



May 21, 2007

**Ex Parte via Electronic Filing**

Marlene H. Dortch  
Office of the Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
TW-A325  
Washington, D.C. 20554

**Re: Ex Parte Filing; Service Rules for the 690-746, 747-762, and 777-792  
MHz Bands (WC Docket No. 06-150; WC Docket No. 06-129; PS  
Docket No. 06-229; WT Docket No. 96-86)**

Dear Ms. Dortch:

Google Inc. ("Google"), by its attorney, respectfully submits this ex parte letter in the above-referenced dockets, and requests that it be made part of the public record for those proceedings. This letter details several important service rules proposals for which the Commission should seek immediate comment. In particular, the Commission should clarify that the service rules governing the 700 MHz bands already allow the use of dynamic auction techniques, such as real-time auctions and per-device registration fees.

Google is a Web-enabled software applications and services company, based in Mountain View, California. From the company's perspective, the upcoming 700 MHz auction presents a wholly unique opportunity for the Commission to adopt public policies that promote the efficient and innovative use of our nation's scarce spectrum resources to bring ubiquitous wireless broadband Internet access to all Americans. While the current record in this proceeding includes a number of different proposed spectrum band plans and service rules,<sup>1</sup> several of which merit the Commission's support, Google believes there are additional proposals that should be presented to the public for comment. These proposals will, among other things, enhance the opportunity for new entrants to bid effectively and successfully in the upcoming 700 MHz spectrum auction, and bring innovative new broadband-based applications, services, and devices to all Americans. Most importantly, by adopting these proposals, the Commission can help accelerate the penetration and uptake of broadband services for consumers, and bridge the so-called

---

<sup>1</sup> *In the Matter of Service Rules for the 698-746, 747-762, and 777-792 MHz Bands, et al*, Federal Communications Commission, WT Docket No. 06-150 *et al*, Report and Order and Further Notice of Proposed Rulemaking, FCC 07-72, released April 27, 2007. Google plans to submit comments in this proceeding that will discuss the relative merits of those various proposals.

“digital divide” that continues to separate far too many Americans from the technological tools critical to economic, social, and personal advancement.

### **The Vision: Formulating A More Flexible and Innovative Spectrum Policy**

While Google is a relative newcomer to the world of federal spectrum policy, nonetheless the company’s interest in this area is keen. In Google’s view, government policies should maximize the efficient and innovative uses of radio spectrum, for the ultimate benefit of users. Certainly those policies should not further exacerbate its relative scarcity. Unfortunately, the U.S. Government’s current “command-and-control” spectrum policies too often have a tendency to lock in incumbent users and uses, while shutting out new entrants and innovative new uses of spectrum, such as widely-available Internet access.

As has been pointed out by various studies, the vast majority of viable spectrum in this country simply goes unused, or else is grossly underutilized. Our nation typically uses only about five percent of one of our most precious resources, and even that minimal use is inefficient compared to what is technically possible today.’ Unlike other natural resources, there is little benefit to allowing this spectrum to lie fallow. Furthermore, the airwaves can provide huge economic and social gains if used more efficiently, as seen today with the relatively tiny slices used by mobile phones and Wi-Fi services. Additionally, in some cases, while the legal rights to use the airwaves have been allocated and assigned, networks are not yet built out. This situation constitutes an entirely avoidable waste of valuable spectrum. For example, modern spectrum sensing technologies enabled by low-cost computers in communications devices can provide one obvious mechanism for restoring this resource to practical use. These technologies allow devices to use spectrum on a secondary basis without interfering or causing any harm to primary users or uses.<sup>3</sup>

Optimally the Federal Government should have in place a flexible, marketplace-driven spectrum regime, one responsive to economic signals and the public interest. Google’s own experience amply demonstrates that reliance on market mechanisms, in concert with open communications platforms, brings maximum benefits to both providers and users. Thus, as a general forward-looking proposition, U.S. policy eventually should allow any spectrum that is unused at a particular place and time to be eligible for secondary uses by any lawful devices. This objective could be achieved, for example,

---

<sup>2</sup> In just one example, Shared Spectrum reported recently that actual spectrum utilization in any given geographic area averages some 5 percent of total available spectrum. See <http://www.sharedspectrum.com/?section=nsfmeasurements> (last visited May 21, 2007).

