



CTIA

Building The Wireless Future™  
Cellular Telecommunications & Internet Association

## The “Win-Win” Spectrum Plan

### Introduction

The President’s FY 2003 budget supports the concept of a legislatively created trust fund to cover the expenses of reallocating Government spectrum to commercial use. The trust, funded from spectrum auction revenues, would pay both for relocation expenses and necessary system upgrades. In addition, the FY 2003 budget provides that the 1710-1755 MHz auction should be postponed from 2002 until 2004. Both these provisions are very important steps in helping to facilitate the transfer of spectrum from military to commercial uses currently being studied in the NTIA Plan announced in October 2001.

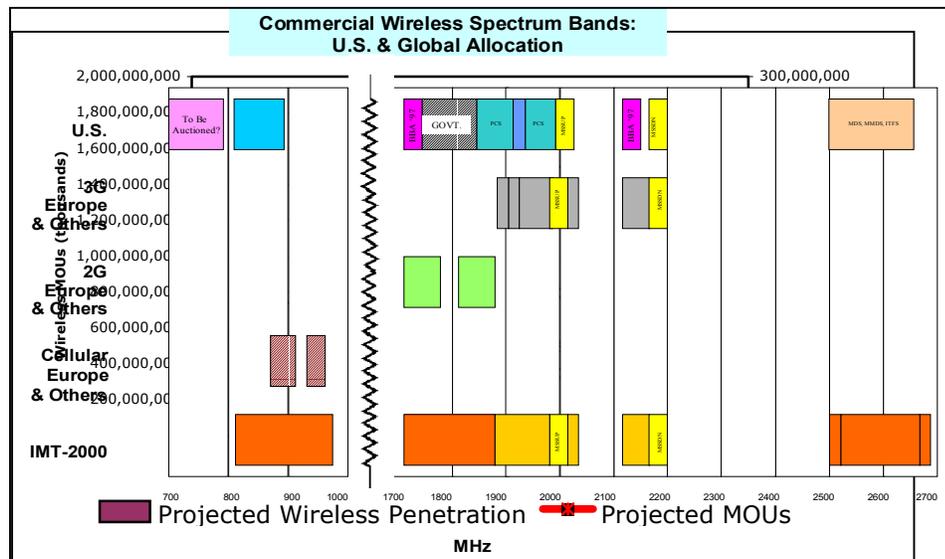
CTIA has analyzed the feasibility of making spectrum that is currently allocated for U.S. Government use available for commercial mobile service, consistent with the allocations in most other countries of the world. This paper focuses on the feasibility of obtaining that harmonized spectrum for commercial mobile use here in the United States.

### Background

International efforts to identify spectrum for advanced mobile service, labeled IMT 2000 by the International Telecommunication Union, began as early as the 1992 World Administrative Radio Conference. Based on an ITU study of IMT-2000 spectrum requirements, an additional 200 MHz is necessary to meet the total forecasted demand for terrestrial mobile spectrum by 2010 in the United States. The 1997 Balanced Budget Act helped lay the groundwork for meeting this demand by designating several blocks of spectrum to be auctioned for commercial service, including the 1710-1755 MHz Government band.

Since the 2000 World Radio Conference (WRC), the United States has devoted significant resources both in industry and Government to studying how best to make additional spectrum available to accommodate growth and the next generation of new services in the mobile wireless industry. The efforts by the Federal Communications Commission (FCC), the National Telecommunications and Information Administration (NTIA) and the Department of Defense have focused on the 1710-1850 MHz and 2110-2170 MHz bands. These bands are consistent with bands identified for commercial mobile service by the ITU, and are currently being used or planned to be used for these services in most other countries around the world.





During the first half of 2001, industry and Government focused on evaluating whether the entire 1710-1850 MHz band, which is currently used primarily by the U.S. military, could be made available over time for commercial mobile service, consistent with the use of these bands in other regions.

