Microsoft

SUBMISSION OF MICROSOFT CORP. TO
GLOBAL INDUSTRY LEADERS' FORM 2009

Beirut, Lebanon, 9 November 09

Microsoft welcomes the opportunity to participate in the International Telecommunications Union's Global Industry Leaders' Forum 2009 (GILF 2009) with the aim to contribute to the collective industry guidance to be presented at the 9th Global Symposium for Regulators (GSR09). Consistent with World Telecommunication Development Conference (WTDC) Resolution 29, Microsoft shares the goal of promoting sustainable information and communication technology (ICT) development and recognizes the importance of the public and private sectors to mobilize resources and form partnerships for sustainable development. At the same time, Microsoft understands that telecommunications is of critical importance to overall economic, social and cultural development. It is critical that industry partner with government to find ways of stimulating ICT investment during this period of global economic downturn.

If one lesson can be learned from the current global economic crisis, it is that we can no longer sustain economic growth by simply relying on consumption or the easy access to debt. We must return to growth that has traditionally been built on innovation and productivity. Telecommunications and, in particular, robust and diverse broadband connectivity is foundational for driving innovation and productivity across all market sectors including education, healthcare, and energy.

Like many other companies, Microsoft sees the potential of broadband to deliver on innovation and achieve greater productivity gains. For example, we envision a connected health ecosystem that enables predictive, preventive, and personalized care. Telehealth technologies can be used to remotely monitor patients, facilitate collaboration between medical professionals, exchange medical data and images, and instantaneously provide efficient emergency service to remote areas. We also see medical research increasingly manipulating the HUGE amounts of patient and genomics data for drug discovery and personalized medicine.

Logistics is an example of an area in which broadband can be leveraged to realize productivity gains. Today, the transport of global goods is growing rapidly, as a result of globalization and global economic growth. One of the things that we will see in the future is that every object shipped, vehicle, loader, container, warehouse, etc, will be connected and the path of goods through the logistics chain will be optimized to drive greater efficiencies and productivity. In this world of interconnected devices, achieving "smart logistics" involves a range of software and hardware tools that monitor, optimize and manage operations, which helps reduce the storage needed for inventory, fuel consumption, kilometers driven and frequency of vehicles travelling empty or partially loaded.

To create an environment conducive to investment in ICT broadband networks and to achieve the goals discussed above, governments should pursue 'convergence-aware' policymaking frameworks. From one country to another, the solutions will be different depending on a variety of factors, including level of economic development, population densities, industry structure, etc. But, regardless of setting, we urge governments to work with industry to evolve from a regulatory scheme based on platform and service silos to one that is suitably transport-agnostic and that does not undermine innovation. Such a framework could acknowledge that not all aspects can or should be "managed" through regulation. In this new environment, regulation should shift its center of gravity from micro-managing via detailed rules to flexibly guiding behavior to achieve desired outcomes. Convergence-aware, principles-based

policies, will lower the risk of adverse outcomes in the presence of complexity and uncertainty and will allow policymakers to act more quickly to address unanticipated adverse phenomena.

One example of convergence-aware, principles-based policy-making could be in the area of spectrum management. Microsoft encourages government agencies responsible for spectrum management to set aside significant amounts of spectrum for wireless broadband access. In order to maximize innovation and investment and promote universal access to voice connectivity and broadband, spectrum managers should resist the temptation to dictate how spectrum is utilized beyond basic rules relating to interference protection. Spectrum managers should also allow for licensed as well as unlicensed spectrum access. That means providing both for the assignment of spectrum blocks for the exclusive use of designated licensees and setting aside spectrum "innovation zones" where consumers can use devices that operate within specified technical parameters and rules of etiquette, but without the permission of a designated licensee. Short of allocating unlicensed spectrum, a country's spectrum managers could also consider allowing the use of cognitive or software defined radios, which can be designed to make opportunistic use of underutilized licensed spectrum.

