

July 15, 2004

Mr. Pradip Bajjal  
Chairman,  
Telecom Regulatory Authority of India  
A-2/14 Safdarjung Enclave,  
New Delhi 110029  
India  
Email:pbajjal@traf.gov.in

Via tele-fax and email

Re: Comments of Microsoft on the "Consultation Paper on Spectrum Related Issues"

Dear Sir,

On behalf of Microsoft Corporation India Private Limited, we are pleased to comment on TRAI's recently released Spectrum Consultation (released 31 May 2004). We do so well aware that in managing the spectrum available for mobile services TRAI needs to assure that there is sufficient spectrum available if the country's mobile services are to continue to grow. We also are aware, however, of TRAI's recent paper entitled Recommendations on Accelerating Growth of Internet and Broadband Penetration (or "Broadband Recommendations") (released 29 April 2004). With respect to one item in the Spectrum Consultation - Issue 2(i) - we see a nexus between the two papers. Issue 2(i) in the Spectrum Consultation raises the question of whether the 450 MHz band should be used for CDMA technology. In response, we encourage TRAI to consider the 450 MHz band as a possible home for mobile services, but also for wireless last mile broadband access. Moreover, to promote the development of such wireless broadband solutions, TRAI should support both licensed and unlicensed broadband uses within the band.

#### A. The Promise of Wireless Broadband Networks

Like TRAI, Microsoft believes that robust and easily accessible broadband services will create new economic opportunities and, more generally, will improve people's lives. More rapid deployment and take-up of broadband services will fuel creation of new commercial applications as well as improvements in governmental and social services, such as education and tele-medicine. See Broadband Recommendations at p.3 Section 3.7 of the Broadband Recommendations contains a healthy discussion of the positive role that terrestrial wireless technologies can play in accelerating the deployment of broadband access. Microsoft wholeheartedly agrees. Indeed, Microsoft believes that wireless technologies - operating in both licensed and unlicensed modes - will be instrumental to speeding up the global rollout and adoption of broadband.

Wireless broadband technology holds so much promise because the economics of deploying it are consumer - friendly. Though their research and development costs are high, manufacturers of wireless technologies have incentives to develop equipment that is affordable and that a user can buy "off the shelf" and install easily. Providers of broadband services, in turn, not only are attracted to these aspects of wireless technology - they are also recognize the benefits of

the technology's scaleable architecture. A hot spot operator may be able to start offering service in a building or an office part. It then can transform itself into to a wide-area wireless Internet Service Provider (or WISP) by seamlessly increasing its coverage area as capital and demand allow. All in all, the favorable attributes of wireless technology put the network infrastructure within the reach of both small entrepreneurs and the larger enterprises that traditionally deliver broadband access - creating the potential for consumers to receive broadband services well before they might receive them via traditional, wired modes of delivery.

#### B. Spectrum below 1 GHz is Vital to Wireless Broadband Networking

The relevant public policy question, then, is how to reduce the regulatory hurdles that might stand in the way of this dynamic reaching its full potential. The Broadband Recommendations note that "two important aspects to the practical deployment of terrestrial wireless systems" are mitigating "procedural delays" and determining the appropriate manner of "spectrum fee charging." See Broadband Recommendations at pp. 45-46. Microsoft agrees that these are important regulatory constraints (and they form the basis for our support for unlicensed allocations as discussed more full below). But perhaps the most important thing to do is to make sufficient amounts of the right spectrum available for wireless broadband. More specifically, Microsoft believes that spectrum below 1 GHz should be made available for both licensed and unlicensed broadband solutions.

In the United States, a significant challenge facing the nascent WISP industry is the limited propagation characteristics of the spectrum at 2.4 GHz and 5 GHz. WISPs can be constrained by the fact that signals in these unlicensed bands attenuate rapidly and are easily blocked by walls. While these bands have worked well for hot spots and other wireless local area networks, last-mile connectivity in both urban and rural areas will do better in the lower bands. Circumstances in India are likely to be little different. The policy objective is to assure widespread access to broadband services, and in this country that means facilitating access in urban areas, characterized by dense, often obstructive construction, and facilitating access in rural areas, where, to remain affordable, the cost of new infrastructure needs to be spread across as large a user base as can be reached.

Spectrum below 1 GHz will allow WISPs to more easily exploit the inherent benefits of a wireless model and overcome these inherent hurdles. Such spectrum allows a single access point to provide greater coverage per customer (either by propagating over larger territory or through more obstructions). With this broader reach, a WISP could easily build one access point (or in a city, perhaps a few access points) and begin business-providing service to an entire community. It can then invest additional capital and expand capacity as business warrants. In the upper bands, a WISP must spend the capital to build access points throughout the community to get similar coverage, which is difficult to do before it has customers.

TRAI has already acknowledged the benefits of using lower-band spectrum. At paragraph 3.7.4.4 of the Broadband Recommendations, TRAI notes the superior propagation of television spectrum, and it urges the WPC to "consider allowing usage of the applicable spectrum for broadband services deployment as well." See Broadband Recommendations at p.45. On this, TRAI is right. Allowing

use of the 450 MHz band for wireless broadband solutions may be an even faster route to achieving the same goal.

C. Promoting Development of Unlicensed Technologies.

As mentioned, the Broadband Recommendations highlight the importance of mitigating regulatory delay and of adopting appropriate spectrum methods. These goals can be in tension. Obviously delicensing spectrum (or making it available for unlicensed use) is the simplest way of reducing regulatory delays. By providing free usage of the spectrum, entrepreneurs of every stripe can quickly make use of this national resource, spurring innovation in the development of products and easing the path to providing new services. Elsewhere in the Recommendations, TRAI acknowledges the “attractive and cost effective options.... For providing terrestrial broadband wireless services” via today’s most popular unlicensed broadband technologies -- those that follow the IEEE 802 set of standards. See Broadband Recommendations at p.42. In terms of overcoming regulatory delay, there could be no simpler solution than delicensing. The trade-off of course is the loss of potential spectrum charges.

We understand there are diverse public policy goals the Commission must consider as it evaluates various approaches to spectrum regulation. In the end, we see licensed and unlicensed allocations serving different, but complementary roles. Unlicensed spectrum minimizes regulatory impediments to entry. But it comes with a set of consequences, including generally low-power restrictions and no absolute protection from interference. Licensed spectrum, which is generally “paid for” in some regard, offers a WISP the greater reach of higher power operations and protection from interference. In considering its spectrum policies, and in particular those policies aimed at promoting broadband deployment, TRAI should support both licensed and unlicensed models, as well as access to spectrum below 1 GHz. With respect to this Consultation, it should seek to make available licensed and unlicensed spectrum in the 450 MHz range. With access to both types of spectrum, the service provider (and ultimately the consumer) can make decisions about desired attributes, including different services, capacities and pricing.

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Microsoft strongly endorses TRAI’s ongoing commitment to removing regulatory barriers to new services. We also agree with TRAI that wireless technologies can play an increasingly important role in the expansion of robust and easily accessible broadband networks. In the context of this Spectrum Consultation, we encourage TRAI to consider that 450 MHz spectrum could be used for both mobile and terrestrial wireless broadband services, and that both unlicensed and licensed solutions will benefit consumers.

Sincerely,

Rajiv Kaul  
Managing Director  
Microsoft Corporation India Private Limited.