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

In the Matter of	)	
	)	
Promoting Efficient Use of Spectrum Through	)	
Elimination of Barriers to the Development of	)	
Secondary Markets	)	ET Docket N0. 00-230
	)	
	)	

COMMENTS OF SHARED SPECTRUM COMPANY

1. Introduction

Shared Spectrum Company hereby comments on the Commission's Notice of Proposed Rulemaking concerning the technical and regulatory implications of secondary spectrum markets (FCC-402, Nov. 27, 2000), 2000 FCC LEXIS 6216. Shared Spectrum believes that the Secondary Markets Initiative along with the advances in broadband wireless network technology being developed by the Department of Defense will provide a profound improvement to wireless communications over the next few years. This will lead to a very large increase in the widespread availability of high capacity wireless communications in both urban and rural regions and provide a significant cost reduction due to reduced spectrum acquisition costs. We applaud the Commission's forward thinking on this issue.

Shared Spectrum is a newly formed company developing broadband wireless equipment optimized for secondary spectrum markets applications. As noted by the Commission[1], there is no equipment on the market now with the flexibility and capability to facilitate the use of available spectrum for a broad range of services. Our goal is to offer technology and equipment to fully realize the potential of the secondary spectrum market as rapidly as possible.

[1] *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, FCC 00-402, Para. 4.

Overall we agree with the Commission's plans for secondary markets. There are, however, a few points that need to be made.

2. Increasing Flexibility in Technical Rules

The Commission's second goal in this initiative[2] is to encourage the advancement of equipment that facilitates the use of spectrum for a broad range of services. To make spectrum highly fungible, low cost multi-band wireless equipment must be developed. Multi-band equipment is affordable and low power. An example is the Yaesu VR-500 receiver that covers 0.1 MHz to 1300 MHz and costs $289 retail.[3] However, under the Commission's current rules, the secondary market service equipment must also support multi-modes so that it can provide the specific service required by the rules in each bands. The cost of multi-band and multi-mode equipment is high and likely to remain high for the near future. It is also unlikely that such equipment will be easily portable and operate with low prime power in the near future.

We encourage the Commission to consider removing or minimizing restrictions on waveform types and channelization on multi-band radio systems if it can be shown that the multi-band system causes insignificant interference to existing users. This will greatly reduce the cost of practical secondary market equipment, expedite early fielding, and support the Commission's goal of encouraging equipment advances that will facilitate use of available spectrum for a broad range of services.[4]

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[2] *Id.* at para. 4.

[3] See http://www.texastowers.com/vr500.htm.

[4] Paras. 4 and 87, *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, FCC 00-402.

3. Facilitating Availability of Information on Spectrum

The Commission suggests, and we agree, that secondary spectrum markets will operate more efficiently with readily accessible information on spectrum rights and usage.[5] This information will be used to determine:

- What spectrum is available,
- Over what area the spectrum is available,
- What existing infrastructure (antennas, backbone equipment, etc) is available,
- Who owns the spectrum,
- Local conditions (background noise levels, etc),
- What encumbrances and lease conditions exist,
- What the future availability is, and
- What "adjacent" equipment (including high level technical characteristics) may cause or be subject to interference. By adjacent we mean equipment that is co-channel, adjacent channel, with frequency harmonically related to the available spectrum, or in spatial proximity to the region where the spectrum is offered for lease. This includes government (including classified) and non-government users. This information needs to be readily available to the parties in the spectrum transaction and to the "adjacent" equipment operators (to check for accuracy).

A consolidated database like this is essential to the secondary markets concept to reduce transaction costs and to enable efficient spectrum use. We agree with the Commission that the current spectrum licensees will be motivated to make much of this information available through private clearinghouses.[6] But they will not be motivated to make "adjacent" equipment information available because this will tend to diminish the value of their spectrum and it will be very hard for them to collect the data because of

[5] Paragraph 99, *Id*.

[6] Paragraph 100, *Id*.

the database's size and complexity, and the difficulty in determining what information is relevant to their spectrum offering.

Who will determine if the spectrum database information should include the presence of a high power TV transmitter or an FAA radar site that may induce non-linear mixing interference to a potential licensee's system (with an operating frequency far from the adjacent system frequencies)? Who will determine if the information should include a cellular telephone network in the area that receives at a frequency that is harmonically related to the transmit frequency being considered by the potential licensee?

Not only will this database be used to facilitate trading, it will also be critical to quickly resolving interference problems, which is why it needs to be complete, detailed and centralized. If the cellular telephone operator experiences what it believes is interference, they need to immediately be able to: determine what emitters are in the region that may cause the problem, obtain the technical characteristics of potentially interfering signals, and have a POC to contact to mitigate the problem. Even if the secondary market operator follows the existing Commission rules for the band in question, interference may occur. The rules can't be expected to prevent all interference because they were made with certain assumptions on spectrum usage, equipment performance and other past data that is likely outdated.

We believe that the Commission needs to focus more on developing methods to identify the causes of interference when it occurs to compensate of the increase risk of interference caused by high levels of spectrum utilization. Not only will the chance for interference increase with more spectrum usage, it will become more difficult to predict and analyze potential interference in the future. Wireless equipment is becoming more complex and more difficult to analyze because they will employ a wider variety of operating modes and there will be more types in the future. Compensating for these difficulties is that the fact that future equipment will be highly flexible and centrally controlled, making interference mitigation much easier than in the past. A current and complete database of spectrum users is essential for a flexible and adaptive system of heterogeneous communication systems to share spectrum.

Shared Spectrum suggests that Commission move towards a central repository of spectrum information that includes the parameters listed above. This project should be privately executed and be contracted out periodically under a competitive process similar to the exchange used to share telephone numbers or Internet address information. Initially this should be provided as a free, government service. A fee based system would be an impediment because as the secondary market gets established, spectrum will initially be traded via a wide range of customized and widely different business arrangements that will make it difficult to implement a fee based revenue collection system. Eventually a fee system based on spectrum cost or spectrum availability may emerge as spectrum trading becomes more commonplace that would take the place of the current spectrum auctions. These fees would support the spectrum exchange and provide revenue to the government.

4. Mass Media Licenses

The Commission is not now considering revisions to the policies and rules within the Mass Media Services in this Notice of Proposed Rulemaking.[7] We concur that this should be addressed in subsequent rulemaking, but not for the reasons given by the Commission. The substantive issue is that the TV bands occupy the most desirable part of the spectrum in terms of enhanced propagation range and it is the most inefficiently used band in terms of fallow, wasted spectrum. As was discussed in Shared Spectrum's comments to Commission's Notice of Inquiry in *Inquiry Regarding Software Defined Radios*, 15 FCC Rcd 5930 (2000), the potential amount of spectrum in the TV bands available for reuse (with no significant degradation to the existing TV/DTV services) is very large.

We encourage the Commission to consider in future rulemaking how best to use the TV bands during the migration to DTV and afterwards. This spectrum has tremendous value to the nation for wireless connectivity to the Internet and it's use would enable a large fraction of the population to have broadband connectivity at low cost. The value of the Internet to promote the public interest (in terms of the impact on the US economy, the number of users, and its unique capability to provide high value

[7] Paragraph 69, *Id*.

information) is substantial. The potential for the Internet to transmit high quality video services (see for example products being developed by DiamondBack Vision[8]) will soon be introduced in the marketplace. Such services can be provided efficiently and economically by secondary sharing of the broadcast bands, supplement broadcast services, produce additional revenues for broadcast licensees, and add to the public's enjoyment of the spectrum.

Respectfully submitted,

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February 9, 2001

[8] http://dbv.dbvision.net/sections/tech.html.