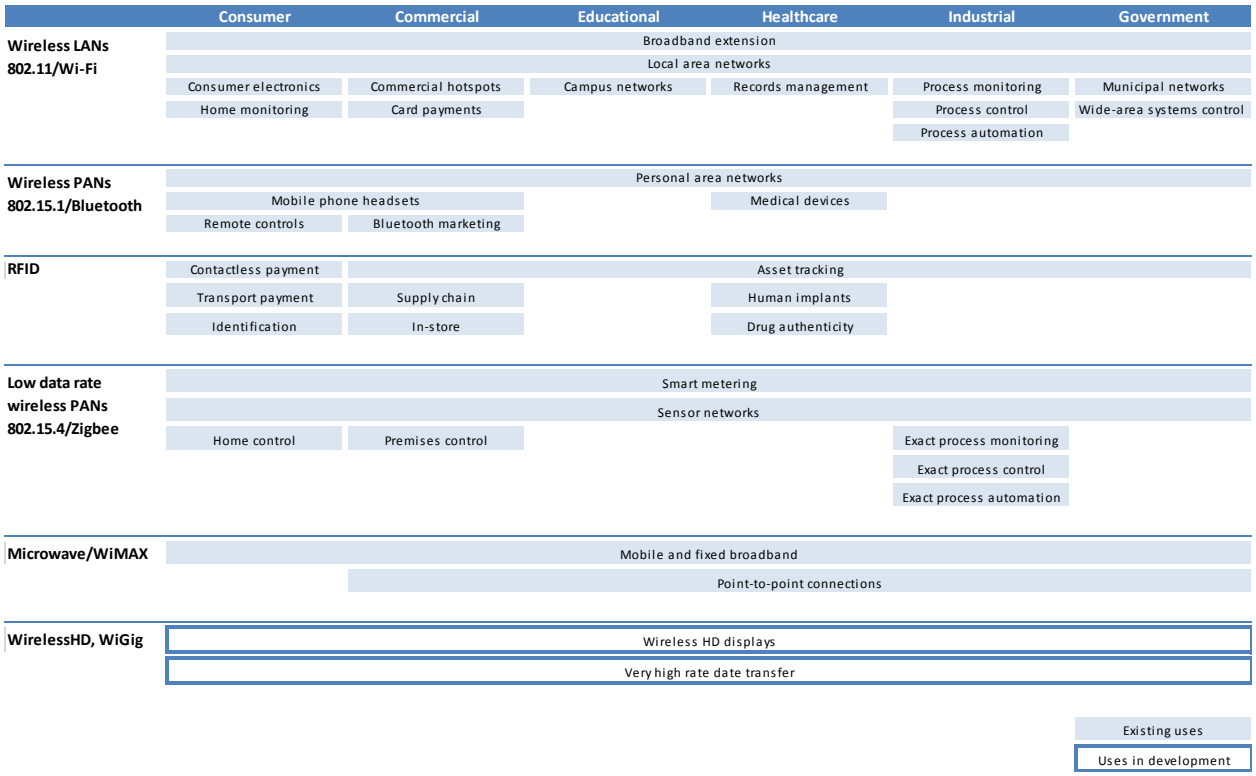
A recent economic paper by Richard Thanki, *The Economic Value Generated by Current and Future Allocations of Unlicensed Spectrum*, explains how technologies utilizing unlicensed spectrum are delivering significant innovation and economic value.[1] Unlicensed uses provide a number of benefits including: (1) Unlicensed networks being deployed rapidly by individual users (or groups of users) when and where needed; (2) Decentralized unlicensed network deployments can prove more resilient, for example, in the aftermath of natural disasters; (3) Allowing network access in offices, factories and homes without having to lay cable can improve consumer and business efficiency; (4) Unlicensed spectrum offers a way to extend the coverage; (5) Because unlicensed uses can occur without the permission of licensed network operators, they provide more opportunities for innovation; and (6) Technological and business innovations first developed in the unlicensed context have translated to broad consumer benefits in both licensed and unlicensed contexts.

Indeed, many innovations often credited to licensed wireless uses occurred first in unlicensed environments. For example, orthogonal frequency division multiplexing (OFDM) is a modulation technique first standardized for use in the wireless local area networks (LANs) in 1999. Seven years later, in 2006, OFDM first appeared in the Long Term Evolution (LTE) standard, now primarily being used for licensed 4G mobile wireless broadband networks. For many of the reasons discussed above, Thanki suggests that "unlicensed spectrum may have a greater potential for innovation than licensed spectrum."[2]

[1] *See* Richard Thanki, *The Economic Value Generated by Current and Future Allocations of Unlicensed Spectrum* (Sep. 2009) ("Thanki Report"), available at http://www.ingeniousmedia.co.uk/websitefiles/Value_of_unlicensed_-_website_-_FINAL.pdf (visited Nov. 6, 2009).

[2] *Id.* at 43.

As the chart below from Richard Thanki's paper illustrates, the unlicensed ecosystem is quite broad, encompassing a wide variety of platforms and devices, including commonly-used cordless phones, Wi-Fi routers, Bluetooth devices, and baby monitors, as well as specialty uses such as meter readers and telemetry.[3]



Explosive growth of licensed wireless applications is often cited as justification for greater access to licensed spectrum, but unlicensed applications show even greater growth potential. According to Mr. Thanki, through 2014, global "shipments of hybrid devices, including Wi-Fi and Bluetooth-enabled mobile phones, 3G and 4G enabled laptops, Wi-Fi enabled televisions and set-top boxes, and cars possessing Bluetooth will likely double . . .. The sales of devices using only unlicensed spectrum are likely to soar, led by Wi-Fi and Bluetooth enabled consumer electronics and laptops, 802.15.4 devices in the consumer, commercial and industrial sectors, and RFID devices."[4] These trends demonstrate the significant and growing value consumers around the world are placing on devices and applications utilizing unlicensed connectivity.

