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January 28, 2003

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street SW
Washington DC 20554

Re: ET Docket No. 98-153, Ultra-Wideband Transmission Systems
Ex parte Communication

On behalf of XtremeSpectrum, Inc. and pursuant to Section 1.1206(b)(2) of the Commission's Rules, I am electronically filing this notice of an oral *ex parte* communication.

This morning, Roni Haggart and John McCorkle of XtremeSpectrum and I met with Ron Chase, Julius P. Knapp, Ahmed Lahjouji, John A. Reed, Bruce A. Romano, Alan J. Scrime, and Ed Thomas of the Office of Engineering and Technology. We urged the Commission to maintain, without change, the rules set out in the First Report and Order that govern ultra-wideband communications systems.

A copy of our presentation outline is attached.

If there are any questions about this filing, please call me at the number above.

Respectfully submitted,

Mitchell Lazarus
Counsel for XtremeSpectrum, Inc.

cc: Meeting Participants

XtremeSpectrum, Inc.

Responds to
Petitions for Reconsideration in
ET Docket No. 98−153
(Ultra−Wideband Transmission)

TOPICS:

- LEGAL STANDARDS (burden of proof; deference to Commission)
- PCS LEGAL ISSUES (adequacy of analysis; exclusive license)
- TECHNICAL ISSUES (PCS; DARS; GPS; Fixed Satellite; Aviation; "Aggregation"; PRF & Modulation; Definitional)
- CONCLUSION

For details, see *Opposition to Petitions for Reconsideration* of XtremeSpectrum, Inc. (filed July 31, 2002).

LEGAL STANDARDS

Opponents' Claim: UWB has failed to meet its burden of proving it will not cause interference.

XtremeSpectrum's Response: (1) Congress imposed the burden of proof on UWB opponents:

> "Any person or party (other than the Commission) who opposes a new technology or service proposed to be permitted under this chapter shall have the burden to demonstrate that such proposal is inconsistent with the public interest." 47 U.S.C. 157(a).

(2) Taken as a whole, the record shows that UWB under the First R&O will not cause interference to other services.

Opponents' Claim: The Commission misinterpreted the record in setting rules for UWB.

XtremeSpectrum's Response: The case law consistently gives the Commission's decisions great deference, especially on technical decisions, and all the more so in connection with new technologies.

(For case citations, see our *Opposition* at pages 7−10.)

PCS LEGAL ISSUES

Opponents' Claim: The Commission did not provide an adequate analysis of interference to PCS.

XtremeSpectrum's Response: The Commission more than satisfied the standards set out in the case law.

(For case citations, see our *Opposition* at pages 10−13.)

Opponents' Claim: The higher limit for indoor UWB is irrational because PCS needs more protection indoors, not less.

XtremeSpectrum's Response: The indoor limit adequately protects PCS under all conditions. The lower outdoor (handheld) limit protects certain Government systems, and has nothing to do with PCS.

Opponents' Claim: A PCS licensee has exclusive rights to its spectrum that bar UWB operation.

XtremeSpectrum's Response: (1) The uncontroverted case law holds that even an "exclusive" license does not bar non−interfering use by other parties. AT&T Wireless Services, Inc. v. FCC, 270 F.3d 959, 962 (D.C. Cir. 2001).

(2) A UWB device is allowed only out-of-band emissions at PCS frequencies, and at much lower levels than out-of-band emissions from other devices.

(3) The PCS carriers bid on their spectrum knowing it was subject to *intentional* in-band Part 15 operation at much higher levels than UWB.

TECHNICAL ISSUES

Opponents' Claim: **PCS**: UWB limits are higher than PCS industry standards allow, and will interfere with PCS handsets.

XtremeSpectrum's Response: The PCS industry standards are derived under ideal laboratory conditions. The Commission analyzed interference in a real−world environment, and showed no interference will occur in practice.

Opponents' Claim: **DARS**: UWB limits are too high in the DARS band, and will interfere with DARS receivers.

XtremeSpectrum's Response:

(1) The numbers used by DARS proponents would make sense only if the receiver were in orbit, or if it used a pencil−beam antenna (rather than the nondirectional antennas actually installed).

(2) The DARS industry overlooks much higher permitted emissions from the neighboring 2400 MHz ISM band.

