Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies	)	ET Docket No. 03-108
	)	
Authorization and Use of Software Defined Radios	)	ET Docket No. 00-47 (Terminated)
	)	

REPLY COMMENTS OF INTEL CORPORATION

Intel Corp. (Intel) hereby submits the following reply comment in response to the Notice of Proposed Rulemaking in the above-referenced proceeding. Intel is the world's largest semiconductor manufacturer and a leader in technical innovation. Intel is also a leading manufacturer of communications and networking chips and equipment. Intel has substantial research programs in areas such as cognitive radio technologies, smart antennas, and ultra wideband.

The Applicability of Cognitive Radios in Unlicensed Bands

Intel agrees with multiple commenters[1] who point out that Commission's adoption of flexible rights for licensees have enabled them to "deploy cognitive radio and other technologies with stunning results for consumers."[2]

[1] See Comments of: THOMAS W. HAZLETT AND MATTHEW L. SPITZER @ 2, Verizon @ 2, CTIA @ 3, Cingular @ 3, Nokia @ 1,

[2] Comments of CTIA @ 3

Likewise, the Commission's efforts in deploying cognitive radio technology in the unlicensed bands in this and other proceedings[3] should be viewed as permitting users of those frequencies greater freedom to deploy advanced technology for the efficient use of their spectrum.

Rural Markets and Unlicensed Devices

Intel and a majority of commenters agreed that increased power in the 900MHz and 2.4GHz bands could be problematic.[4] Some commenters cited important services such as EZ-Pass that could suffer interference if the Commission were to adopt the proposed rules[5]. Intel and Motorola stated that the Commission's proposed method of determining whether higher power was permissible was premature and required further study.[6] We note that Motorola and others correctly contrasted the difficulties in implementing the sensing proposed in this proceeding with the straight-forward proposal for sensing vacant TV channels proposed in ET Docket 02-380.[7]

Proposals for Part 15 rule changes

Several commenters[8] supported the Commission's proposal to allow certification of Part 15 devices that are capable of operating on non-Part 15 frequencies. The commenters state, however, that DFS should not be mandated in all devices. Rather, the rule should allow for devices operating under the

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[3] In the Matter of Unlicensed Operation in the Band 3650 – 3700 MHz, ET Docket No. 04-151; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, ET Docket No. 02-380 ; Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band, ET Docket No. 98-237, and Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band (ET Docket No. 02-380).

[4] See Comments of Waverider, EZ-Pass, PortAuthority, Intel, Cingular, CTIA, Erricsson, Nokia, ITI, Itron, Nextel, Statewide Wireless Network, New York State Office for Technology

[5] See Comments of E-ZPass Interagency Group

[6] See Comments of Motorola @ 8

[7] ibid @ 12, Comments of Intel @, IEEE-USA @ 3, Shared Spectrum

[8] See Comments of Cisco @ 13, Intel @, and ITI @

control of a master controller to be exempted from DFS or other requirements. This approach would be consistent with the U-NII proceeding, and allow for devices to be manufactured much more economically while not sacrificing interference protection. Accordingly, the Commission should reject the IEEE802 proposal that "all nodes in the network be required to have the capability to sense spectrum occupancy and appropriately control their own transmitter power."[9]

The Wi-Fi Alliance requests that the FCC:

> consider the existing standards based solution(s) available for ensuring authorized operation of devices with World Capabilities such as the 802.11TGd feature. In this case, the Master/Controller scheme is used, similar to multiband mobile phones where beacons from the controller indicate to the client device the proper channels of operation.[10]

The above mentioned solution of combining the Commission's proposal with the rule that devices operating under the control of a master controller should be exempted from DFS or other requirements would address the Alliance's concern that "[t]he new proposed rules would be an unnecessary burden and disincentive from selling World capable client devices which benefit U.S. and non-U.S. users alike."

Proposals for Part 2 rule changes

Many commenters agreed with Intel that manufacturers should NOT be mandated to declare as an SDR[11] products technically meeting the Commission's definition, because "a mandatory SDR declaration will force manufacturers to declare as SDRs many radios that have no need for the streamlined modification procedures. This proposal would impose a large and unnecessary burden on manufacturers,

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[9] See Comments of IEEE @ 36

[10] See Comments of WFA @ 7

[11] See Comments of Intel @ 3, SDR Forum @ 4, Ericsson @ 20, ITI @ 5, NPSTC @ 30, WFA @ 5, TIA @ 8

and turn the original intent of the SDR designation – the elimination of unnecessary burdens – on its head."[12]

Also, many commenters supported the Commission's proposal that the requirement that grantees or applicants supply a copy of their radio software upon request be replaced with the less burdensome requirement that applicants supply a description and flow diagram of the software that controls the radio operating parameters.

With regard to liability limits, Intel reiterates its position that the establishment of a "safe harbor" such as "industry accepted practice," would be counterproductive in this instance--unduly encouraging manufacturers to design equipment to fit the safe harbor rather than address the actual threat.

Finally, a large majority of commenters[13] rejected the Commission's proposal restricting the mass marketing of high-speed DACs. Intel concurs with the Information Technology Industry Council (ITI) that "By restricting them, the FCC would set a dangerous precedent in applying intentional radiator rules to unintentional radiator devices. This would create an undue regulatory burden on manufacturers and result in increased costs for consumers."[14]

The Commission Should Continue to Reject Etiquettes

The Commission should reject PulseLink's proposal for a Common Signaling Mode.[15] Such a proposal violates the Commission's technology neutral policy and would pose a large barrier to innovation. The panoply of unlicensed devices today, from baby monitors to cordless phones and wireless

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[12] See Comments of SDR Forum @ 5

[13] See Comments of AMSAT @ 9, Intel @ 4, ARRL @ 16, ITI @ 6, Raytheon @ 2, TAPRC @ 2

[14] See Comments of ITI @ 6

[15] See Comments of Pulse-Link

LANs, would have been impeded, if not totally precluded had they been subject to such a rule. Pulse-Link incorrectly cites the Commission's proposal to mandate "unlicensed devices to broadcast identification information at regular intervals[16]" in the 3650-3700 band as support for their idea. As Intel discussed at length in ET Docket No. 03-201[17], the Commission's proposal in the 3650 proceeding is an example of secondary use by unlicensed devices predicated on non-interfering or negotiated agreement with the primary users. Such an "inter-service" etiquette, as in the authorization of DFS for authorized unlicensed use of the 5 GHz band, does not impose unnecessary costs because without it unlicensed devices would not gain use of the spectrum in the first place.

In contrast, an "intra-service" etiquette among co-equals, such as Pulse-Lick's Common Mode Signaling, would require the FCC to set additional technical mandates that would necessarily favor particular users, services, technologies or companies over others in their use of the unlicensed spectrum. Mandating etiquettes would also create a substantial risk of impeding innovation because rule changes might be required—vitiating one of the primary benefits of unlicensed allocations.

Respectfully submitted,

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[16] In the Matter of Unlicensed Operation in the Band 3650 – 3700 MHz, ET Docket No. 04-151; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, ET Docket No. 02-380 ; Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band, ET Docket No. 98-237 ; @ 60

[17] Comments of Intel in the matter of Modification of Parts 2 and 15 of the Commission's Rules for unlicensed devices and equipment approval @ 6