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**COMMERCE SPECTRUM MANAGEMENT ADVISORY  
COMMITTEE (“CSMAC”)**

**RECOMMENDATIONS FOR IMPROVING THE PROCESS FOR  
IDENTIFYING SPECTRUM FOR FUTURE REALLOCATION  
OR SHARING**

August 22, 2008

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## SUMMARY

The U.S. Department of Commerce Spectrum Management Advisory Committee (“CSMAC”) has been charged with recommending improvements to the processes of (i) reallocating spectrum from Federal to non-Federal users, (ii) identifying spectrum to be reallocated, and (iii) identifying radio systems and spectrum for Federal/non-Federal sharing. This report contains those recommendations.

In preparing the report, the following materials were reviewed (i) comments submitted in various FCC proceedings initiated to reallocate spectrum from Federal Government to commercial use or to facilitate spectrum sharing, (ii) the U.S. Department of Commerce’s Federal Strategic Spectrum Plan, and (iii) press reports regarding various spectrum reallocations. In addition, input was solicited from Federal Government and commercial entities regarding recent experiences relating to the Advanced Wireless Services (“AWS”) spectrum reallocation process and sharing between Federal Government and non-Federal Government entities in other bands. Information from all these sources was utilized to prepare this report.

Based on this information, and as discussed in more detail below, CSMAC makes the following recommendations:

- Future spectrum reallocations or sharing should only be mandated in response to identifiable needs/demands taking into account impact to both commercial and government operations;
- The timeline of the relocation process should be clearly defined and consistently applied;
- Improve information dissemination prior to reallocation/auction/sharing process so that potential applicants for spectrum will have a clear understanding of the technical requirements and needs of incumbents. This would also allow parties interested in sharing to have a better understanding of Federal Government needs. For example, commercial entities must have sufficient information to fully understand whether commercial deployments will be possible before the Federal operations are fully relocated;
- Use the portal established by the Department of Defense (“DoD”) as the baseline model for exchanging information between Federal Government and commercial entities regarding relocation issues;
- Develop secure on-line capabilities that will allow, where feasible, for virtually instantaneous coordination between Federal and non-Federal systems operating on frequencies identified for relocation or sharing;
- Oversight responsibility for the relocation of Federal Government systems should be centralized;
- Funds should be allocated for agencies to hire temporary personnel solely to address a relocation process;
- To facilitate the process, interim spectrum clearing benchmarks (measured by spectrum, geography, or a similar metric) should be evaluated as a vehicle for facilitating the deployment of commercial systems during the relocation process;

- Incentives should be created to spur agencies to promptly clear spectrum bands identified for reallocation to other uses.

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# RECOMMENDATIONS FOR IMPROVING THE PROCESS FOR IDENTIFYING SPECTRUM FOR FUTURE REALLOCATION OR SHARING

## INTRODUCTION

In May 2003, President George W. Bush established the “Spectrum Policy Initiative” (“SPI”) which called for “a comprehensive review of spectrum management policies . . . with the objective of identifying recommendations for revising policies and procedures to *promote more efficient and beneficial use of spectrum without harmful interference to critical incumbent users.*”<sup>1</sup>

The SPI directed the Secretary of Commerce, after consultation with other agencies and public meetings, to prepare reports with recommendations for, among other things, identifying policy changes that would create incentives for more efficient and beneficial use of spectrum.<sup>2</sup> On May 19, 2005, the Secretary of the U.S. Department of Commerce established the Spectrum Management Advisory Committee (“CSMAC”)<sup>3</sup> “to advise the Assistant Secretary of Communications and Information, Department of Commerce on needed reforms to spectrum policies and management to enable the introduction of new spectrum dependant technologies and services including expediting America’s access to broadband services.”<sup>4</sup>

In December 2007, NTIA formally charged CSMAC with providing recommendations regarding (i) improvements in the process of identifying spectrum for future reallocation of incumbents (Federal or non-Federal) and what, if any, changes NTIA should consider to improve

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<sup>1</sup> Presidential Memo on Spectrum Policy: Spectrum Policy for the 21<sup>st</sup> Century, 39 Weekly Comp. Pres. Doc. 726, 727 (May 29, 2003) (“SPI Memo”), *available at* <http://www.whitehouse.gov/news/releases/2003/06/20030605-4.html>.

<sup>2</sup> *See* SPI Memo at § 2.

<sup>3</sup> *See* U.S. Department of Commerce, Charter of the Spectrum Management Advisory Committee (May 19, 2005).

existing processes for spectrum reallocation, and (ii) how to reduce regulatory burdens associated with the Federal/non-Federal sharing of radio systems, as well as suggestions on how the process can be streamlined. This report is being issued in response to that charge.

In preparing the report, committee members reviewed (i) comments submitted in various FCC proceedings initiated to reallocate spectrum from government to commercial use and to facilitate spectrum sharing, (ii) the U.S. Department of Commerce's Federal Strategic Spectrum Plan, and (iii) press reports regarding various spectrum reallocations. In addition, input was solicited from Federal Government and commercial entities regarding recent experiences relating to the Advanced Wireless Services ("AWS") spectrum reallocation process and sharing between Federal Government and non-Federal entities in other bands. Information from all these sources was utilized to prepare this report.

Based on this information, and as discussed in more detail below, CSMAC makes the following findings and recommendations:

#### *Findings*

- Congress has at times mandated spectrum reallocation, but those decisions have not always been based on a clear demonstration of commercial need;
- The Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 ("NDAA-99") and the Commercial Spectrum Enhancement Act ("CSEA") were groundbreaking progress because they represented the first attempts by Congress to establish a clear mechanism for reimbursing Federal agencies the cost of transitioning their operations from Federal spectrum that has been reallocated for non-Federal use;
- The CSEA was an innovative improvement in the process of reallocation of spectrum assigned to the Federal Government;
- Incumbent wireless users lack incentives to identify spectrum for reallocation and sharing;

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<sup>4</sup> See Spectrum Policy for the 21<sup>st</sup> Century — The President's Spectrum Policy Initiative: Report 2 Recommendations from State and Local Governments and Private Sector Responders at B-2 (June 2004) ("Report 2").