(3) According to the DARS data, reception indoors (where the claimed risk of interference is greatest) will generally require either a terrestrial repeater or an outdoor antenna, either of which eliminates the claimed threat of interference from UWB.

Opponents' Claim: **GPS**: UWB limits are too high in the GPS band.

XtremeSpectrum's Response: The GPS−band limit for UWB is the lowest value requested by the U.S. GPS Industry Council, the lowest limit for any device anywhere in the Commission's Rules, and the lowest level susceptible to laboratory measurement for compliance testing.

Opponents' Claim: **FIXED SATELLITE**: The UWB limits are too high to protect Fixed Satellite System receive dishes at 3.7−4.2 GHz

XtremeSpectrum's Response: The Fixed Satellite industry improperly accounted for building attenuation, minimum satellite antenna elevation, and building blockage, and offered no technical grounds for questioning the Commission's calculations.

Opponents' Claim: **AVIATION**: UWB communications devices should be limited to frequencies above 5.5 GHz, and emissions between 2.31 and 5.25 GHz should be severely curtailed, to protect various aviation systems.

XtremeSpectrum's Response: All of the systems of concern were either thoroughly analyzed in the proceeding, and shown to be safe from UWB, or else lie below 3.1 GHz, and already have the protection requested. The aviation interests do not present any technical basis for reconsideration.

Opponents' Claim: **"AGGREGATION"**: Some petitioners insist that the Commission reduce emissions levels to account for cumulative UWB interference.

XtremeSpectrum's Response: (1) Aggregation continues to be the urban myth of this proceeding. Although UWB emissions do add, they do not aggregate harmfully:

(2) Only the nearest UWB emitter matters, because signals fall off quickly with distance. *Ten UWB devices at 10 meters distance produce less than 1% of the emissions from one emitter at 3 meters.* (This realistically assumes propagation losses at $1/R^2$ for the emitter 3 meters away, and $1/R^4$ for the emitters 10 meters away.)

(3) Nearby UWB devices share a common radio channel, and so cannot transmit at the same time. Even a dense deployment of devices cannot yield a dense deployment of *operating* devices.

Opponents' Claim: **PRF AND MODULATION**: MSSI (1) says UWB systems with a high pulse repetition frequency (PRF) are more interfering than those with a low PRF; and (2) criticizes high−PRF bi−phase modulated systems (such as XtremeSpectrum's) as inadequately tested for interference effects.

XtremeSpectrum's Response: MSSI is wrong. The output of a properly−designed, high−PRF, bi−phase modulated system is indistinguishable from low−level wideband noise, and is benign into a wide range of receiver architectures. Other modulations are far more likely to produce both interference−causing spectral features and a high peak−to−average ratio.

(1) Systems using a high PRF are advantageous and preferred. Harm to a victim receiver is almost always proportional to the peak signal in the resolution bandwidth (RBW) of the victim receiver. For high PRF systems peaks in the victim are minimized because essentially all victim receivers fall in the RBW<PRF category where both peak and average are low—changing as 10*log(RBW)—just like noise. On the contrary, low PRF systems result in a higher likelihood of causing harmful interference because the peak amplitude in a victim receiver is larger—changing as 20*log(RBW) when PRF<RBW.

(2) Other UWB systems themselves may also be considered victim receivers and should not be subject to unnecessary harm. High PRF systems present the least chance of harmful interference to other UWB systems because the peaks in the ultra-wide victim receiver bandwidth are minimized by the high PRF.

Opponents' Claim: **DEFINITIONAL**: Multispectral Solutions, Inc. (MSSI) asks the Commission to amend the UWB definition so as to exclude devices that achieve wide instantaneous bandwidths because of high data rates

XtremeSpectrum's Response: MSSI's request has no reasoned support in the record of this proceeding, in academic and industry research results, or even in MSSI's own Petition for Reconsideration. *The UWB definition should be left unchanged.*

CONCLUSION

- The rules in the First R&O achieve a safe, workable balance.
- The present rules fully protect all other spectrum users while enabling a commercially feasible UWB industry in the public interest.
- XtremeSpectrum has already announced and demonstrated working prototype chipsets that meet current FCC requirements.
- The above petitions for reconsideration should be denied; no further notice is needed at this time. This nascent industry needs marketplace stability and certainty.
- Internationally, the Commission needs to send signal that its rules are established.