Although always an imprecise exercise, much has been written on the economic value of licensed spectrum allocations. In the licensed context, economists often rely on factors such as auction results from different spectrum allocations and the impact of prices on demand to make inferences about producer and consumer surplus. These data points do not exist for unlicensed spectrum. That the economic benefits of unlicensed spectrum allocations are hard to quantify does not mean that the benefits are not massive.

[3] *See id.* at 16.
[4] *See id.* at 19.

Thanki estimates the U.S. economic value generated by the following unlicensed applications: (1) Wi-Fi broadband access within homes, (2) voice over Wireless local area networks and wireless electronic health records in hospitals, and (3) RFID tags for in-store item-level tagging in the clothing retail sector. Accounting for only about 15% of the total projected market for unlicensed chipsets, Thanki estimates that the annual consumer surplus generated by Wi-Fi in the United States in homes is between $4.3 and $12.6 billion.[5] That translates to a consumer surplus per U.S. household per month of between $5.40 and $15.70. By increasing the value of broadband connections, Wi-Fi may be driving home U.S. broadband adoption by anywhere between 4.3 to 9.8 million additional connected households.[6] It is important to stress that these estimates do not account for wireless carriers' and consumers' increased use of unlicensed Wi-Fi as a complement to licensed 3G mobile wireless broadband connectivity. They also do not account for the considerable economic benefits associated with business, educational, and other uses associated with Wi-Fi connectivity.

The economic benefits are equally compelling for wireless local area networks in U.S. hospitals. According to Thanki, the projected cost savings generated by use of voice over Wi-Fi and wireless electronic health records in U.S. hospitals come to a net present value of $92 to $154 billion, or an annualized $9.7 to $16.3 billion a year between 2009 and 2025.[7] These cost savings can translate to reduced costs and/or resources reallocated to improving the quality of healthcare for patients. Likewise, Thanki estimates the annual economic value derived from using RFID tags for in-store item-level tagging in the U.S. clothing retail sector of $2.0 to $8.1 billion per year between 2009 and 2025.[8]

The chart below summarizes the annualized economic benefits from Thanki's analysis of selected unlicensed applications:

Summary of modelled economic benefits of selected unlicensed applications in the US

Scenarios (2009 – 2025)	Low	Medium	High
Economic value generated by home Wi-Fi ($ billions)	4.3	8.4	12.6
Economic value generated by hospital Wi-Fi ($ billions per year)	9.6	12.9	16.1
Economic value generated by clothing RFID ($ billions per year)	2.0	4.1	8.1
SUM OF ANNUAL ECONOMIC VALUE ($ billions per year)	**16.0**	**25.4**	**36.8**

The three applications Thanki chose to analyze – Wi-Fi enhancing broadband access in homes, Wi-Fi delivering voice services and wireless access to patient records in hospitals and RFID tracking inventory in clothing retail stores – together may generate $16 to $37 billion per year in economic value for the U.S. economy over the next 15 years. The paper also estimates the economic value that might be generated from existing Wi-Fi applications improved through using the unused TV bands (the "white spaces") in the U.S. as $3.9 -7.3 billion a year over the next 15 years.

[5] *See id.* at 27.
[6] *Id.*
[7] *See id.* at 30.
[8] *See id.* at 34.

We would expect to see similar economic benefits experienced in other countries. For example, the paper details the benefits that could be derived from two applications that could be enabled by the propagation characteristics of white spaces spectrum: rural broadband in the EU and agricultural automation and monitoring in the Mediterranean region. The paper discusses how white spaces can be used to significantly reduce the costs of connectivity in rural areas, resulting in increased broadband adoption and consumer surplus. The paper also details how white spaces can be used in wireless irrigation control networks to reduce water scarcity.

Given the growing importance of wireless technology in the world economy, and particularly in next generation communications, Microsoft recommends that the ITU consider advising member countries in ways to secure greater availability of spectrum for new services and applications. Accordingly, the ITU could recommend that member countries introduce mechanisms to increase spectrum efficiency, including trading and liberalisation of licences and also administrative incentive pricing for public sector users. In particular, the ITU should consider recommending that the earliest possible opening of white spaces in underutilized spectrum below 1 GHz. The white spaces are suitable for low/medium power applications and recent advances in technology enable consumers to benefit from this capacity without compromising licensed services in the band.

The use of interleaved spectrum for white spaces will provide consumers with another point of access to the network, will increase the capacity of networks, and will help to address potential spectrum shortages. This greatly underused capacity sits in the most economically valuable part of spectrum: which offers an optimum balance between coverage costs and antenna size. Further, white spaces capacity is greatest in rural areas, where broadband access is often poor. Paired with fibre-optic cable or high capacity wireless backhaul, white spaces provide a cost-effective way to extend Internet access to areas of lower population density. Encouraging the opening of white spaces through a harmonised framework would be a great step forward and would put the ITU at the forefront of international community, providing substantial economic and social benefits to citizens from an underused resource.