWB sacrifices range in order to deliver high data rate, low cost, and low battery drain. This makes it ideal for such tasks as same-room wireless interconnection of images, data, or music among digital cameras, MP3 players, Palm-type devices, and personal computers. UWB is equally well suited to streaming audio and video among satellite-video and cable set-top boxes, VCRs and DVD players, TVs, and stereos in wirelessly networked homes. The technology will contribute to the projected $300 billion market for handheld devices by 2005. Although U.S. companies are developing UWB technology, start-ups in other countries have already received funding.

8. **THE UWB INDUSTRY NEEDS PROMPT FCC ACTION.** The UWB manufacturers in the United States are entrepreneurial start-ups in a notoriously tight funding market. They cannot survive extended regulatory delay. One UWB company has already folded, unable to wait out the delays associated with the regulatory process.[11]

After three years, having compiled a record of more than 700 submissions, the FCC has all the information it needs to make a sound decision. It is uniquely qualified to do so, both technically and legally. Congress not only gave the FCC the task of managing the Nation's radio spectrum, but also instructed it to encourage new technologies, such as UWB, and to apply a presumption in their favor.[12] The FCC is well able to determine what technical rules are needed to implement these policies while still

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[11] Neil Orman, *Fantasma runs out of time -- Firm drains funds awaiting OK for wideband standard*, Silicon Valley /San Jose Business Journal (April 27, 2001), http://sanjose.bcentral.com/sanjose/stories/2001/04/30/story7.html

[12]

> It shall be the policy of the United States to encourage the provision of new technologies and services to the public. Any person or party (other than the Commission) who opposes a new technology or service proposed to be permitted under this Act shall have the burden to demonstrate that such proposal is inconsistent with the public interest.

47 U.S.C. Sec. 157(a).

protecting PCS and other services. If, at the end of the day, Sprint PCS believes the FCC's rules do not adequately protect other users, it can seek judicial review.

XtremeSpectrum asks only that the FCC be allowed to do its job.

Respectfully submitted,

Mitchell Lazarus
Counsel for XtremeSprectum, Inc.

ML:deb

cc: Chairman Michael K. Powell
Commissioner Kathleen Q. Abernathy
Commissioner Michael J. Copps
Commissioner Kevin J. Martin
Ms. Magalie Roman Salas, Secretary, FCC (two copies)
Bruce Franca, FCC
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