- Agencies are concerned, based on some past experience, that if they agree to allow non-Federal entities to perform tests or experiments on new technology in Federal bands, those non-Federal entities will not easily vacate the spectrum at the end of the testing and experimentation period — squatter problem;
- Non-Federal users do not appreciate/understand how Federal spectrum is being used. This is in part due to the limited information provided by the Federal agencies as part of the relocation process. A lack of sufficient information increases the risk to potential bidders and therefore can lead to lower bids or to unfulfilled expectations of auction winners. At the same time, some information about agency operations cannot be made available;
- Government entities generally do not have discretionary staff to dedicate to address relocation issues — this contributes to delay and frustration from entities seeking access to the spectrum prior to complete relocation of Federal systems (*i.e.*, access on a rolling basis prior to the estimated date for full relocation);
- Although NTIA and OMB provide guidance to the agencies with respect to the relocation process, each agency develops its own tailored approach to determining relocation cost and time estimates and in responding to requests for coordination of early entrance by auction winners. These approaches are not uniform.

#### *Recommendations*

- Future spectrum reallocations or sharing should only be mandated in response to identifiable needs/demands;
- The timeline of the relocation process should be clearly defined and consistently applied;
- Improve information dissemination prior to reallocation/auction/sharing so that potential applicants for spectrum will have a clear understanding of the technical requirements and needs of incumbents. This would also allow parties interested in sharing to have a better understanding of Federal Government needs. For example, commercial entities must have sufficient information to fully understand the scope of the Federal operations and whether commercial deployments will be possible before the Federal operations are fully relocated;
- Use the portal established by the Department of Defense (“DoD”) as the baseline model for exchanging information between Federal Government and commercial entities regarding relocation issues;
- Develop secure on-line capabilities that will allow, where feasible, for virtually instantaneous coordination between Federal and non-Federal systems operating on frequencies identified for relocation or sharing;
- Oversight responsibility for the relocation of Federal Government systems should be centralized;
- Funds should be allocated for agencies to hire temporary personnel solely to address a relocation process;

- To facilitate the process, interim spectrum clearing benchmarks (measured by spectrum, geography, or a similar metric) could be established to facilitate the deployment of commercial systems during the relocation process.
- Incentives should be created to spur agencies to promptly clear spectrum bands identified for reallocation to other uses.

## DISCUSSION

### I. LEGISLATIVE EFFORTS DESIGNED TO SPUR REALLOCATIONS

Over the years, there have been numerous Congressional efforts to improve the spectrum allocation process and to transfer spectrum from Federal Government to commercial use. The four most significant efforts — the Omnibus Reconciliation Act of 1993 (“1993 OBRA”), the Balanced Budget Act of 1997 (“BBA”), NDAA-99, and the CSEA — are discussed below.

#### A. Omnibus Reconciliation Act of 1993

In 1993, Congress enacted legislation — 1993 OBRA — that required the Secretary of the Department of Commerce to identify at least 200 MHz of spectrum currently allocated for use by Federal Government agencies that could be transferred to private sector use.<sup>5</sup> Pursuant to the statute, the entire spectrum recommended for reallocation had to be located below 5 GHz, with at least 100 megahertz of this spectrum below 3 GHz. 1993 OBRA also required the Secretary of Commerce to issue reports recommending specific spectrum for reallocation.<sup>6</sup>

1993 OBRA has been criticized on a number of grounds. There were no specific commercial uses identified as triggering the need for the reallocation of Federal Government spectrum. Instead, the reallocation of frequencies was motivated by a general perception that

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<sup>5</sup> See Pub. L. 103-66, Title VI, §6002 (d)(3), 107 Stat. 397.

<sup>6</sup> See *id.*, §6001(a)(3), as codified at 47 U.S.C. § 923.

spectrum is scarce and the Federal Government had been using its spectrum inefficiently.<sup>7</sup> Moreover, some have speculated that revenue generation rather than spectrum management motivated enactment of the spectrum-related provisions of 1993 OBRA. Others have criticized the process as failing to account for the impact on the mission of the Federal users subjected to relocation. The legislative history demonstrates that Congress contemplated requiring the reallocation of Federal Government frequencies which “*have the greatest potential for commercial use under the Act,*”<sup>8</sup> but this requirement was eliminated from the final version of the legislation.

In accordance with 1993 OBRA requirements, the Department of Commerce issued a report on February 10, 1994 that preliminarily identified spectrum for reallocation.<sup>9</sup> Three frequency bands totaling 50 MHz — 2390-2400 MHz, 2402-2417 MHz, and 4660-4685 MHz —

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<sup>7</sup> The House of Representatives also made the following findings that ultimately were stricken from the final Conference Report on procedural grounds, but were incorporated by reference because the “conferees believe that these findings and conclusions are important and lay the predicate for this legislation” (*see* House Conf. Rep. No. 103-213 at 473-74):

When many of the frequencies were initially assigned, spectrum was plentiful and, therefore, efficient use of the spectrum was a secondary consideration to the prevention of interference. Recently, the increasing demand for spectrum among the private sector and non-Federal Government users has resulted in [Federal Communications] Commission proceedings requiring users to employ more spectrum-efficient technologies. However, Federal Government users are not subjected to the discipline imposed by the Commission’s proceedings. As a result, Government users have not implemented spectrum-efficient technologies as extensively as have Commission licensees. The Committee finds that many of the frequencies reserved for government licenses are under-utilized or inefficiently used. . . .

House Report No. 103-111 at 264-64.

<sup>8</sup> House Report No. 103-111 at 265 (emphasis added).

