

Third Interim Progress Report on the Ten-Year Plan and Timetable



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1. INTRODUCTION

Summary

The National Telecommunications and Information Administration (NTIA) submits this Progress Report as called for by the *Presidential Memorandum* issued on June 28, 2010, directing the Secretary of Commerce, working through NTIA and in collaboration with the Federal Communications Commission (FCC), to make available 500 megahertz of federal and non-federal spectrum by 2020 for expanded wireless broadband use.¹ To date, NTIA, in accordance with advice received from the Policy and Plans Steering Group (PPSG), has identified 210 megahertz of federal spectrum for potential reallocation, and continues to move forward to quickly transition the specified spectrum bands.² NTIA and the FCC have also kicked off the implementation of the key spectrum-related provisions of the Middle Class Tax Relief and Job Creation Act of 2012, enacted in February 2012.³

Key Accomplishments

This third interim report summarizes and assesses the progress made from October 1, 2011, through September 30, 2012, against the October 2010 *Plan and Timetable to Make Available 500 Megahertz of Spectrum for Wireless Broadband*, commencing annual updates.⁴ The key accomplishments for this reporting period include the following:

- NTIA and the FCC commenced actions to implement key spectrum provisions from the *Tax Relief Act*;
- NTIA published a report in March 2012 on the 1755-1850 MHz band, which recommended making 95 megahertz of prime spectrum available for commercial broadband use and identified the associated challenges to address;
- NTIA launched collaborative efforts between industry and government stakeholders to assess and recommend practical frameworks for the development of relocation, transition, and sharing arrangements and plans for 110 megahertz of federal spectrum in the 1695-1710 MHz and the 1755-1850 MHz bands;

¹ See Memorandum for the Heads of Executive Departments and Agencies, *Unleashing the Wireless Broadband Revolution* (rel. June 28, 2010), published at 75 Fed. Reg. 38387 (July 1, 2010), available at <http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution> (*Presidential Memorandum*).

² The PPSG is an advisory group of senior federal officials who advise NTIA on achieving the objectives of the *Presidential Memorandum*. See *id.* at § 1(c).

³ See Pub. L. No. 112-96, Title VI, 126 Stat. 201 (Feb. 22, 2012), available at <http://www.gpo.gov/fdsys/pkg/PLAW-112publ96/pdf/PLAW-112publ96.pdf> (*Tax Relief Act*).

⁴ See NTIA, *Plan and Timetable to Make Available 500 Megahertz of Spectrum for Wireless Broadband* (October 2010), available at http://www.ntia.doc.gov/files/ntia/publications/tenyearplan_11152010.pdf (*Ten-Year Plan*); *Presidential Memorandum* at § 1(d).

- NTIA initiated studies on the potential use of up to 195 megahertz by unlicensed broadband devices in the 5350-5470 MHz band and the 5850-5925 MHz band;
- The FCC commenced rulemaking proceedings to facilitate the transition of broadcasting and satellite spectrum bands to terrestrial mobile broadband services;
- The United States Government successfully advocated for an agenda item for the 2015 World Radiocommunication Conference to consider allocation of additional spectrum to the mobile service on a primary basis for International Mobile Telecommunications and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications; and
- NTIA and the PPSG continued reevaluation and reprioritization of other spectrum bands that offer the greatest opportunities for unleashing the innovative potential of wireless broadband and using the wireless spectrum more creatively and efficiently.

This report also provides an update on additional related activities of the FCC and the international spectrum community since the last interim progress report.⁵

Looking ahead, NTIA along with federal and non-federal stakeholders will continue to address the increasing radio spectrum needs of both federal and non-federal users as efficiently and effectively as possible. In implementing the *Presidential Memorandum* and the *Tax Relief Act*, the focus for the next 12 months will be on engaging industry and government stakeholders to continue to evaluate the feasibility of achieving the transition of the 210 megahertz previously identified through innovative relocation and sharing approaches, including the 1755-1850 MHz band, and to facilitate the evaluation of expansion options for unlicensed devices in the two above mentioned 5 GHz bands.