After the events of September 11<sup>th</sup>, CTIA entered into discussions with the Executive Branch aimed at narrowing the scope of the study to accommodate the military's need to devote resources to the war effort in the short run. In October, NTIA announced that the focus of the study had been narrowed to address a pairing of 1710-1770 MHz with 2110-2170 MHz. CTIA supports this proposed band pairing, and would like to see this study successfully concluded this Spring, consistent with the NTIA timetable.

### What Is The Same: Mobile Services Need More Spectrum in the 1700 MHz Band

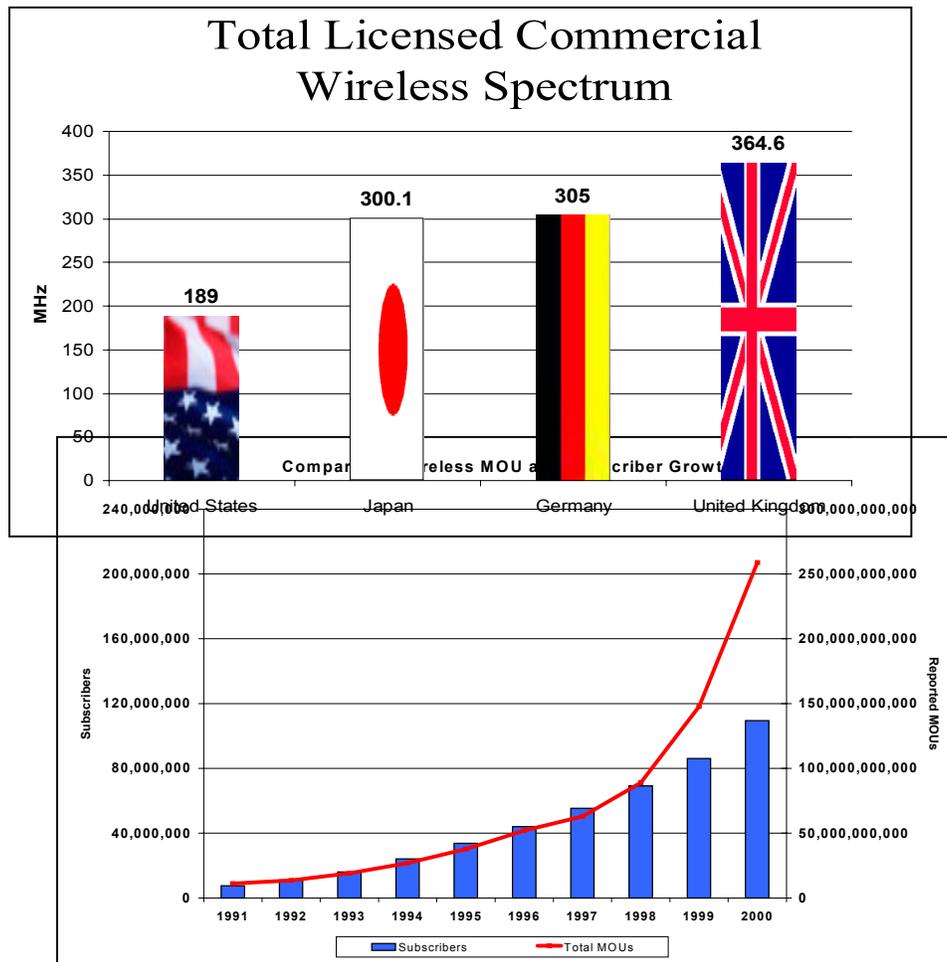
- *Demand Trends for Mobile Voice and Data Indicate Growth Will Continue*

Prior to WRC 2000, the International Telecommunications Union (ITU) conducted a study to assess the need for additional spectrum for advanced mobile services. It concluded that the total forecasted demand for terrestrial mobile spectrum by 2010 would be 390 MHz of spectrum in the Americas. In the United States, 189 MHz of spectrum is currently available for advanced mobile services, indicating that another 200 MHz would be necessary to meet the ITU's projection in this country. Since that estimate was made, demand trends in our country have outstripped projections, indicating that the 200 MHz estimate was in all likelihood understating the need for additional spectrum over the next decade.