<sup>9</sup> Nat’l Telecommunications and Info. Admin., U.S. Dep’t of Commerce, Special Publication 94-27, Preliminary Spectrum Reallocation Report (Feb. 1994) (“NTIA 1994 Preliminary Report”).

were identified for immediate reallocation.<sup>10</sup> In February 1995, the Department of Commerce released a final report<sup>11</sup> identifying the following frequency bands for reallocation:

|                      |                      |
|----------------------|----------------------|
| <b>1390-1400 MHz</b> | <b>2400-2402 MHz</b> |
| <b>1427-1432 MHz</b> | <b>2402-2417 MHz</b> |
| <b>1670-1675 MHz</b> | <b>2417-2450 MHz</b> |
| <b>1710-1755 MHz</b> | <b>3650-3700 MHz</b> |
| <b>2300-2310 MHz</b> | <b>4635-4660 MHz</b> |
| <b>2390-2400 MHz</b> | <b>4660-4685 MHz</b> |

#### **B. Balanced Budget Act of 1997**

Four years after enactment of 1993 OBRA, Congress passed the BBA which mandated that the Secretary of the Department of Commerce identify an additional 20 MHz of spectrum below 3 GHz for reallocation from Federal Government to private sector use.<sup>12</sup> The BBA also required the FCC to identify 55 MHz of spectrum for assignment to licensees using competitive bidding — 40 MHz from the 2110-2150 MHz band and 15 MHz from the 1990-2110 MHz band.<sup>13</sup> Congress cautioned the FCC, however, to carefully weigh the “taxpayers’ clear interest in continued government use of the 1990-2110 MHz band for space research” and authorized the President to designate replacement frequencies.<sup>14</sup> The FCC was further required to reallocate the 60 megahertz in the Upper 700 MHz band (746-806 MHz) as follows: 24 megahertz of spectrum for public safety services and the remaining 36 megahertz of spectrum for commercial use to be

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<sup>10</sup> *Id.*

<sup>11</sup> Spectrum Reallocation Final Report, Response to Title VI – Omnibus Budget Reconciliation Act of 1993, NTIA Special Publication 95-32 (Feb. 1995) (“1995 Spectrum Report”).

<sup>12</sup> Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 (1997).

<sup>13</sup> House Conf. Rep. No. 105-217 at 574.

<sup>14</sup> *Id.*

assigned by competitive bidding.<sup>15</sup> As with 1993 OBRA, the statute and legislative history contains scant discussion of any particular commercial need for the spectrum, other than a general perception of spectrum scarcity.

In February 1998, the National Telecommunications and Information Administration (“NTIA”) within the Department of Commerce issued a Spectrum Reallocation Report (“1998 Spectrum Report”) in response to the BBA.<sup>16</sup> The Report identified 20 MHz within the following bands for reallocation: 139-140.5 MHz; 141.5-143 MHz; 216-220 MHz; 1385-1390 MHz; 1432-1435 MHz; and 2385-2390 MHz.<sup>17</sup>

The FCC subsequently informed NTIA that it planned on satisfying its BBA obligation by identifying Federal Government spectrum within the 2025-2110 MHz band for assignment to commercial entities pursuant to competitive bidding.<sup>18</sup> NTIA objected to this proposal because the 2025-2110 MHz band was used for critical space science services by the Federal Government and several foreign governments.<sup>19</sup> NTIA noted that the BBA allowed the President to substitute an alternate 15 MHz and therefore proposed alternative bands.<sup>20</sup>

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<sup>15</sup> See 47 U.S.C. §337(a) (enacted by the Balanced Budget Act of 1997, Pub. L. No. 105-33, §3004, 111 Stat. 251, 266 (adding new Section 337(a) and establishing initial timetable for conducting auctions)). Although Congress did not specify the amount of spectrum to be reclaimed beyond the Upper 700 MHz Band, the Commission determined that all broadcasters using digital transmission systems could be accommodated in the core TV Channels 2-51. As a result, the 48 megahertz of spectrum in the Lower 700 MHz Band (698-746 MHz) became available for new services through competitive bidding.

<sup>16</sup> See Spectrum Reallocation Report, U.S. Department of Commerce, NTIA Special Publication 98-36 (Feb. 1998).

<sup>17</sup> *Id.*

<sup>18</sup> See Identification of Alternate Bands in Response to the Balanced Budget Act of 1997, NTIA 98-39 at 1 (Nov. 1998).

<sup>19</sup> See *id.* at 2-3.

<sup>20</sup> See *id.* at 1; BBA, § 3002(c)(4). Additionally, on October 5, 1999, Congress determined that the Federal Government continues to have a need for reliable communications between Federal agencies in the 138-144 MHz band and therefore mandated that the President reclaim the three megahertz of spectrum in the 138-144 MHz band, identified in the 1998 Spectrum Report, for

(continued on next page)

### C. Strom Thurmond National Defense Authorization Act for Fiscal Year 1999

In 1998, Congress passed the NDAA-99 which amended the NTIA Organization Act to require new non-Federal licensees to reimburse incumbent Federal entities in advance for the relocation costs incurred as a result of frequency spectrum reallocations.<sup>21</sup> Under the NDAA-99, NTIA would supply to the FCC information regarding the marginal costs associated with the relocation of the Federal entity; in turn, the FCC would notify potential bidders of the relocation costs prior to an auction.<sup>22</sup> A winning bidder was then required to compensate the Federal entity for any relocation costs.<sup>23</sup> These reimbursement requirements applied “to any Federal entity that operates a Federal Government station assigned to use[] electromagnetic spectrum identified for relocation” in the 1995 and 1998 Spectrum Reports and previously assigned to the DoD or the intelligence community “if before August 5, 1997, the Commission has not identified that spectrum for service or assigned licenses or otherwise authorized service for that spectrum.”<sup>24</sup>

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reallocation to exclusive Federal Government use. *See* Pub. L. No. 106-65, Div. A, Title X, §1052, 113 Stat 768 (1999).

<sup>21</sup> Strom Thurmond National Defense Authorization Act for Fiscal Year 1999, Public Law 105-261, § 1064(c), 112 Stat. 1920, 2132 (1998). Subsequently, the National Defense Authorization Act for Fiscal Year 2000 (NDAA-2000) (P.L. 106-65, Oct. 5, 1999) stipulated conditions to be met if spectrum in which the DoD is the primary user is surrendered and requires that NTIA, in consultation with FCC, identify and make available to DOD for its primary use, if needed, alternate band(s) as a replacement for the band surrendered. In addition, “if such bands of frequency are to be surrendered, the Secretaries of Defense and Commerce and the Chairman of the Joint Chiefs of Staff must jointly certify to relevant congressional committees that such alternative band(s) provide comparable technical characteristics to restore essential military capability.” Government Accountability Office, “Defense Spectrum Management: More Analysis Needed to Support Spectrum Use Decisions for the 1755-1850 MHz Band,” August 2001, at 9 n. 18.

