

AN INTRODUCTION TO SPECTRUM REALLOCATION LEGISLATION

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ABSTRACT

In the past four years Congress has passed legislation mandating the reallocation of 255 MHz of radio frequency bands from Federal to non-Federal or "MIXED USE." Several of the frequency bands supporting telemetering functions were affected, and more legislation of this nature is forecasted.

KEY WORDS

Spectrum Reallocation, Spectrum Encroachment, Aeronautical Telemetry, OBRA-93, BBA-97.

INTRODUCTION

Aeronautical flight testing is an expensive, technically sophisticated and, at times, dangerous production. A number of complex and organizationally independent functions must be successfully coordinated to complete a mission. Examples of some of these are: range safety, chase aircraft, weather, radars, recorders, and, of course, aeronautical telemetry support. Because a mission relies on so many disparate factors, the availability of sufficient dedicated frequencies and frequency bands is essential.

The aeronautical flight test community is heavily dependent on access to four portions of the electromagnetic spectrum. Specifically, the 1435-1525 MHz and 2310-2390 MHz bands (also referred to as "L-Band" and "Upper S-Band" respectively) are used by the Department of Defense (DOD), the National Aeronautics and Space Administration and the civil aerospace industry for the development and checkout of manned aircraft. The 2200-2290 MHz band ("Lower S-Band") is restricted to telemetering of unmanned flight vehicles such as drones and missiles. Although the 1710-1850 MHz band was reallocated to other functions many years ago several ranges still retain frequency assignments in this band for air/ground video telemetry operations. Loss of access to these bands, or portions of these bands, would have a significant cost to the telemetering community.

BODY

On 10 February 1995, then-U.S. Secretary of Commerce Ronald H. Brown issued the National Telecommunications and Information Administration's (NTIA) "Spectrum Reallocation Final Report." Mandated by the Omnibus Budget Reconciliation Act of 1993 (OBRA-93), this report identified 235 MHz of radio frequency bands for reallocation from Federal to non-Federal or "MIXED USE":

<u>BANDS</u>	<u>REALLOCATION TIMETABLE</u>
1390-1400 MHz	January 1999
1427-1432 MHz	January 1999
1670-1675 MHz*	January 1999
1710-1755 MHz*	January 1999/2004**
2300-2310 MHz	August 1995
2390-2400 MHz	Complete
2400-2402 MHz	August 1995
2402-2417 MHz	Complete
2417-2450 MHz*	August 1995
3650-3700 MHz*	January 1999
4635-4660 MHz	January 1997
4660-4685 MHz	Complete

* These bands are designated "MIXED USE"

** The reallocation was moved forward for the top 25 U.S. cities to January 1999. Only existing Federal agencies will continue within 150 km of these cities. All other areas will be reallocated in January 2004.

Four of the reallocated bands were designated "MIXED USE." This means that limited amounts of some classes of Federal transmitters will be conditionally permitted to operate in these bands. In addition to this clemency, the transfer of certain bands at specified locations will be delayed (in many cases indefinitely) to protect certain high-value users.

There were three primary objectives to this legislation. The first was to increase the efficiency of spectrum use and the effectiveness of the spectrum management process. The second, to promote and encourage the use of new spectrum-based technologies in telecommunications applications. The third, to add several billion dollars to Government coffers through competitive bidding (auctions) for the reassignment and licensing of the reallocated bands to the private sector by the Federal Communications Commission (FCC).

These noble goals were of little comfort to those spectrum orphans who were expected to:

- Locate unoccupied Government spectrum and get replacement assignments for their expelled equipment. And with fewer frequency bands and more systems to accommodate, spectrum congestion and conflict would increase.
- In some cases, totally re-engineer the expelled equipment to fit the characteristics and standards of the new band; a wretched and expensive burden indeed. Since Title VI did not provide a mechanism to compensate Federal agencies for the costs of this reallocation, the user was responsible for funding, converting, retuning and replacing his displaced frequencies and equipment.