Background

In October 2010, pursuant to the June 2010 *Presidential Memorandum*, NTIA, with input from the PPSG, issued a Plan and Timetable to achieve the President’s 500 megahertz goal over the next ten years. Taking into account the significance of protecting vital government missions that rely on spectrum, NTIA’s *Ten-Year Plan* identified over 2,200 megahertz of federal and non-federal spectrum bands for evaluation, proposed a process for evaluating candidate bands, and set forth the steps necessary to select and make spectrum available for wireless broadband services.

In addition, NTIA selected four spectrum bands and worked with other federal agencies to perform a “fast-track” evaluation to determine whether any of the bands could be made available

⁵ See NTIA, *Second Interim Progress Report on the Ten-Year Plan and Timetable* (Oct. 2011), available at http://www.ntia.doc.gov/files/ntia/publications/second_interim_progress_report_on_the_ten_year_plan_and_timetable.pdf (*Second Interim Report*).

for commercial wireless broadband services within five years.⁶ This evaluation resulted in the identification of 15 megahertz in the 1675-1710 MHz band, and 100 megahertz in the 3550-3650 MHz band, subject to certain geographic limitations, for reallocation. NTIA also recommended that the federal government begin working within domestic and international processes to consider the reallocation of 4200-4220 MHz and 4380-4400 MHz bands for wireless broadband.⁷ On January 19, 2011, in furtherance of the recommendations in the *Fast-Track Report*, NTIA formally recommended to the FCC that it take regulatory action to repurpose the 1695-1710 MHz and 3550-3650 MHz bands for wireless broadband use on a geographic shared basis.⁸

NTIA next selected the 1755-1850 MHz band for detailed evaluation based on the nature of the current federal use of this spectrum, the likelihood of successfully repurposing the band within ten years, its harmonization with mobile allocations around the world, the existence of mature wireless equipment, and the band's advantageous propagation characteristics for mobile broadband operations. As discussed below, based on NTIA's March 2012 report analyzing this band, the Commerce Spectrum Management Advisory Committee (CSMAC) has established five new working groups to develop recommendations to facilitate the transition of the 1695-1710 MHz and 1755-1850 MHz bands.⁹

On February 22, 2012, the President signed the *Tax Relief Act* providing for, as recommended in the *Ten-Year Plan*, additional incentives, and support from the Spectrum Relocation Fund for federal users.¹⁰ The *Tax Relief Act* also requires, as recommended in the *Fast-Track Report*, the reallocation of 15 megahertz from the 1675-1710 MHz band.¹¹ This new legislation further requires that NTIA

⁶ See NTIA, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz, 4380-4400 MHz Bands* (Oct. 2010), available at http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf (*Fast-Track Report*).

⁷ See *id.*

⁸ See Letter from Karl B. Nebbia, Assoc. Admin. Office of Spectrum Mgt., NTIA, to Julius Knapp, Chief, Office of Eng. and Tech., FCC (Jan. 19, 2011), available at http://www.ntia.doc.gov/files/ntia/publications/ntia_fcc_letter_115_mhz_01192011.pdf (April 2011 Letter to FCC). See also NTIA, *First Interim Progress Report on Ten-Year Plan and Timetable* (Apr. 1, 2011), available at http://www.ntia.doc.gov/files/ntia/publications/first_interim_progress_report_04012011.pdf.

⁹ In 2004, the Department of Commerce established the CSMAC to provide advice to the Assistant Secretary for Communications and Information at NTIA on a broad range of spectrum management and policy issues. See generally <http://www.ntia.doc.gov/category/csmac>. CSMAC members serve in a personal capacity and do not officially represent any organization or interest, but they offer unique and valuable expertise and perspectives on, for example, reforms to enable new technologies and services, including recommended improvements that expedite the American public's access to wireless broadband services. Under its current charter, the CSMAC is focusing on how best to execute the *Presidential Memorandum* and the *Ten-Year Plan*. See U.S. Dept. of Commerce, *Charter of the Commerce Spectrum Management Advisory Committee* (Apr. 1, 2011), available at http://www.ntia.doc.gov/files/ntia/publications/csmac_charter_04012011.pdf.