<sup>22</sup> *See id.* However, it is important to note that, in some instances, there may be no costs associated with relocating Federal operations. For example, the 1432-1435 MHz band is subject to the CSEA but NTIA notified the FCC on December 27, 2005 that “there are no costs associated with relocating federal operations” from the band. *See* “Auction of 1.4 GHz Bands Licenses Scheduled for February 7, 2007,” FCC Public Notice, DA 06-1016 (Aug. 28, 2006).

<sup>23</sup> Pub. L. No. 105-261, §1064(c).

<sup>24</sup> *Id.*

With regard to spectrum identified in the 1995 Spectrum Report, however, NDAA-99 only applied to the 1710-1755 MHz band.<sup>25</sup>

#### **D. The Commercial Spectrum Enhancement Act**

In 2002, NTIA proposed to build on the NDAA-99 procedures by establishing a relocation trust fund that would pay all relocation expenses for Federal entities from auction proceeds.<sup>26</sup> Based largely on these recommendations, the CSEA was passed and signed into law on December 23, 2004.<sup>27</sup> The CSEA established a mechanism for reimbursing Federal agencies out of spectrum auction proceeds for the cost of relocating their operations from certain “eligible frequencies” that have been reallocated from Federal to non-Federal use and “achiev[ing] comparable capability of systems.”<sup>28</sup> Eligible frequencies comprise four bands specified in CSEA (the 216-220 MHz, 1432-1435 MHz, 1710-1755 MHz and 2385-2390 MHz bands), as well as any other band of frequencies reallocated from Federal use to non-Federal use after January 1, 2003, and assigned by the Commission through competitive bidding.<sup>29</sup> Bands of frequencies previously identified by the NTIA in the Spectrum Reallocation Final Report, NTIA Special Publication 95-32 (1995), are excluded.<sup>30</sup>

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<sup>25</sup> *Id.* Although ambiguously worded, the NDAA-99 “applied only to the bands transferred to non-Government use under BBA-97, to the 1710-1755 MHz band, and to future actions where commercial users of spectrum are seeking relocation in spectrum or modification in existing spectrum of a Federal Government station, but not to the bands transferred to non-Government use under OBRA-93.” *See Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, WT Docket No. 02-353, *Report and Order*, 18 FCC Rcd 25162, ¶ 48 (2003).

<sup>26</sup> U.S. Department of Commerce, National Telecommunications and Information Administration, “Commerce Department Asks Congress to Create Spectrum Relocation Fund for Federal Agencies Whose Spectrum Is Reallocated to Commercial Use,” NTIA Press Release, July 23, 2002 (available at <http://www.ntia.doc.gov/ntiahome/press/2002/relocationfund7242002.htm>).

<sup>27</sup> Pub. L. No. 108-494, 118 Stat 3896, 3992 (2004) (“CSEA”).

<sup>28</sup> *Id.*

<sup>29</sup> *See* 47 U.S.C. § 923(g)(2).

<sup>30</sup> *See* 47 U.S.C. § 923(g)(2)(B).

Under the CSEA, the “total cash proceeds” from any auction of eligible frequencies must equal at least 110 percent of estimated relocation costs of eligible Federal entities.<sup>31</sup> If the auction proceeds fail this threshold, the auction cannot be concluded and will be canceled.<sup>32</sup>

The CSEA requires NTIA to provide to the Commission relocation cost and timeline estimates “by the geographic location of the Federal entities’ facilities or systems and the frequency bands used by such facilities or systems . . . [t]o the extent practicable and consistent with national security considerations. . . .”<sup>33</sup> The statute permits the Commission to grant commercial licenses in these bands prior to relocation of Federal Government operations and the termination of a Federal entity’s authorization, but such licenses must be subject to a condition prohibiting commercial licensees from causing “harmful interference” to a Federal entity until such entity’s authorization has been terminated by NTIA.<sup>34</sup>

## **II. SIGNIFICANT REALLOCATIONS OF FEDERAL GOVERNMENT SPECTRUM OR MANDATED SPECTRUM SHARING**

With the foregoing background, this report analyzes experiences associated with the relocation of government spectrum for the development and deployment of Advanced Wireless Services (“AWS”) and opening the millimeter wave band for sharing between Federal Government and non-Federal entities. These examples are illustrative of the spectrum reallocation and sharing processes currently utilized by the Federal Government and set the groundwork for recommendations regarding possible improvements in the process.

### **A. Advanced Wireless Services (1710-1755 MHz and 2110-2155 MHz)**

As a result of spectrum reallocations mandated by 1993 OBRA and the BBA, the FCC allocated 90 MHz of spectrum in the 1710-1755 MHz and 2110-2155 MHz bands for the

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<sup>31</sup> CSEA, § 203(b).

<sup>32</sup> *Id.*

<sup>33</sup> 118 Stat at 3992-93 (codified at 47 U.S.C. §§ 923(g)(4)(A), (C)).

provision of AWS.<sup>35</sup> These bands are subject to the CSEA and include spectrum used by Federal Government entities that must be transferred to non-Federal use, spectrum currently used by fixed microwave services and designated for emerging technologies, and spectrum currently used by the Broadband Radio Service (“BRS”).

With regard to spectrum held by Federal Government entities, and consistent with its CSEA obligations, NTIA provided the Commission with the following information on December 27, 2005 for each Federal station in the 1710-1755 MHz band:<sup>36</sup>

- Serial Number
- Longitude/Latitude of Transmitter and Receiver sites
- Frequency Center Channel
- Bureau Code (Agency Identifier)
- Service Type (e.g., fixed microwave, aeronautical)
- Relocation Timeline
- Cost Estimate
- Agency Point of Contact.