The NTIA was tasked to research and identify the spectrum for reallocation. To make the transfer as painless and efficient as possible, the NTIA sought out the Government spectrum that:

- Was not required for the Government's present or future needs.
- If transferred, would not result in costs or loss of services that were excessive in relation to the benefits.
- Had the greatest potential for productive uses and public benefits (and auction profits) when sold to the private sector.

OBRA-93 was more of a nuisance than a handicap to the telemetering community. The 1390-1400 MHz and 1427-1432 MHz bands host the DOD's Range Joint Program Office (RAJPO) data link system. However, in 1999 the RAJPO assignments in these bands were not deleted but rather permitted to operate on a non-interference basis to existing and future non-Federal assignments. Also, all of the remaining telemetry assignments in the 1710-1755 MHz band will be deleted but the rest of the 1755-1850 MHz band remains Federally-allocated.

After two years of thorough search and sometimes painful negotiation the NTIA succeeded in minimizing the reallocation impact to Federal users. Of the thousands of types of emitters used by the Government, just a few dozen were affected to any extent. Most of these lost a fraction of their allocated operating band, meaning their operators would merely have to shift their assignments a few MHz up or down. Only a few major systems, like the U.S. Navy's Cooperative Engagement Capability Data Distribution System and the AN/SPN-43 air traffic control radar, were seriously impacted.

However, despite the word "FINAL" in the title of the reallocation report, the raids on Federally-allocated spectrum continued. When the initial spectrum auctions produced several billion dollars for the US Treasury, members of Congress took notice and generated further spectrum reallocation proposals, many of them crackpot. On 7 June 1995, Senate Bill S.888

was brought before a vote. This bill by Senator Stevens (R-Alaska) proposed reallocation of another 275 MHz of Government spectrum, including the entire 225-400 MHz band. In 1993 the DOD declared that the 225-400 MHz band was the single most critical spectrum resource of the military tactical forces, both nationally and within the North Atlantic Treaty Organization. Despite this proclamation Bill S.888 passed by a voice vote. Once the Bill passed the House and was signed into law by the President the DOD would have nine months to vacate the band.

The DOD was stunned. Not only had the Senate totally overlooked the significance of the band to the national defense but the DOD had no notice this Bill was even being contemplated until the day of the vote. The resulting outcry quickly persuaded Senator Stevens to strike reallocation of the 225-400 MHz band from the Bill, but the DOD knew this was just a brief respite. Realizing the gravity of the threat to its electromagnetic spectrum assets the DOD has since mobilized to:

- Ensure there are no more breakdowns in liaison between the DOD and Congress concerning proposed spectrum reallocation legislation.
- Document and justify its use and possession of its remaining frequency bands against further encroachment.
- Somehow predict the access it will have to crucial spectrum assets in the near and far terms; an access largely dependent on national-level legislating and budgeting whims.

There were other circumstances that slowed the impetuous of the reallocation frenzy. Pressured by a voracious Congress the FCC increased the pace of the spectrum auctions. As a result too much spectrum was dumped on the market too soon, resulting in a glut. One auction was predicted to pull in about \$1.8 billion; instead it only raised \$13.6 million, or less than 1% of the expected amount. At the same time many of the earlier auction winners were declaring bankruptcy; they belatedly discovered that neither the market or the required technology was prepared to accommodate their pricey electromagnetic investments.

Despite these alarms, on 8 August 1997, President Clinton signed into law the Balanced Budget Act of 1997 (BBA-97). Title III of the BBA required the Federal Government to surrender 20 more MHz of spectrum below 3 GHz for future auctions NLT 8 February 1998. It is important to note that the BBA-97 required identification of reallocatable frequencies in a report to the Congress within six months. In contrast, the report to Congress on OBRA-93 was submitted after 18 months of analysis and negotiation. The BBA-97 final reallocation plan is detailed below:

<u>BANDS</u>	<u>REALLOCATION TIMETABLE</u>
139.0-140.5 MHz*	January 2008
141.5-143.0 MHz*	January 2008
216-220 MHz*	January 1999
1385-1390 MHz	January 1999
1432-1435 MHz*	January 1999
2385-2390 MHz	January 2005

* These bands are designated "MIXED USE"

The loss of the 1385-1390 MHz band removed additional channels from the RAJPO system, which reduced the number of aircraft that can be simultaneously in the same geographic area. However, all RAJPO-hosting facilities were excluded from the mandates of reallocation until January 2009. Reallocation of the 1432-1435 MHz band removed the upper channel for the RAJPO system. To protect this investment, all RAJPO sites were granted indefinite protection.

More significant is the loss of the 2385-2390 MHz band. This band is used at DOD test ranges and by the private sector aerospace industry for flight test telemetry for manned aircraft such as the F/A-18E/F, V-22, F-22, Joint Strike Fighter and the Boeing 777. Since the 2310-2360 MHz band was reallocated in 1992 to the Digital Audio Broadcasting industry, its usability will soon be lost to the flight test community. Loss of the 2385-2390 MHz band will mean increased program schedule slippage and range operations costs because only 25 MHz of spectrum (2360-2385 MHz) will be available for aeronautical telemetry in the Upper S-Band.

CONCLUSION

Both the House and Senate Commerce committees predicted in the BBA-97 revenues of \$26.3 billion over the next five years from spectrum sales. In light of recent shortfalls in predicted auction profits this figure is certainly over-optimistic. Still, while not the bottomless piggy bank some partisans anticipated, the spectrum sales have proven profitable. As a result pressure to reallocate more Federal (and telemetry) spectrum to non-Federal use will continue for the foreseeable future.

For more information consult the "DOD Spectrum Encroachment WWW Page." This is an unclassified, continuously updated compendium of spectrum reallocation-related documents, reports, bulletins, summaries and sources. It allows the spectrum user to identify and track the numerous crucial spectrum encroachment issues that will directly impact their systems and facilities. It can be used as a tool for informing and educating other spectrum users and defending against loss of their spectrum assets. Finally, it serves as a "rumor control" to head

off much of the counterproductive speculation and misconception that have followed the different surges of encroachment legislative proposals. The Web Address is:

<http://spectrum.nawcad.navy.mil>

REFERENCES

Brown, Ronald, "PRELIMINARY SPECTRUM REALLOCATION REPORT: Response to Title VI – Omnibus Reconciliation Act of 1993," NTIA Special Publication 94-27, National Telecommunications and Information Administration, U.S. Department of Commerce, Washington, DC, February, 1994.

Brown, Ronald, "SPECTRUM REALLOCATION FINAL REPORT: Response to Title VI – Omnibus Reconciliation Act of 1993," NTIA Special Publication 95-32, National Telecommunications and Information Administration, U.S. Department of Commerce, Washington, DC, February, 1995.

U.S. General Accounting Office, "DEFENSE COMMUNICATIONS: Federal Spectrum Sale Could Impair Military Operations," GAO/NSIAD-97-131, Washington DC, June, 1997.

Daley, William, "SPECTRUM REALLOCATION REPORT: Response to Title III of The Balanced Budget Act of 1997," NTIA Special Publication 98-36, National Telecommunications and Information Administration, U.S. Department of Commerce, Washington, DC, February, 1998.

BIOGRAPHY

Mr. Mikel R. Ryan is the Head of the Mid-Atlantic Area Frequency Coordination Office at the Naval Air Warfare Center Aircraft Division, Patuxent River, MD. He served in the US Army 82nd Airborne Division and the 11th and 19th Special Forces Groups (Airborne), and retired a Master Sergeant in 1994. In September 1997, Mr. Ryan was given a Congressional Tribute by the HON. Steny H. Hoyer (D-Maryland) for his tenure as the Chairman of the Frequency Management Group of the Range Commanders Council. Mr. Ryan has been heavily involved with defending Federal spectrum from reallocation since 1994.