Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Facilitating Opportunities for Flexible,	)	ET Docket No. 03-108
Efficient, and Reliable Spectrum Use	)	
Employing Cognitive Radio Technologies	)	
	)	
	)	

To: The Commission

Reply Comments of the Society of Broadcast Engineers, Inc.

The Society of Broadcast Engineers, Incorporated (SBE), the national association of broadcast engineers and technical communications professionals, with more than 5,000 members world wide, hereby respectfully submits its reply comments in the above-captioned notice of proposed rulemaking (NPRM) relating to "smart," or cognitive radios, and to software defined radios.

I. Wireless Broadband Operators Coalition Comments

1. SBE disagrees with the comments of the Wireless Broadband Operators Coalition (WBOC). First, nowhere in the WBOC comments is there even the slightest hint of an acknowledgment that 2.4 GHz Part 15 wireless local area network (WLAN) operations are a secondary, bottom-of-the-RF-food chain, use of spectrum. Nor is there any acknowledgment that 2.4 GHz WLANs must not cause interference to, and must accept interference from, any licensed stations using the same spectrum. The technical term for this is "clueless." Although the WBOC comments do discuss interference issues, it is clear that they are talking about WLAN-into-WLAN interference, and not WLAN-into-BAS (Broadcast Auxiliary Service) interference or WLAN-into-POFS (Private Operational Fixed Service) interference.

2. WBOC proposes re-defining how 2.4 GHz Part 15 WLAN transmitter power output (TPO) is to be measured. WBOC proposes using what it calls "maximum average interference power" or "MAIP." WBOC defines MAIP as the product of the "instantaneous transmitter power ("ITX") times the transmitter duty cycle times the beam width of the azimuth pattern/360. Further, WBOC proposes no limit whatsoever on the equivalent isotropic radiated power (EIRP).

3. WBOC makes the stunning claim, at Page 6 of its comments, that "the average amount of interference generated by a radio signal is independent of the antenna radiation pattern, and is dictated by the amount of TX power injected into the antenna port." This is complete nonsense. Beyond path performance, the antenna gain and pattern on both ends of the signal path determine whether one station will create harmful interference to another station. Changing antennas on either end from an interior low-gain building-attenuated omnidirectional antenna to an exterior, directional, high-gain antenna can easily elevate the average interference from imperceptible to actual impairment. Standard microwave path designs factor in this consideration to minimize interference between closely located co-channel users. The laws of physics don't change because someone is operating a Part 15 device.

4. Accordingly, SBE urges the Commission to reject the concept of MAIP, which would be prone to all sorts of abuse, and difficult, if not impossible, to enforce. SBE further urges the Commission to reject the WBOC proposal that the current EIRP limit on 2.4 GHz Part 15 WLANs should be abolished. Contrary to the claim made at Page 8 of the WBOC comments, that these two changes would result in "a dramatic reduction in interference," SBE believes that just the opposite would be the case.

II. Cisco Systems Comments

5. SBE has to give "kudos" to Cisco Systems, Inc. ("Cisco"), where, at Page 2 of its comments, Cisco states "First, the Commission must protect licensed services from harmful interference." Such an acknowledgement from a manufacturer of Part 15 2.4 GHz WLAN equipment is indeed refreshing. SBE also likes Cisco's proposal, at Page 11 of its comments, that:

> "...cognitive radios have the capacity to turn off transmissions in the event that the device is causing harmful interference. This concern extends well beyond the unlicensed bands, in which an unlicensed device must cease transmissions if it is causing interference, to bands in which all transmitters are licensed.

The problem, of course, is how does a licensed station receiving harmful interference first identify the unlicensed station causing the interference, and then let the user of that Part 15 device know about the problem? The answer, unfortunately, is that in the vast majority of cases there is no practical way for this to happen. In the real world, the licensed system generally has to suffer the interference caused by a Part 15 device. Therefore, it is imperative that the Commission be conservative and cautious about any further opening of the Part 15 "Pandora's Box."

6. Thus, SBE must nevertheless disagree with Cisco, which urges that the Part 15 Rules should allow equipment to be manufactured for worldwide sale. As was cautioned by SBE in its initial comments, this would inevitably result in Part 15 WLANs operating in the 2,483.5-2,500 MHz band in the United States.

III. Other Parties Provided Similar Warnings of Increased Interference as Did the SBE Comments

7. SBE is gratified to see that it was not the only party warning the Commission that higher power for 2.4 GHz Part 15 WLANs would result in increased interference. The comments of the Cellular Telecommunications & Internet Association (CTIA) cautions that the proposal to allow higher powers

> ...does not contain any meaningful analysis regarding interference risks to both in-band and out-of-band licensees, and urges the Commission not to adopt the proposed six-fold power increase for Part 15 2.4 GHz WLANS.[1]

SBE agrees. Higher powers for 2.4 GHz Part 15 devices is a bad idea.

8. CTIA also recognizes the difficulty in enforcing Part 15 limits. The CTIA comments state:

> Unlike licensed transmitters, unlicensed devices enter the marketplace in an uncontrolled manner and enforcement efforts are, for all practical purposes, non-existent."[2]

Sadly, SBE has to agree. This is the basis for SBE's "Pandora's Box" analogy.

9. The comments of the Telecommunications Industry Association (TIA) provide the Commission with a similar warning:

> Because of their ubiquitous deployment, any increase in power of unlicensed devices operating in the 900 MHz and 2.4 GHz bands would likely result in significantly more interference."[3]

10. As did SBE, the Industrial Telecommunication Association, Inc. (ITA) comments warned the Commission about the threat of unauthorized modifications to Part 15 devices:

> ...the Commission must remain cognizant of the potential for the device operator to alter the equipment so as to effectively modify the operating parameters of the device and the surrounding spectral environment for incumbent users. Simply stated, these advanced

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1 CTIA comments, at Page 2.
2 CTIA comments, at Page 10.
3 TIA comments, at Page 5.

> technologies could be used to circumvent the Commission's rules or avoid them altogether to the degradation of the signal of incumbent licensees.

SBE agrees. The Commission must not be naive, and must not let itself be played for a "sucker."

IV. If Higher Power 2.4 GHz Part 15 WLANs Are Nevertheless To Be Allowed, Then There Needs To Be a Station Identification Requirement

11. If higher power 2.4 GHz Part 15 WLANs are nevertheless to be allowed, the Commission needs to impose a station identification requirement, so that when interference is caused to a licensed, Part 74, TV BAS operation, the source can be more easily identified. The station identification should consist of the operator's name, address and telephone number, and the physical location of the WLAN transmitter, including geographic coordinates with the datum specified.

V. Summary

12. SBE urges the Commission to apply a healthy dose of "engineering common sense." The Commission should not allow a six-fold increase in the allowable TPO for 2.4 GHz Part 15 devices, it should not adopt a new, and subject to mischief, definition of how TPO is to be measured, and it most certainly should not abandon the EIRP limit for 2.4 GHz Part 15 devices. If, due to political pressures from FCC Commissioners, or the White House, OET is forced to ignore sound engineering principles and nevertheless authorize higher power 2.4 GHz Part 15 WLANs, then it is imperative that these higher power Part 15 operations be required to transmit station identification information. Finally, the Commission should not allow the importation of Part 15 WLAN devices capable of transmitting on 2,400–2,500 MHz, as opposed to the present limit of 2,400–2,483.5 MHz.

Respectfully submitted,

Society of Broadcast Engineers, Inc.

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