<sup>3</sup> Google and other members of the White Spaces Coalition have presented such spectrum-sensing techniques to the FCC for unlicensed operations in the TV “white spaces” proceeding. *See, e.g.*, Comments of Dell Inc., Google Inc., The Hewlett-Packard Company, Intel Corp., Microsoft Corp., and Philips Electronics North America Corp., ET Docket Nos. 04-186, 02-380, filed January 31, 2007.

through a dynamic auction mechanism, fixed per device registration fees (both of which will be described further), or on an unlicensed basis (as in the FCC's pending TV white spaces docket).

For purposes of this proceeding, as explained below, the Commission should clarify that the service rules governing the 700 MHz bands already allow the use of dynamic auction techniques, such as real-time auctions and per-device registration fees. By acknowledging the ability of licensees to harness the immense power of the marketplace, the Commission can facilitate the spread of ubiquitous two-way, high-speed, Internet-connected communications, and help close the digital divide.

### **The Commission Should Affirm The Ability To Use Dynamic Auction Mechanisms**

As Eli Noam has observed: there are intrinsic problems with the U.S. Government's current spectrum auction model. Among other things, auctions take money away from infrastructure build-outs, require advance payments that create unnecessary barriers to entry (especially for smaller firms and experimental technologies), and arguably constitute a tax by removing money from the private sector. Consumers obviously reap fewer benefits as well under this system.

In Google's view, many of these thorny problems could be alleviated by a more open and market-driven spectrum access policy. As one example, licensees could institute a dynamic auction mechanism, where a designated entity would provide access to spectrum on an as-needed basis. Payments would be made in perpetuity as the spectrum is being used, rather than months or even years in advance. Such a dynamic auction would facilitate infrastructure build-outs, remove barriers to entry for smaller and more innovative entities, and leave additional money in the private sector to build out infrastructure. From the consumer's perspective, these real-time wholesale platforms will help reduce retail prices, engender a host of new service offerings, and spread broadband Internet access to the farthest reaches of the country.

While dynamic auctions can take many forms, the central concept is to utilize intelligent devices to resolve spectrum access contention. Two examples are real-time airwaves auctions and device-driven registration processes.

#### **Real-time airwaves auction model**

- For each available spectrum band, the licensee could bestow the right to transmit an amount of power for a unit of time, with the total amount of power in any location being limited to a specified cap. This cap would be enforced by measurements made by the communications devices. For channel capacity efficiency reasons, bands should be allocated in as large chunks as possible. The airwaves auction would be managed via the Internet by a central clearinghouse.

---

<sup>4</sup> "Taking the Next Step Beyond Spectrum Auctions: Open Spectrum Access," IEEE Communications, Vol. 33(12), December 1995.

### Per-device registration fees

- **As** part of a real-time auction process, the communications device itself could become key to the payment process. For example, the consumer's price to purchase a device could include an airwaves registration fee (say, \$5.00-10.00), which would grant the ability to gain unlimited use at a specified power level. The device could include collision-detection and back-off features (similar to Wi-Fi) to limit congestion.

Either or both of these dynamic auction mechanisms would provide more efficient utilization of spectrum, making it available for myriad users and uses. So, as one example, a consumer could purchase an IP-enabled "smart" communications handset at a retail store in Washington, D.C., and as part of that purchase pay a one-time \$10.00 registration fee to access the pertinent spectrum. In turn, an ISP may have secured the rights to service that same device via the real-time auction of a licensee's spectrum holdings. Through the use of marketplace mechanisms, then, a particular slice of spectrum ends up in the hands of the user who values it most at any particular time and place.'

The existing rules governing the commercial bands of the 700 MHz spectrum appear already to allow licensees to employ these kinds of dynamic spectrum management techniques. Nonetheless, to eliminate any doubt, Google requests that the Commission declare that any successful bidder in the upcoming 700 MHz auction subsequently could institute such dynamic spectrum management practices. **As** shown above, employment of such an optimally priced system would bring very real benefits to providers and users alike. The Commission further should posit at least whether it would be in the public interest to mandate such treatment for some, or even all, of the commercial spectrum to be auctioned in the 700 MHz bands.

### **The Commission Should Require Broadband Platforms in the Lower 700 MHz Band**

The current band plan for the Lower 700 MHz Band includes an unpaired 6 MHz "E" Block (722-728 MHz) that resides in current TV channel 56. This particular spectrum block appears to lack any significant immediate commercial value, due to the relatively limited bandwidth available and its unpaired nature. In order to unlock the long-term commercial potential of the E Block, and create the greatest possible efficient uses, the Commission should designate it as suitable, primarily or exclusively, for the deployment of broadband communications platforms. Specifically, the E Block only should be (1) utilized for interactive, two-way broadband services, (2) connected to the public Internet, and (3) used to support innovative software-based applications, services, and devices.