The Commission, in turn, adopted rules requiring all AWS licensees to coordinate use of the 1710-1755 MHz band during the transition “so that licensees can deploy their systems in a timely and efficient manner without causing harmful interference to existing federal operations during the transition.”<sup>37</sup> According to the Commission, this coordination requirement was designed to “assist new licensees in determining when new systems can be deployed without

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<sup>34</sup> 118 Stat at 3994 (codified at 47 U.S.C. § 309(j)(15)(c)).

<sup>35</sup> The AWS allocation was adopted by the Federal Communications Commission after substantial consultation with, and input from, NTIA regarding operational impacts, interference risks, and continuity of government operations. *See, e.g.*, NTIA Report, “An Assessment of the Viability of Accommodating Advanced Mobile Wireless (3G) Systems in the 1710-1770 MHz and 2110-2170 MHz Bands” (July 22, 2002).

<sup>36</sup> *See The Federal Communications Commission and NTIA — Coordination Procedures in the 1710-1755 MHz Band*, 21 FCC Rcd 4730 (2006).

<sup>37</sup> *Id.*

causing harmful interference to federal incumbents.”<sup>38</sup> The following procedures were outlined as reasonable steps AWS licensees could take to satisfy the coordination requirement:

- The AWS licensee, or a third-party coordinator on its behalf, contacts the appropriate Federal agency to get information necessary to perform an interference analysis. The AWS licensee enters into Non-Disclosure Agreements, as appropriate, with the subject Federal agency.
- If a Federal agency does not provide the necessary information within 30 days of a request, AWS licensees may contact NTIA for assistance.
- Using TIA Bulletin 10F, or an alternative method agreed to by the parties in cases in which TIA 10F does not apply, AWS licensees make the interference analysis necessary for determining whether new AWS operations would potentially interfere with nearby incumbent operations.
- The AWS licensee or a third-party coordinator sends the interference analysis to the appropriate designated agency contact for review.
- The Federal agency will have 60 days from acknowledgement of receipt of the interference analysis, to review the interference analysis. At the end of 60 days, if the Federal agency does not raise an objection, the AWS licensee may commence operations.
- If an agency notifies a licensee that it is experiencing interference, the AWS licensee turns off the offending station immediately and makes any necessary changes to eliminate interference.<sup>39</sup>

Corresponding obligations also were imposed on Federal entities:

- Agencies must cooperate with licensees when contacted by providing, within 30 days of a request, site specific technical information necessary to complete the interference analysis.
- If an agency disapproves of an interference analysis submitted by an AWS licensee, the agency must provide the licensee with a detailed rationale for its disapproval.
- Should harmful interference occur, agencies will work in good faith to identify the source of the harmful interference and work with AWS licensees to eliminate or mitigate the interference.

To further facilitate the coordination process, NTIA published information on the Federal Government operations in the 1710-1755 MHz band<sup>40</sup> and provided a list of agency contacts on

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<sup>38</sup> *Id.*

<sup>39</sup> See *The Federal Communications Commission and NTIA — Coordination Procedures in the 1710-1755 MHz Band*, 21 FCC Rcd 4730 (2006).

its web site.<sup>41</sup> In some cases, however, the agencies did not provide the site specific technical information necessary to complete the interference analysis due to concerns regarding the release of information to the public. Some agencies dealt with the release of the data via non-disclosure agreements, but DoD developed a portal mechanism that permitted DoD to “green light” or identify problems with a project without revealing the information used in the interference analysis directly to the AWS developers.<sup>42</sup>

Virtually all parties agree that improvements to the CSEA relocation process are needed. First, interviews with commercial entities and government personnel demonstrate a fundamental flaw with the CSEA — it does not fund the hiring by the affected Federal agencies of government personnel dedicated to addressing the relocation of their systems. As a result, both commercial entities and government personnel were frustrated with the relocation process. In many cases, existing government personnel did not have the time necessary both to perform their regular duties and to address relocation requests with the immediacy expected or hoped for by the commercial entities.

Second, there was substantial uncertainty regarding commencement of the relocation process. Commercial entities that spent millions or billions on AWS licenses wanted the relocation “clock” to start as soon as they submitted payment for their licenses. Federal Government entities, on the other hand, often took the position that the relocation clock did not start until they received funds pursuant to the CSEA process — a process which often took months.

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<sup>40</sup> See [www.ntia.doc.gov/osmhome/reports/specrelo/index.htm](http://www.ntia.doc.gov/osmhome/reports/specrelo/index.htm).

<sup>41</sup> See [www.ntia.doc.gov/osmhome/reports/specrelo/pdf/1710-1755MHz\\_points\\_of\\_contact.pdf](http://www.ntia.doc.gov/osmhome/reports/specrelo/pdf/1710-1755MHz_points_of_contact.pdf).

<sup>42</sup> Further, DoD could not always describe in detail the results of its analysis because a description of the analysis might reveal details of the DoD operation.

Third, it appears that commercial entities did not have a firm understanding of how the Federal Government was using the spectrum. For example, Federal systems used for nationwide mobile operations were not necessarily identified as a deployment barrier for AWS bidders because system bandwidth was not included among the characteristics provided by NTIA. Thus, AWS bidders had not been able to ascertain whether their proposed systems might be blocked across the entire 45 MHz throughout the country until the Federal agencies vacated the spectrum. Also, since these Federal systems were already sharing the spectrum with other Federal operations, the AWS proponents did not recognize that the agencies would be unwilling to share spectrum with additional licensees until relocation had been completed. Borrowing from their experience with the relocation of non-Federal licensees to permit the deployment of new technologies and services (such as experience garnered from the relocation process to permit the development and deployment of Personal Communications Services (“PCS”)), commercial entities often assumed that the relocation process would take place in stages and that certain geographic areas or frequencies would be cleared well in advance of the complete relocation of the government system. Thus, commercial entities assumed that they could roll-out AWS service in advance of the date established for the final, complete relocation of government systems. However, some Federal entities maintained that such an approach was not contemplated or possible given the nature of the Federal operations.