The reality of the wireless marketplace is that overall voice usage has been soaring, at the same time data services are increasing in number, in kind, and in volume. The usage we have seen over the past few years has outstripped the volumes expected when the calculations were originally made in order to determine the appropriate spectrum allocations for commercial wireless service.

During the last decade, overall wireless subscribership in the United States has grown consistently at 20 percent or more a year. As the wireless industry has offered more service options and more attractive bucket pricing plans, the traffic volumes have grown even faster than subscribers. In fact, total minutes of use have grown at more than 75 percent a year for the last two years.

U.S. carriers have attempted to keep pace with this growth by technical fixes such as converting customers to digital and cell splitting, but these short-term measures have not alleviated the urgency of additional spectrum in the longer term. This spectrum requirement is not solely attributable to the promise of “3G” services – it is fueled by a combination of growth in subscribers and minutes for *existing* services, as well as a continual increase in



demand for developing new advanced mobile data services. To accommodate this growth, the wireless industry continues to believe that an additional 200 MHz will be required to meet growth in demand by 2010.

The United States currently lags the world in spectrum allocated for commercial mobile services. Our mobile wireless carriers now serve over 130 million subscribers, the

second largest customer base in the world. It is important that the United States pave the way for the allocation of enough additional spectrum for mobile services that our carriers will be able to provide these U.S. consumers with access to the same advanced services available to subscribers in other countries.

The 120 MHz being considered under the NTIA Plan will not fully satisfy this requirement, and longer-term spectrum requirements will need to be addressed in the future. But CTIA supports the proposed bandplan because it offers enough spectrum to meet near-term growth demand, while at the same time providing large enough blocks of spectrum to meet the needs of multiple competitors, ensuring that a competitive mobile wireless market will continue to benefit consumers. Any smaller allocation than the 120 MHz would not be sufficient to enable multiple competitors to obtain the blocks of spectrum they need to meet their customers' demand for advanced mobile services.

- ***Growth Requires More Spectrum That Is Harmonized with Global Allocations***

Unfortunately, spectrum is not fungible. It matters *where* that spectrum is located. Spectrum must not only be technically suitable, it must be compatible with the international allocation scheme. Consumers would benefit most if the additional spectrum were not only technically capable of being used for mobile (typically below 3 GHz), but also harmonized

with allocations for commercial mobile spectrum in other countries. Harmonized spectrum offers important economic benefits for consumers, operators and manufacturers:

- larger volume means lower R&D and production costs for both handsets and network infrastructure
- consumers will have access to less expensive, smaller handsets
- new products and services will get to market in less time
- U.S. mobile wireless market grows faster

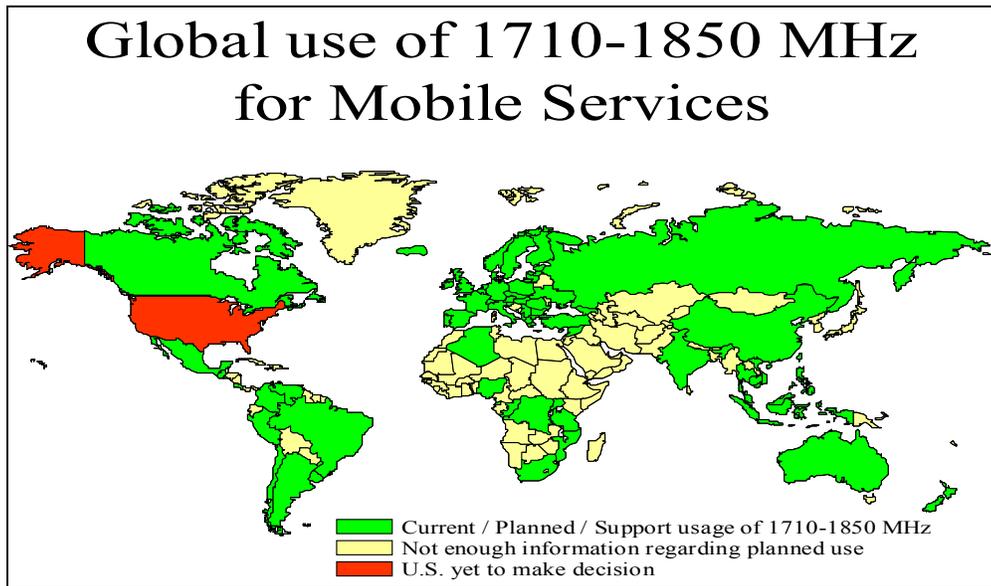
The vast majority of the rest of the world has allocated the 1710-1850 MHz band for commercial mobile service.

