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From: "Dr. Robert J. Fontana" <rfontana@multispectral.com>
To: <mmarcus@fcc.gov>
Date: 4/16/01 9:49AM
Subject: Thanks

Dear Dr. Marcus,

I wanted to thank you for spending time with Rob Mulloy and me last week. We walked away with a better understanding of the FCC's concerns in the UWB proceeding; and, hopefully, we were able to adequately describe our rationale in suggesting to the FCC that UWB emissions be kept above 3.1 GHz. We believe this will be to the ultimate benefit of the UWB industry in allowing the technology to be "accepted" by the vast majority of other spectrum users.

I'm afraid that I still disagree with Mr. Reed's analysis of the peak power limitations suggested by Part 15 -- particularly as they apply to non constant envelope, pulse emissions. We will follow up with a more complete analysis in the near future. It's in my court to provide a more convincing argument.

I also have given considerable thought to your question regarding the apparent high level of background emissions indicated in several of the NTIA graphs. I believe that your concern is that, if such a high level of background "noise" is present in a realistic environment, then why should one be concerned over low power UWB emissions?

While it may be true that an elevated receiver (e.g., one overlooking the LA basin) may pick up a large number of signals in the microwave bands, most if not all of these are relatively narrow band (i.e., less than a few tens of MHz). Furthermore, most wideband pulse emissions (e.g., airport surveillance radars, etc.) are typically low PRF (pulse repetition frequency) and are only observed with sufficient post detection integration at the spectrum analzer -- not to mention additional reception issues relating to scan-on-scan effects. (It is rather rare to see high PRF pulse doppler applications in other than airborne radars.) Radar pulsed emissions are also typically filtered prior to radiation from the antenna (e.g., PAVE PAWS system block diagram in Skolnik, Radar Handbook, Chapter 5 on solid state radar transmitters), so that they also have confined spectral densities -- determined by FCC, NTIA and FAA requirements. Thus, what a spectrum analyzer really sees (if one lowers the resolution bandwidth) is an extremely sparce spectral occupancy in the microwave bands (i.e., above 3.1 GHz) -- certainly in terms of total bandwidth occupancy.

As Secretary Rohde from the NTIA pointed out, however, it is really in the region below 3.1 GHz where much of the federal and commercial use of spectrum occurs. Many portions of this spectrum have been placed on the Part 15 restricted bands list, and for good reasons. There are several systems operating in these "lower" frequency bands that need to, and typically do, operate near the thermal noise floor -- radio astronomy, weak signal amateur radio operations, and even GPS. That they can do so is further proof that the "background noise" from other emissions is not the limiting factor.

As a ham radio operator for nearly 36 years (AK3Y -- formerly WB6RWR and F0TD), I am particularly concerned about the effects of UWB operation below 3.1 GHz on the amateur radio bands. A UWB wireless LAN in the home or apartment next door can create havoc with a high sensitivity HF/VHF/UHF or microwave amateur setup -- even with narrow victim receiver bandwidths. This has been shown by the ARRL in its responses, and can be readily demonstrated in the lab. (Again, I would welcome you to stop by our facility in Germantown to see demonstrations of UWB equipment.) We have discussed these issues with the ARRL (Mr. Chris Imlay and Mr. Paul Rinaldo), and agree in principle that restricting UWB operations to frequencies above 3.1 GHz is in the best interest of both the amateur and UWB communities.

I hope that I have answered your question, and I would welcome the opportunity to discuss these issues with you further. As we mentioned to you, MSSI has been actively involved in the development and fielding of UWB systems since 1989. My own work in UWB goes back even earlier (1984) when I developed the first UWB communications transceiver for the Government together with Dr. Gerry Ross

from ANRO Engineering. With this extensive background in UWB hardware development (currently over 45 UWB programs -- each resulting in fielded hardware -- since 1989), we have seen what improperly designed equipment can do to other systems -- even narrow band systems.

Please let me know if there are any other issues that you would like clarified, or if I can expand further on our proposals to the FCC. Thank you again for the significant amount of time you spent with us last week -- it was extremely helpful to us.

Sincerely,

Bob Fontana

P.S. I realized from your business card that you must have received your degree from M.I.T. Not too many schools use the Sc.D. notation! Both my wife and I are MIT grads -- she received a Ph.D. from MIT in Political Science (China specialty), and I finished up my SMEE there (under Bob Kennedy in quantum communications theory) before going on to Stanford University to complete my Ph.D. (nonstationary random processes for time division multiple access communications).

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