Fourth, commercial entities generally expressed frustration over the lack of uniformity and agency knowledge regarding the relocation process. Individual Federal agencies had distinct approaches and knowledge levels regarding the relocation process. As a result, commercial entities often felt as though they were back at “square one” when they approached each Federal agency about relocation of their Federal operations for the first time. In general, a portal created by DoD for handling relocation requests was viewed as a baseline that should be used as a model

for other agencies as the minimum effort required by a government entity during the relocation process. Absent the creation of a fully automated process, such as the one utilized for the sharing of the Millimeter Wave spectrum discussed below, each Federal entity should utilize and improve upon the DoD model.

**B. “Millimeter Wave” Spectrum in the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands**

In October 2003, the FCC established service rules to promote the development and use of the “millimeter wave” spectrum in the 71-76 GHz, 81-85 GHz, and 92-95 GHz bands by non-Federal entities.<sup>43</sup> The Commission determined that the millimeter wave spectrum was optimally suited to sharing between Federal and non-Federal entities because the characteristics of the band require “highly directional, ‘pencil beam’” signals.<sup>44</sup> These highly directional signals permit the deployment of numerous systems without any threat of interference. Thus, the rules adopted by the FCC permitted the issuance of an unlimited number of non-exclusive, nationwide licenses to non-Federal entities to operate throughout the millimeter wave spectrum.<sup>45</sup>

To facilitate licensing, a web-based registration process was established by the FCC and NTIA to govern use of the millimeter wave spectrum by both Federal Government and non-Federal users.<sup>46</sup> The web-based process automated the frequency coordination process and permitted users to deploy systems in the millimeter wave band immediately.<sup>47</sup> The automatic

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<sup>43</sup> See *Allocation and Service Rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands*, WT Docket No. 02-146, *Report and Order*, 18 FCC Rcd 23318 (2003).

<sup>44</sup> *Id.* at 23337-39.

<sup>45</sup> *Id.*

<sup>46</sup> See NTIA News Release, “NTIA and FCC Launch On-Line Registration for High-Speed Wireless Links Sharing Spectrum in the 70-80-90 GHz Bands” (Feb. 8, 2005).

<sup>47</sup> *Id.*

process eliminated the delay associated with the traditional coordination process that required an exchange of information between Federal Government and non-Federal Government users.

Information gathered to date indicates that this sharing process has been extremely successful largely because of the nature of the operations and the lack of classified Federal operations in the band. Current security processes available to NTIA do not allow the connection of a classified database to a public web-site. Due to the lack of classified systems in the band, it was possible for the government to develop a fully automated system for coordinating operations between Federal and non-Federal entities.

### **III. LESSONS LEARNED**

#### **A. Spectrum Reallocation Often Required Without an Identifiable Need**

Spectrum reallocation and sharing decisions should be guided by multiple factors, including identified demand, but not general assumptions or revenue generation goals. The 1993 OBRA and the BBA reallocations were not driven by a particular demand and, as a result, some of the spectrum identified as part of the reallocation process failed to generate significant interest from commercial entities. Limited Federal Government resources were wasted conducting detailed system analyses and preparing relocation estimates for relocations that thus far have proven to be unnecessary.

#### **B. No Enticement for Agencies to Identify Spectrum for Reallocation**

Federal agencies are in the best position to determine which of its allotted frequencies are underutilized. There is little incentive for any agency to take this action, however, absent a Congressional directive and close monitoring by NTIA. Federal agencies are reluctant to relinquish operations in specific Federal spectrum — a valuable resource — when comparable replacement resources may be unavailable. Moreover, it is quite common for multiple Federal agencies and/or multiple Federal systems/operations to share a given frequency band — making

coordinated action and assessment of utility difficult. Thus, obtaining consent to commence commercial operations from one Federal agency does not necessarily clear the way for commercial operations — all Federal agencies operating on the relevant spectrum must consent to the proposed operations.

In the past, Federal entities have been penalized for working cooperatively with certain commercial entities to evaluate possible commercial use of Federal spectrum. Once the commercial entities gain access to the Federal spectrum, it can be extremely difficult to get the commercial entities to vacate the spectrum. The commercial entities effectively become “spectrum squatters.” These experiences have further chilled Federal efforts to work cooperatively with non-Federal users.

### **C. Information Available to Potential Bidders and Auction Winners Could be Improved**

Information gathered in preparation for this report demonstrates a virtually universal acknowledgement that non-Federal users do not fully appreciate/understand how Federal spectrum is being used prior to commencement of the auction, relocation or sharing process.<sup>48</sup> Transparency must be improved to permit potential bidders for Federal spectrum to quantify time to complete relocation, costs, *etc.* We note that increased transparency will improve the ability of auction participants to value the spectrum appropriately, which may increase or decrease auction revenue.

With regard to spectrum sharing, the consensus appears to be that the millimeter wave approach is extremely successful. Many of the problems associated with coordinating the relocation of Federal Government systems could be overcome if an automated system were

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<sup>48</sup> Parties often disagreed on the reasons behind this issue.

available similar to the one use for millimeter wave spectrum sharing.<sup>49</sup> This approach would eliminate much of the delay associated with the coordination process and likely would facilitate commercial deployments prior to the complete relocation of Federal systems. Before such an approach could be uniformly applied, however, a mechanism would need to be created to address coordination affecting confidential government operations. To date, NTIA may not connect classified data to a public website. Thus, no such mechanism currently exists.

#### **D. Disagreement Over Time Required for Relocation**

A common theme among participants in the Federal Government spectrum relocation process is that the parties generally disagree over how the relocation schedule should be calculated and the degree to which Federal Government systems must be relocated before commercial systems can be deployed.

First, there appears to be considerable uncertainty over the “start date” for purposes of calculating the length of the relocation process. Commercial entities believe that the relocation period should commence from the time they submit payment for their licenses. Some Federal entities, however, take the view that the relocation timelines do not commence until they receive funds via the CSEA process, consistent with the Federal appropriations model. Although OMB ultimately set the start date as the date OMB sent the funds to the agencies, some agencies indicated that the users would not receive the funds until their own agency took action to distribute the money. Some agencies were also concerned that relocation required the contracting of support services and such processes could take a long time and were outside the control of the users. These agencies argued that the start date should be linked to the date the

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<sup>49</sup> It is important to note, however, that the establishment of this mechanism will not necessarily increase the amount of spectrum available for sharing. Existing federal systems still may trigger a negative response in the coordination process.