If the United States is to reap the benefits of harmonized spectrum, we must find spectrum in that band as well.

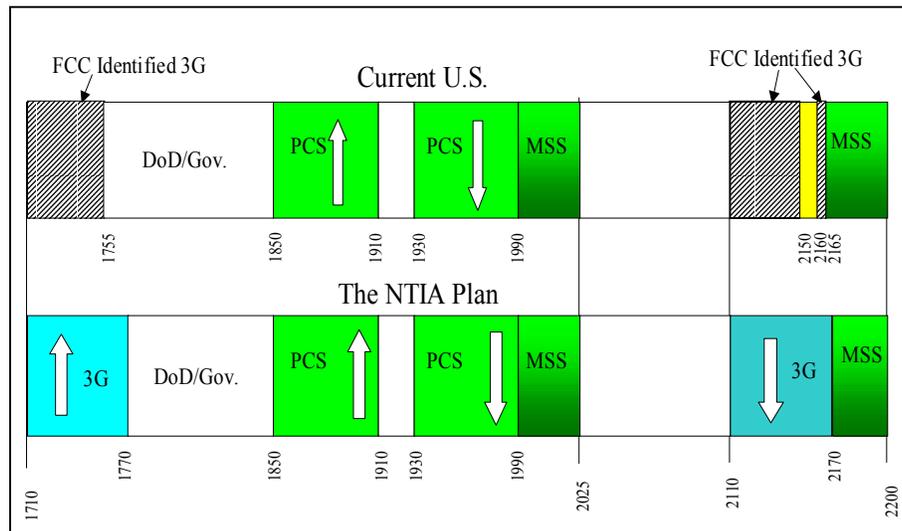
**What is Different: The NTIA Plan Requires Far Less Government Spectrum**

- *The NTIA Plan only requires 15 MHz of additional Government spectrum*

Last Spring, the search for additional spectrum for advanced mobile services was considering the entire 1710-1850 MHz band. The NTIA plan announced in October 2001 narrows the scope significantly to address pairing the 1710-1770 MHz Government band



with the 2110-2170 MHz commercial band. Although this bandplan offers less harmonization with international uses than if the entire 1710-1850 MHz were available, it does wholly overlap bands used internationally for commercial mobile services, and therefore offers significant harmonization benefits.