¹⁰ See *Tax Relief Act* §§ 6701-6702, 126 Stat. 245-255. Congress established the Spectrum Relocation Fund in 2004 in the Commercial Spectrum Enhancement Act (CSEA) to provide incentives and financial assistance to facilitate the relocation of eligible federal agencies from reallocated bands that are auctioned by the FCC. See Pub. L. No. 108-494, Title II, 118 Stat. 3991 (Dec. 23, 2004), available at <http://www.gpo.gov/fdsys/pkg/PLAW-108publ494/pdf/PLAW-108publ494.pdf>. See also *Ten-Year Plan* at 16-17 (recommending CSEA reforms that would not only provide additional funds for better equipment to support federal agencies' mission-critical communications systems and reduce transition timeframes, but would also produce more efficient use of spectrum through sharing options, reduce long-run costs and increase auction proceeds).

¹¹ See *Tax Relief Act* § 6401(a), 126 Stat. 222.

evaluate spectrum sharing technologies and solutions in connection with the potential operation of unlicensed devices in the 5350-5470 MHz and 5850-5925 MHz band.¹²

2. ACTIVITIES AND ACCOMPLISHMENTS

Since October 1, 2011, NTIA and the participant federal agencies of the PPSG have endeavored to achieve the President’s goal of making 500 megahertz of spectrum available for wireless broadband according to the *Ten-Year Plan*. NTIA has chaired 18 meetings of the PPSG and the PPSG’s Spectrum Working Group. Table 2-1 provides an updated list of the spectrum bands that NTIA, in conjunction with the PPSG, have identified for investigation, adding 195 megahertz for the 5350-5470 MHz and 5850-5925 MHz bands, as required by the *Tax Relief Act*.¹³

Frequency Band (MHz)	Amount (megahertz)	Current allocation/usage
406.1-420**	13.9	Federal
1300-1390**	90	Federal
1675-1710*	35	Federal/non-federal shared
1755-1780***	25	Federal
1780-1850***	70	Federal
2200-2290	90	Federal
2700-2900**	200	Federal
2900-3100	200	Federal/non-federal shared
3100-3500	400	Federal/non-federal shared
3500-3650*	150	Federal
4200-4400**	200	Federal/non-federal shared
[4200-4220 & 4380-4400]		Federal/non-federal shared
5350-5470	120	Federal/non-federal shared
5850-5925	75	Federal/non-federal shared
Total	1668.9	

* Parts of these bands already recommended for reallocation in *Fast-Track Report*.

** Band obligated by U.S.-Canada or U.S.-Mexico bilateral agreement(s) and will require international consideration if repurposed.

*** The band, 1755-1850 MHz, was considered in its entirety in the report entitled *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1755-1850 MHz Band (March 2011)*.

The following subsections provide an update on activities that have occurred during the October 1, 2011 to September 30, 2012 reporting period including: (1) release of the 1755-1850 MHz band report and ongoing collaborative efforts to address the challenges outlined in the report; (2) progress on the transition planning for the 15 megahertz in the 1695-1710 MHz band; (3) implementation of changes to the Commercial Spectrum Enhancement Act (CSEA); (4) ongoing qualitative and quantitative analysis of the 5350-5470 and 5850-5925 MHz bands; (5) the

¹² *Id.* § 6406(b), 126 Stat. 231.

¹³ Compare *Second Interim Report* at 4, Table 2-1.

activities regarding the 2700-2900 MHz and 4200-4400 MHz bands; (6) the FCC's recent and ongoing activities; (7) reevaluation and reprioritization of selected bands for study; and (8) related international activities.

1755-1850 MHz Band Report and Ongoing Collaborative Efforts

On March 27, 2012, NTIA released its report on the viability of accommodating commercial wireless broadband in the 1755-1850 MHz band.¹⁴ Developed in collaboration with the predominant federal agency users of this band, the report concluded that the 1755-1850 MHz band could be repurposed for wireless broadband use. However, in light of several critical challenges related to the estimated timelines, costs, and complexities of completely clearing all of the federal users currently in the band, NTIA proposed a new path forward for consideration that relies on a combination of relocating federal users and sharing spectrum between federal agencies and commercial users while ensuring no loss to federal critical capabilities. This path seeks to optimize costs and speed implementation of commercial systems.