Federal user actually received its funds or was enabled to act based on the reception of funds. These divergent expectations result in relocation timelines that vary by many months.

Second, commercial entities anticipated that they would be able to deploy certain systems prior to completing the full relocation of Federal Government systems. They point to the coordination procedures adopted by the FCC and NTIA “so that licensees can deploy their systems in a timely and efficient manner without causing harmful interference to existing federal operations during the transition.”<sup>50</sup> Thus, if a Federal user indicated that it would take 36 months to fully relocate its operations, some commercial entities may have assumed that a limited commercial deployment was possible in certain areas within 18 months. In some cases, however, the Federal Government agencies took the view that partial clearing to permit limited commercial deployments was not necessary — and in fact was extremely difficult given the nature of many Federal Government systems — provided they were able to complete the entire relocation process within the estimated timeframe.

#### **E. Lack of Government Personnel Dedicated to Relocation Issues**

All participants in the Federal Government spectrum relocation process agree that the lack of government personnel dedicated to relocation issues has hampered the relocation process. Commercial entities expressed frustration over the amount of time and number of contacts required to move the relocation process forward. Federal Government agencies, on the other hand, lack sufficient personnel to address a relocation process and respond with the speed expected by commercial entities that have spent millions or billions in order to obtain access to Federal Government spectrum.

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<sup>50</sup> See *The Federal Communications Commission and NTIA — Coordination Procedures in the 1710-1755 MHz Band*, 21 FCC Rcd 4730 (2006).

## **F. No Consistency Across Agencies Regarding the Relocation Process**

Commercial entities generally expressed frustration over the lack of uniformity within the Federal Government regarding the relocation process. Individual Federal entities had their own distinct approaches and particular knowledge levels regarding the relocation process. As a result, commercial entities often felt as though they were back at “square one” when they approached a new Federal entity about relocation for the first time. Although acknowledging that the circumstances of each agency will inherently differ, auction participants expect a baseline of common understanding across Federal agencies.

## **IV. RECOMMENDATIONS FOR IMPROVING THE PROCESS**

### **A. Future Spectrum Reallocations Should be Mandated Only in Response to a Identifiable Demand**

Spectrum is a scarce resource, but so too are human and financial resources within individual Federal agencies. Before human and financial resources are dedicated to evaluating the relocation of Federal systems, the need for commercial access to Federal spectrum should be clearly identified. The availability of this information also will enhance the ability of government to calibrate the demand with the nature of the Federal spectrum that would be made available.

This approach would not require a particular entity to identify a specific business plan for the spectrum, but rather seeks to avoid waste of government resources that would otherwise be spent in analyzing reallocation options.<sup>51</sup> There should be a correlation between the demand for spectrum and the frequencies identified to satisfy the demand. For example, if there is demand for applications that require large blocks of contiguous spectrum, a reallocation of non-

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<sup>51</sup> To the contrary, this report does not suggest that a new “pioneer’s preference” program be established whereby spectrum is awarded to applicants that identify fallow or underutilized spectrum that could be used to satisfy their private business plan.

contiguous, slivers of spectrum would not satisfy the demand. This process would more closely track the commercial system. There commercial entities identify commercial bands for reallocation, petition the FCC for reallocation of that specific band, and then the FCC assesses whether the public interest is served by the change.<sup>52</sup>

One option may be to supplement the traditional spectrum reallocation process by creating a formal mechanism that commercial entities could use to trigger a reallocation. For example, a process similar to that used in Guatemala could be established whereby a party requesting access to spectrum triggers an assessment of the viability of sharing or reallocation.<sup>53</sup> Thus, the Federal Government would only examine changes in Federal systems in response to commercial or public safety demand. This approach would resolve the issues created by 1993 OBRA and the BBA where spectrum was allocated, but there was little or no commercial interest.

#### **B. Improve Information Dissemination**

Many commercial entities expressed displeasure with the information available regarding government operations — both prior to the auction and during the relocation process. Steps should be taken to improve the availability of this information.

First, an automated process would be the optimal way to conduct the relocation process. Such a process has worked well with regard to the millimeter wave bands. Various parties referenced a system developed by the DoD for spectrum relocation purposes that has

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<sup>52</sup> For example, MVDDS advocates recently identified DBS bands as underutilized. The FCC subsequently agreed and created the new service.

<sup>53</sup> See *Ley General de Telecomunicaciones*, Art. 61; see generally Hazlett, Thomas W.; Ibarguen, Giancarlo; and Leighton, Wayne, "Property Rights to Radio Spectrum in Guatemala and El Salvador: An Experiment in Liberalization," *Review of Law & Economics*: Vol. 3: Iss. 2, Article 10 (2007) (available at [www.bepress.com/rle/vol3/iss2/art10](http://www.bepress.com/rle/vol3/iss2/art10)). Obviously the disparity in the breadth and scope of US Government and Guatemalan Government operations may limit the precedential value of this approach.

substantially improved the transparency and availability of information. Although the DoD model does not approach the millimeter wave automated approach in terms of speed and efficiency, parties universally agree that it is a step in the right direction. This DoD model is not used, however, by all Federal entities.

Second, clarity must be established regarding the relocation timelines — when does the clock start and what steps can be taken to permit limited commercial deployments prior to the full relocation of Federal Systems. Clarity also is necessary with regard to financial responsibility when the estimated relocation timeline is not met. Should the commercial entity be entitled to a rebate? What penalty is imposed on the Federal entity for failing to meet the relocation timeline?<sup>54</sup>

Third, the Federal Government should evaluate mechanisms that may permit sharing of information necessary for relocation purposes but that is confidential or otherwise exempt from the Freedom of Information Act (“FOIA”). For example, could commercial entities be provided with the information if they employed personnel having the appropriate clearances or utilize third-party entities with such personnel? Currently, security protocols assume that “need to know” means that the information is needed to directly support the government. This determination is not made by the Federal Government agency or entity with the sought after information and neither NTIA nor another agency can order the information released. It would be beneficial if participation in the relocation process were deemed to qualify as a “need to know, subject to appropriate clearances, etc....” It also would be beneficial if a centralized entity were authorized to review determinations denying access to information by entities that have submitted an application to participate in an auction.