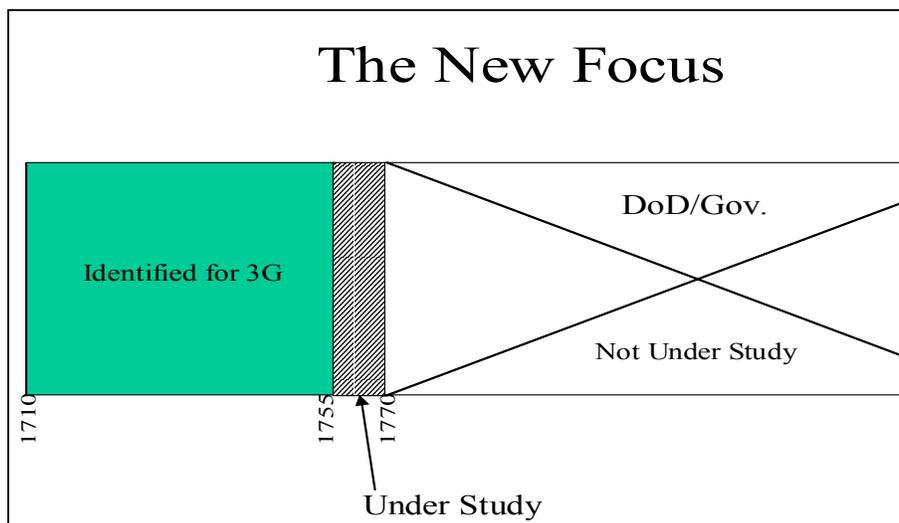
The NTIA Plan is built on two blocks of spectrum that were originally identified for reallocation in the 1997 Balanced Budget Act: 1710-1755 MHz of U.S. Government spectrum, and 2110-2150 MHz of commercial spectrum. Both these blocks of spectrum have thus been targeted for reallocation and auction since 1997, and the NTIA and FCC have been working on plans for the reallocation of these bands for their respective blocks. The NTIA Plan adds 20 MHz of commercial spectrum in the 2150-2170 MHz range to the proposed band pairing in the 2100 band, which includes spectrum currently allocated to MDS (Multipoint Distribution Service), as well as spectrum allocated to MSS (Mobile Satellite Service). In the Government bands, the NTIA Plan would add 15 MHz to the proposed band pairing, 1755-1770 MHz.

Since the 1710-1755 MHz band had already been designated to be reallocated from Government to commercial use by the 1997 Balanced Budget Act, the NTIA Plan only requires an additional 15 MHz of Government spectrum. The remaining 80 MHz of Government spectrum (1770-1850 MHz) that was being considered earlier last year is no longer “on the table” in the NTIA Plan.

- ***The NTIA Plan eliminates interference into most of the military systems entirely***

There were seven military systems that were being studied in the original consideration last Spring of the entire 1710-1850 MHz band:

- Air Combat Training
- Land Warrior
- Combat Identification for the Dismounted Soldier
- Satellite
- Conventional Fixed Microwave
- Tactical Radio Relay
- Precision Guided Munitions



Narrowing the spectrum band being considered to 1710-1770 MHz band eliminates most of the interference concerns that had been identified in the earlier study that looked at the entire 1710-1850 MHz band.

For three systems, there is now *no* overlap in frequency use at all, and thus no potential for harmful interference.

The system that presented the most challenges in March 2001, when NTIA was studying the entire 1710-1850 MHz band, was the satellite control system that operates from 1761-1842 MHz. Under the previous study, the primary concern was interference into satellite receivers from IMT-2000 base stations operating in the 1805-1850 MHz portion of the band. However, with the NTIA Plan, the terrestrial commercial mobile base stations would no longer transmit in the satellite band (they would instead transmit in 2110-2170 MHz). While IMT-2000 mobile transmitters will transmit in a small portion of the satellite receive band, NTIA has recognized the "...the potential interference is within the range of prudent risk management." (NTIA Final Report at xvi). As a result, the commercial mobile systems operating at 1710-1770 MHz will have no adverse impact on the military satellite systems. While there is some potential for interference from the satellite systems into the commercial mobile systems, the wireless industry has analyzed this issue and concluded that standard

## DOD Systems That Do Not Overlap With 1710-1770 MHz

- **Air Combat Maneuvering Instrumentation (ACMI) & Tactical Air Combat Training Systems (TACTS)**
  - Two channels aircraft-to-ground at 1778 and 1788 MHz
  - Two channels ground-to-aircraft at 1830 and 1840 MHz
- **Land Warrior**
  - Soldier-mounted WLAN enabling access to communication and information
  - 2.4 GHz spread-spectrum technology intended to be rebanded to operate in 1772-1822 MHz
- **Combat Identification for the Dismounted Soldier (CIDDS)**
  - Developmental system that operates in 1772-1822 MHz band.



mitigation techniques can be implemented to ensure that this interference would not impair mobile (or for that matter satellite) operations.

