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August 28, 2001

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

VIA MESSENGER

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
The Portals
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: Response to Time Domain Corporation *ex parte* Notification and Summary dated June 28, 2001 and Ex Parte Notification dated August 3, 2001.
ET Docket 98-153

Dear Ms. Salas:

The undersigned wish to respond to letters, one dated June 28, 2001 and filed July 2, 2001 and another letter filed August 3, 2001, submitted by Time Domain Corporation ("Time Domain") in the above-referenced proceeding. The July 2nd Time Domain letter proposes a completely inadequate level of in-band protection: 20 dB attenuation of "spectral features for GPS [Global Positioning System] receivers in the L_1 GPS band." The August 3rd letter regresses to an even more reduced measure of in-band protection of 12 dB below the Part 15 Class B levels.

Concerning the June 28th letter, the narrow scope of this proposal is based on the unsupported and misleading assertion that, although GPS receivers are more susceptible to CW-like (continuous wave-like) UWB emissions than to those that are white-noise-like, "there has

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been nothing submitted to the FCC record that shows a sensitivity of any other system to CW-like UWB emissions besides GPS."[1]

This distinction is beside the point. Each UWB waveform is unique and testing to date has been done on an extremely limited set of UWB waveforms. Nevertheless, the record is clear that *all* UWB signals, whether "CW-like" or not, share characteristics which cause harmful interference to a variety of authorized systems including GPS, cellular, PCS (Personal Communications System), and federal radar systems. UWB devices are likely to cause harmful interference to other systems which have not been tested, many of which (for example, Satellite Digital Audio Radio Service, radio astronomy, and amateur radio receivers) are even more sensitive than receivers already tested. Furthermore, regardless of distinctions between individual types of UWB signals, widespread deployment of such devices and resulting aggregate emissions will significantly interfere with or harm operations of existing or planned systems by raising the noise floor. In fact, aggregate testing of the interference effects of multiple UWB devices representing multiple unique waveforms (pulse-like; noise-like; and CW-like) operating simultaneously in the same environment has not been conducted. There has been no testing—indoor or outdoor—of GPS-enabled E911 mobile telephones.

Furthermore, Time Domain's statements are misleading because they imply that only one particular type of UWB signal causes interference, and that only GPS receivers (and, apparently, only GPS receivers in the L_1 band) are affected. The fact is that all GPS bands are affected by UWB emissions, although they may not be as sensitive to CW-like emissions as the C/A code receivers at L_1. The statements also imply that, aside from the single identified "quirk," UWB signals and their interference effects are uniform, which is not the case. In fact, the record makes clear that numerous other variables determine the interference effect of UWB signals, including Pulse Repetition Frequency (PRF), modulation, and gating techniques.

With its August 3rd letter, Time Domain, alone among UWB proponents, persists in regressing to the possible approach suggested in the NPRM that 12 dB protection in-band below current Part 15 limits would be sufficient to protect authorized systems. The range of test data clearly demonstrates that this suggested measure of protection is woefully inadequate. Other UWB proponents have responded to the emerging body of test data with increasingly conservative protection proposals for GPS and other services. (Another example of a major shift in Time Domain's position is its current insistence that UWB devices must operate below 6 GHz. By contrast, in 1995, Pulson Communications (now known as Time Domain) submitted comments advising the FCC to: "Adopt rules allowing only the use of UWB technologies with a center frequency of 5.5 GHz and bandwidths in excess of 4 GHz, such rules to be consistent with spectrum sharing. If only 2 GHz of bandwidth can be cleared then 2 GHz bandwidth-limited

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[1] Time Domain *ex parte* letter dated June 28, 2001, at 1.

UWB systems with a center frequency of 5.5 GHz should be allowed."[2]) Time Domain's denial of the growing body of interference evidence in this docket means that this process has not served the nation by advancing to a common technical understanding and solution. There is clearly an inadequate record to support the issuance of a Report and Order in this proceeding without first issuing a further NPRM.[3]

More generally, the Time Domain statements in both of those filings continue to ignore the following facts:

- Noise does not relay information. The UWB pulses generated in these noise tests were completely random. In commercial deployment, UWB emissions can never be totally random because their signal levels and spectral components must be sufficient to convey the desired information rate. The commercial utility of UWB communications networks is in transmitting information at high data rates.

- The Stanford tests were not the only ones conducted. NTIA test results showed the interference effects of non-white-noise UWB emissions, which, by the way, were verified with proper analysis of conductive test data collected by the Time Domain sponsored ARL:UT tests.

- Margins for safety-of-life and multiple emitters are continually ignored by Time Domain.

- Aviation is not the only safety-of-life service using GPS. E911 Emergency Calling Services mandated by the FCC also use GPS, and use GPS indoors where UWB is proposed for local area networks. GPS receivers used for these services are about 20 dB more sensitive to UWB emissions than those used for aviation.

- ITU and FCC emission levels (-70 dBW/MHz) specified for the GPS Band are already allocated to out-of-band emissions (OOBE) for (white noise-like interference based on a specific scenario for a single emitter) mobile-satellite (MSS) services. There is no margin in these levels for

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2 See Pulson Communications Ex Parte Comments on "Apple Computer's Petition for Rulemaking "NII Band" dated May 24, 1995", RE: Docket RM-8653: In the Matter of Allocation of Spectrum in the 5 GHz Band to establish a Wireless Component of the National Information Infrastructure", (July 10, 1995).

3 Time Domain submitted a further ex parte filing on August 16, 2001. The coalition will respond to the August 16 Time Domain letter in a separate filing.

UWB emitters, much less multiple UWB emitters.).[4] *Further, this specific OOBE limit was "not intended to be applied to any service other than MSS MESs operating in the 1-3 GHz range without further study".*[5]

The letters further underscore why the Commission should release a further NPRM in this proceeding. The particular problem raised by Time Domain is only one of many complex technical issues that must be addressed before UWB devices can be authorized. Each new test submitted to the record reveals new information about the interference risk of UWB signals, and each new report emphasizes both the complexity and variability of the effect of UWB signals on authorized systems. A piecemeal approach of individual concessions and narrow, stopgap measures will not allow UWB technology to come into use in an efficient and safe manner. To protect authorized systems, the Commission will have to develop detailed and comprehensive rules regarding UWB deployment and signal limitations. Once such a plan is laid out in proposed rules in a further NPRM, the comments of all interested parties will ensure an effective and complete regulatory scheme.

Sincerely,

Robert D. Briskman

Robert D. Briskman
On behalf of the parties listed above

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4 See U.S. GPS Industry Council *Ex Parte* Presentation, "*In-Band Emission (IBE) or Out-of-Band Emissions (OOBE): That is the Question,*' ET Docket 98-153 (July 25, 2001).

5 See Rec. ITU-R M.1477, "*Technical and Performance Characteristics of Current and Planned Radionavigation-Satellite Service (Space-To-Earth) and Aeronautical Radionavigation Service Receivers To Be Considered In Interference Studies in the Band 1559-1610 MHz*". NOTE 1 – *This Recommendation is not intended to be used to form the basis for future modifications to maximum unwanted emission levels for the band 1559-1610 MHz that are stated in the Annexes to Recommendation ITU-R M. 1343. The maximum unwanted emission levels for the band 1559-1610 MHz stated in Recommendation ITU-R M. 1343 have been developed pursuant to a specific interference scenario, and are not intended to be applied to any service other than MSS MESs operating in the 1-3 GHz range without further study.*