The *1755-1850 MHz Report* also identified the need to establish, early in the process, appropriate fora to encourage communications between federal agencies and industry and to develop clear relocation, transition, and sharing plans for the 1755-1850 MHz band, or a significant portion thereof. Accordingly, in May 2012 the CSMAC formed four separate working groups as a means for federal agency representatives to interface with industry experts and facilitate information sharing among the interested stakeholders.¹⁵ The four working groups are addressing the various federal operations within the band as indicated below:

- Working Group 2 – Law Enforcement Video, Explosive Ordnance Disposal, and other short distance links;
- Working Group 3 – Satellite Control and Electronic Warfare;
- Working Group 4 – Tactical Radio Relay, Fixed Microwave, and ground-based software defined radios; and
- Working Group 5 – Airborne Operations (Air Combat Training Systems, Unmanned Aerial Vehicles, Precision Guided Munitions, airborne software defined radios, and Aeronautical Telemetry)

Each working group includes representatives and experts from industry and the federal agencies. Each group has been collecting and exchanging information on respective equipment parameters,

¹⁴ NTIA, *An Assessment of the Viability of Accommodating Wireless Broadband in the 1755-1850 MHz Band* (March 2011), available at http://www.ntia.doc.gov/files/ntia/publications/ntia_1755_1850_mhz_report_march2012.pdf (*1755-1850 MHz Report*).

¹⁵ As discussed in the next section, Working Group 1 was established by the CSMAC to focus on the 1695-1710 MHz band to improve modeling of commercial wireless networks and to reduce the exclusion zones.

operating areas, frequency of operations, and the number of frequency assignments for that operation. NTIA provided guidance for each working group, which focused on the following tasks: (1) Working Group 2: the correlation of agency city-by-city transition plans with industry implementation priorities, and prioritizing vacating the 1755-1780 MHz sub-band; (2) Working Group 3: the definition and specification (including any interference acceptance rules) of zones around satellite sites, and coordination path and rules for electronic warfare development and training; (3) Working Group 4: definition and specification (including any interference acceptance rules) of zones around Department of Defense (DoD) sites that require access, and relocation process of fixed microwave links starting from 1755-1780 MHz; and (4) Working Group 5: the determination of protection requirements for federal operations, and understanding of the periodic nature of airborne operations and the impact to commercial wireless systems from government airborne operations.¹⁶

In addition to the work of the CSMAC working groups, commercial wireless carriers are working with the DoD to monitor and gather information about several systems identified in NTIA's *1755-1850 Report* that appear to be the most difficult, costly or time consuming to relocate.¹⁷ Initially, the parties will engage in spectrum monitoring of the 1755-1850 MHz band at selected DoD sites, followed by modeling, analysis, and simulation. The carriers are providing resources for the monitoring effort. In addition, the carriers requested special temporary experimental authority from the FCC to conduct tests in the 1755-1780 MHz and 2155-2180 MHz bands for commercial mobile broadband services, and to examine technical co-existence with a limited number of incumbent federal operations, in a defined number of geographic locations that may remain in the band indefinitely, consistent with the CSMAC working groups' efforts.¹⁸ The FCC, with concurrence from NTIA, has granted this request contingent on coordination of specific locations and frequencies prior to and during the operations.¹⁹

In order to maintain comparable capabilities, several agencies have proposed moving operations for video surveillance from the 1755-1850 MHz band into a number of other bands, including 1675-1695 MHz.²⁰ As a result, NTIA's Institute for Telecommunication Sciences in Boulder,

¹⁶ CSMAC, *Framework for Work within CSMAC* (May 30, 2012), available at http://www.ntia.doc.gov/files/ntia/meetings/framework_for_work_within_csmac_20120525.pdf (*Working Group Framework*).

¹⁷ See Testimony of Steve B. Sharkey, T-Mobile USA, Inc., Hearing on Creating Opportunities Through Improved Government Spectrum Efficiency, Before the Subcommittee on Communications and Technology, Committee on Energy and Commerce, U.S. House of Representatives at 6-7 (Sept. 13, 2012), available at <http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/Hearings/CT/20120913/HHRG-112-IF16-WState-SharkeyS-20120913.pdf>.