- *Systems with frequency overlap can be accommodated under the NTIA Plan*

There are three military systems that do have some operations in the frequencies being

### Satellite Control Stations – No Interference to Military Satellite Operations

- **Satellite Uplink for Tracking Telemetry & Control (TT&C)**
  - Primarily launch, early operation & anomaly resolution.
  - Operates at 1761-1842 MHz.
  - No interference to satellite operations
- **IMT 2000 base stations operate out-of-band.**
- **No unacceptable interference into satellites from mobiles.**
  - Potential interference from satellite earth stations into IMT-2000 base stations
- **Any such interference can be effectively managed due to low number of satellites operating at 1755-1770 MHz**




studied under the NTIA plan. In the case of each of these systems, however, there is a solution available that will enable commercial use of the additional 15 MHz being studied under the NTIA plan by 2005.

For each of these systems, significant sharing of spectrum between the military and commercial mobile systems can be achieved through geographic separation and shielding. Many of these military systems are typically utilized in remote geographic areas, where the

### Systems That Operate in the 1710-1770 MHz Band - But Can Be Accommodated

- **Conventional Fixed Microwave**
  - Similar to commercial point-to-point systems that were relocated as necessary to accommodate PCS.
  - Public safety fixed links and systems operated by the Federal Power Agencies in 1710-1755 MHz band are grandfathered.
- **Tactical Radio Relay (TRR)**
  - Transportable fixed operation
  - Capable of operating on different frequencies in the 1710-1850 MHz band
- **Precision Guided Munitions (PGM)**
  - Remotely-launched air-to-ground missiles
  - Capable of operates on different frequencies in the 1710-1850 MHz




short-term spectrum needs of mobile carriers are less demanding. Because mobile carriers plan to upgrade to advanced mobile services in existing spectrum, it will take considerably longer before additional spectrum is required in remote areas compared to urban areas because of lower population densities. This creates greater opportunities for sharing in remote areas. In the case of fixed point-to-point microwave systems, this means that systems

will only need to be relocated as a mobile license builds out its system. In very remote areas, it may be possible for the microwave user to remain indefinitely. Tactical Radio Relay and Precision Guided Munitions are also highly likely to be utilized in the United States to support military operations in remote areas, where training exercises are typically conducted, and thus there is also potential for sharing with some of these systems.

There will be some geographic areas in which sharing would not be possible with these three systems in the long run. In these situations, it is both feasible and desirable from the military's perspective to relocate these systems to other frequency band. Most of the radios in these systems can be retuned to another frequency to avoid interference, just as many systems have had to be retuned to be deployed internationally. In the case of fixed microwave, for example, these are the same type of systems that were relocated to make way for PCS here in the early 1990s, and are tuned to frequencies outside of the 1710-1850 MHz band outside the United States. The March 2001 DoD report acknowledged that in many cases, these links could be retuned to other spectrum already utilized by military systems (see DoD Report, p. E-9).

Tactical Radio Relay and Precision Guided Munitions are both systems that would benefit from increased compatibility with international spectrum uses. This is an additional reason why relocating these systems to other frequency bands could be beneficial, to the extent sharing is not possible. DoD has indicated that the potential for interference between commercial mobile systems and tactical radio relay systems in Europe has led them to investigate developing a new High Capacity Line of Sight mobile radio system to help solve this conflict. DoD March 2001 Report, p. C-6. Similarly, Precision Guided Munitions would be able to be deployed both domestically and internationally as necessary, if they could be developed in frequency bands that are not currently widely utilized for commercial mobile services around the world, as is the case for the 1710-1850 MHz band.

### **Meeting Military and Economic Challenges in the 21<sup>st</sup> Century**

The U.S. wireless industry believes that the NTIA Plan is a “win-win” for *both* mobile wireless consumers and the U.S. military. Consumers are pushing for better service quality and new data services. Carriers need more spectrum, and harmonized spectrum, to meet that demand. The U.S. military needs state-of-the-art systems that can be deployed both in the United States and overseas. The NTIA Plan helps further that goal by ensuring that there is no frequency overlap with DOD systems that cannot easily be moved in the near-term, and the Administration's FY 03 budget crafts an auction-funded trust fund to pay for both relocation and upgrade costs.