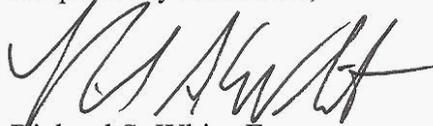
---

<sup>5</sup> Additional background information on this proposal can be found in Appendix **A** to this letter.

Such a service requirement will help maximize the commercial utility of this particular spectrum band. Designation of the E Block in the Lower 700 MHz Band for interactive Internet-enabled services will create real opportunities for ubiquitous affordable wireless broadband Internet access, to the obvious benefit of consumers. This will help unlock the true long-term value of the spectrum, a goal which this Commission should embrace enthusiastically.

Should you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'R. S. Whitt', is written over a light gray rectangular background.

Richard S. Whitt, Esq.

Washington Telecom and

Media Counsel

Google Inc.

**APPENDIX A:**  
**ADDITIONAL INFORMATION ON GOOGLE'S SPECTRUM PROPOSALS**

**The Economic Benefits of Real-Time Auctions**

For every query using Google's search engine, the company separately performs its own real-time auction to determine the market price of a particular advertisement linked to a particular search term. In the same way, an auction could be performed for a radio transmission in a pertinent place and time to determine the economic value the market would support for that transmission.

In rural areas, auction-based prices typically would be much lower than in a large city because there would be fewer competing bids and less contention for use of the spectrum. Thus, a real-time auction would enable rural areas to have improved, low cost services. Because most cities have other options for moving information, such as fiber optics, spectrum would be utilized more efficiently simply by allowing the market to make the proper economic tradeoffs. In addition, a new service provider could enter a market immediately, with no significant capital outlay necessary, and would pay the same spectrum rates as others. Consumers would experience lower prices from the resulting competition.

**The Interplay of Up-Front Auctions and Recurring Spectrum Payments**

There is no conflict between a real-time auction and the current model of requiring an up-front auction payment for a block of spectrum. Under Google's proposal, a licensee can simply purchase spectrum initially in the up-front auction, and then recover its costs over time by charging third parties for real-time and place use. The chief difference is that in the real-time auction model, uses and users of the spectrum can change dynamically in response to ever-shifting market conditions.

**Using the Internet and Spectrum Together for Greater Efficiency**

Currently both wired and wireless communications are used in concert to move all types of information around the world. For example, a cell phone call is usually transmitted via radio to a base station, and then through fiber in an optical backhaul network, before finally being carried via radio to the receiving cell phone.

In order to efficiently manage and use spectrum, wherever possible wired communications infrastructure (in particular Internet access facilities) should be utilized instead of wireless spectrum to move information. Using today's technology, the amount of information that can be put through a single fiber optic cable is nearly unlimited in comparison to what can be sent via more constrained radiowaves. Therefore, if a wireless device is near a high-speed wired Internet connection, economics dictate that it would be preferable to connect the device directly to the Internet. Future spectrum policies should take this important fact into account, by providing the right incentives and policies to connect wireless devices to the Internet in ways that allow maximum usage by

the whole community. Connections between spectrum and Internet should be made widely available through reasonable market and/or open access means, using well understood protocols.

By providing efficient Internet-connected spectrum, the whole community gains far more information capacity than can be achieved through using spectrum alone. This increased availability of information will result in huge economic and social gains, as well as new innovative uses, as the quality, speed, and availability of both wired and wireless communications improve.

### **Favoring The Deployment of Two-Way Communications Infrastructure**

Before the advent of personal computers and cell phones, most people primarily used spectrum to receive large-scale, unidirectional television and radio broadcasts. Because of this considerable history, most of our nation's best spectrum remains reserved for broadcasting uses. Nonetheless, as this Commission has recognized, interactive, two-way technologies such as wireless devices and, more recently, the Internet, are of increasing importance to the economic, social, and personal welfare of our citizens. Thus, as a general guiding principle, the Commission should render new spectrum allocations based on usage that supports primarily two-way communications.

### **The Critical Role of Resiliency**

Our nation's communications infrastructure should be made resilient against all types of natural and man-made disasters. With proper design and ample bandwidth, wireless communications systems could provide incredibly important services at the time of a disaster. Adopting the principles discussed here will result in much more efficient use of our precious spectrum resources.