¹⁸ See T-Mobile License LLC, Application for Experimental Special Temporary Authority, File No. 0373-EX-ST-2012 at Exhibit I (May 4, 2012); see also Verizon Communications, Inc., News Release, Verizon's McAdam, in Keynote Address, Advocates for Shared Spectrum by Public and Private Sectors, Verizon Prepared to Commit Personnel, \$5 Million to Develop Method to Share Spectrum; Points to New Era of Transformation Through Technology (May 9, 2012), available at <http://www.verizonbusiness.com/about/news/pr-25930-en-Verizon%BFs+McAdam,+in+Keynote+Address,+Advocates+for+Shared+Spectrum+by+Public+and+Private+Sectors+.xml>.

¹⁹ See FCC, Experimental Special Temporary Authorization, WF9XQW (Aug. 14, 2012).

²⁰ See *1755-1850 Report* at 37-38, Table 4-9.

Colorado, has been engaged to test certain video surveillance equipment in the 1675-1695 MHz band to determine, in cooperation with all affected agencies, compatibility with other federal operations in this band.

1695-1710 MHz Band

The *Fast-Track Report* proposed reallocation of 15 megahertz from the 1675-1710 MHz band, specifically the 1695-1710 MHz band, subject to certain contingencies and assumptions. NTIA proposed to implement exclusion zones to protect federal operations from harmful interference from new wireless broadband operations. However, industry commenters urged further evaluation that could potentially reduce the impact of such exclusion zones, resulting in the band being more attractive and useful for wireless broadband operations.²¹ In that regard, NTIA tasked CSMAC Working Group 1 to evaluate improved modeling of commercial wireless networks and possible reduction of exclusion zones. Further, NTIA together with the National Oceanic and Atmospheric Administration (NOAA) – the major federal user of this spectrum band – has begun to plan for the transition of this band.

The *Fast-Track Report* also indicated that the reallocation of the 1675-1710 MHz band was contingent upon the timely availability of funds for the redesign of NOAA’s Geostationary Operational Environmental Satellite-R (GOES-R) satellite system and other costs NOAA and other agencies will incur in connection with sharing this spectrum.²² NOAA has reported to the PPSG that it has completed the GOES-R redesign to ensure that its operations will fall below the 1695-1710 MHz band. The first launch of the GOES-R series satellite is scheduled for 2015.²³

CSMAC Working Group 1 is developing ways to facilitate the implementation of commercial wireless broadband in the 1695-1710 MHz band.²⁴ By accomplishing its task of improving the modeling of the commercial wireless networks, the working group plans to reach the goal of reducing the geographic area necessary to protect the meteorological-satellite receive stations.

²¹ See FCC, *Spectrum Task Force Requests Information on Frequency Bands Identified by NTIA as Potential Broadband Spectrum*, Public Notice in ET Docket No. 10-123, DA 11-444 (Mar. 8, 2011), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-11-444A1.pdf (*March 2011 Public Notice*). The FCC received responses from approximately 25 parties, but it did not release another notice asking for reply comments in ET Docket No. 10-123. See, e.g., Comments of the Telecommunications Industry Association in ET Docket No. 10-123 at 8 (Apr. 22, 2011) (urging FCC to ensure that the maximum potential of this band is not hampered by over-expansive exclusion zones); Comments of CTIA – The Wireless Association in ET Docket No. 10-123 at 10 (arguing that there would be significant negative impacts from such exclusion zones, particularly in urban areas); Comments of T-Mobile USA, Inc. in ET Docket No. 10-123 at 11 (arguing that exclusion zones near metropolitan, suburban or other heavy use areas prevent the use of that frequency band and any paired frequencies in several capacity-strained regions where additional spectrum is needed most). See also C. Bazelon, *The Economic Basis of Spectrum Value: Pairing AWS-3 with the 1755 MHz Band is More Valuable than Pairing it with Frequencies from the 1690 MHz Band* at 2 and 22, attached to Ex Parte Presentation of The Brattle Group in ET Docket No. 10-123 *et al.* (Apr. 11, 2011) (estimating that proposed exclusion zones associated with the 1695-1710 MHz band represent 12 percent of the U.S. population, but 17 percent of the value weighted population, and would reduce value of the spectrum by \$1.1 billion).