Another improvement in the process would be to permit the release of information exempt under FOIA to licensees. Historically, some agencies have entered into agreements to release this information to auction winners subject to certain safeguard requirements. The release of information in this manner, however, prevented it from being used to value the spectrum and develop business plans. Accordingly, it is worthwhile to evaluate whether sufficient safeguards can be established to permit the release of this information prior to an auction to qualified bidders.

**C. Funds Should be Allocated for Agencies to Hire Personnel Dedicated to Relocation Issues**

Many of the problems with the relocation process would be solved or minimized if Federal entities had personnel in place to manage an agency's relocation process. Accordingly, the CSMAC should recommend that funding be provided for agencies to hire such personnel. Is it possible for the costs of these employees to be included in relocation costs that are reimbursed by auction funds? Alternatively, could the reimbursement mechanism be altered to guarantee a percentage of auction revenues for reimbursement purposes?

Moreover, in addition to having individual agencies with dedicated personnel for that agency's relocation process, it may be beneficial to centralize oversight responsibility for the relocation process within the executive branch and have dedicated relocation personnel there to interface with the auction winners. NTIA would seem particularly suited to this role provided it received the necessary funding and related resources. At a minimum, agencies should be required to identify personnel that would be responsible for a relocation process, and to have the personnel participate in centralized training process provided by NTIA. All Federal personnel

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<sup>54</sup> If penalties become part of the process, however, they may trigger more conservative relocation timelines from agencies. Thus, the benefits of such an approach must be carefully considered.

responsible for the relocation of government systems thus would have the same training and guidance.

#### **D. Interim Spectrum-Clearing Benchmarks**

As discussed above, commercial entities noted that some Federal agencies were reluctant to clear enough spectrum on an interim basis to permit commercial deployments. These agencies took the approach that commercial deployments could be delayed until the entire relocation process was complete. Commercial entities suggest that this approach appears inconsistent with the guidance provided to commercial entities by the FCC and NTIA regarding the AWS coordination process. Many Federal agencies understood that the FCC/NTIA guidance provided for the potential for early entry, but did not promise such a result. If the agencies can not, in a specific instance, limit or alter their operation until they are ready to vacate a portion of spectrum, the AWS users may not be able to deploy in a specific area and frequency. It thus may be beneficial to clarify whether commercial entities are entitled to deploy commercial systems on select frequencies or in certain geographic areas in advance of the final relocation deadlines. Interim relocation benchmarks may be a mechanism for ensuring that Federal entities work cooperatively with commercial entities during the “transition” of the spectrum from Federal Government to non-Federal Government use. For example, in some cases, the following benchmarks could be established (with all dates provided prior to any auction of the spectrum):

- Date by which 25 percent of the geographic area covered by a Federal system must be available for commercial use;
- Date by which 50 percent of the geographic area covered by a Federal system must be available for commercial use;
- Date by which 75 percent of the geographic area covered by a Federal system must be available for commercial use; and
- Date on which relocation will be completed.

Utilization of such an approach would depend upon the nature of the Federal usage but, where appropriate, may allow the Federal entities to test their new systems before the transition is

complete and would allow auction winners to begin operating sooner, which will allow them to begin recouping the costs of the license sooner. Such an approach likely will lead to higher auction proceeds.

#### **E. Incentives for Relocating**

Federal entities that identify spectrum for relocation and complete the relocation process promptly should be entitled to a substantial benefit. One approach would entitle a Federal entity that vacates a band earlier than envisioned to receive additional direct funding from the commercial entrant or auction proceeds. These funds would not be available, however, until the band was actually vacated by that Federal agency. This approach would provide a vehicle for increasing agency funding, which is especially important under current budgetary constraints. A direct correlation between spectrum relinquishment and funding would be a strong incentive to identify spectrum for relocation/sharing and to modify systems as soon as practicable. Legislation would be necessary, however, to permit utilization of this incentive approach.<sup>55</sup>

Further, if incumbent Federal radio users are to be encouraged to use non-radiocommunication technologies or commercial communications services in the future, some mechanism must be adopted to allow agencies to be reimbursed for subscriber costs for the period of the life of the incumbent radiocommunications system. Otherwise, users who move to commercial or non-radio technologies and services may be limited to reimbursement for the period that funds are available from OMB. A process should be established that provides the Federal users with certainty that they will be made whole and that the reimbursement for the

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<sup>55</sup> The Miscellaneous Receipts Act (“MRA”), 31 U.S.C. § 3302(b) requires “an official or agent of the Government receiving money for the Government from any source” to “deposit the money in the Treasury as soon as practicable without deduction for any charge or claim.” Thus, any incentive payment would have to be submitted to the Treasury, rather than retained by the Federal licensee receiving the payment for relocation purposes. Once revenue is submitted to the Treasury, it may only be dispersed pursuant to a specific Congressional directive.

replacement services does not cease after one year. If a Federal user vacates to clear spectrum for other uses, it should not incur any new costs. If the user opts for a new, replacement service, a mechanism should be established to ensure that the service is fully funded for a term equal to the remaining useful life of the system being vacated. It would be inadequate to force an agency to vacate an existing system based on a year-to-year appropriation that pays for the new service but which may evaporate after a single year.

Federal entities also may be offered incentives to actively consider spectrum sharing and relocation proposals. Sharing and relocation involve substantial resources and perceived risks and Federal entities must be give a rational basis to enter into such a process. Adoption of the joint NTIA/FCC test beds may provide a model vehicle for commercial entities to test their technologies and compatibility, while limiting access to the spectrum for a specified duration of time. Moreover Federal entities need to have assurances that the terms of any relocation or sharing arrangement is truly enforceable so as to ensure they get the full benefits of the arrangement with the anticipated level of risk.