²² See *Fast-Track Report* at v, 1-6.

²³ See <http://www.goes-r.gov/>.

²⁴ See *Working Group Framework*.

Suggestions have been made within the CSMAC working group²⁵ to investigate alternative sharing approaches such as coordination zones, temporal sharing, and the feasibility of relocating satellite earth stations. This working group is also examining how to model Long Term Evolution and Long Term Evolution-Advanced (LTE/LTE-A) wave forms with respect to satellite communication links in order to refine analysis of the *Fast-Track Report*.²⁶

The *Tax Relief Act* requires the Secretary of Commerce to submit a report to the President identifying 15 megahertz of spectrum between 1675-1710 MHz for reallocation from federal to non-federal spectrum use. NTIA, on behalf of the Secretary of Commerce, will use the *Fast-Track Report* as a basis of this forthcoming report to be submitted no later than February 22, 2013. Recommendations from CSMAC will inform the forthcoming report that may modify the assumptions, analysis, and conclusions from the *Fast-Track Report* regarding the extent and nature of any geographic limitations necessary to protect federal satellite earth station operations that must remain during and after the transition.

Changes to Commercial Spectrum Enhancement Act

Several provisions of the *Tax Relief Act* build upon NTIA's recommendations in the *Ten-Year Plan*. First, new statutory provisions expand the types of relocation and sharing costs for which affected federal entities can receive payment from the Spectrum Relocation Fund. These include the costs of planning or managing a relocation or sharing arrangement, research, engineering studies, and economic analyses. The changes to the CSEA also require NTIA to establish a Technical Panel, procedures for a Dispute Resolution Board, and a common format for federal agency transition plans.²⁷ In addition, the *Tax Relief Act* authorizes the Director of the Office of Management and Budget (OMB) to make transfers to eligible federal entities from the Spectrum Relocation Fund to pay for relocation or sharing costs related to certain pre-auction activities.²⁸

NTIA proposed regulations governing the Technical Panel and dispute resolution procedures.²⁹ In consultation with the PPSG, NTIA is developing a common format for agency transition plans

²⁵ See CSMAC Working Group 1 (WG-1) Status Update Presentation (Oct 4, 2012), available at http://www.ntia.doc.gov/files/ntia/publications/csmac_wg-1_report_for_csmac_oct_2012_observations_v5.pdf.

²⁶ The LTE and LTE-A standards were developed by the Third Generation Partnership Project (3GPP) to provide specifications to support new mobile broadband technology deployment in a number of spectrum bands. See, e.g., 3GPP Technical Paper, *UTRA-UTRAN Long Term Evolution (LTE) and 3GPP System Architecture Evolution (SAE)* (2008), available at ftp://ftp.3gpp.org/Inbox/2008_web_files/LTA_Paper.pdf; J. Wannstrom, *LTE-Advanced* (May 2012), available at http://www.3gpp.org/IMG/pdf/lte_advanced_v2.pdf.

²⁷ *Tax Relief Act* § 6701, 126 Stat. 245-252.

²⁸ *Id.* § 6702, 126 Stat. 252-55.

²⁹ See NTIA, *Relocation of and Spectrum Sharing by Federal Government Stations – Technical Panel and Dispute Resolution Board*, Notice of Proposed Rulemaking, Docket No. 110627357-2209-03, 77 Fed. Reg. 41956 (July 17, 2012), available at http://www.ntia.doc.gov/files/ntia/publications/fr_technical_panel_dispute_resolution_board_nprm_07172012.pdf. Final rules are being reviewed by OMB pursuant to paragraphs (h)(3)(D) and (i)(8) of section 113 of the NTIA Organization Act, as amended. 47 U.S.C. § 113(h)(3)(D), (i)(8).

and a revised Annex O to the NTIA “Redbook”.³⁰ Well before the next FCC auction of repurposed federal spectrum, Annex O will provide guidance to, and establish regulations and requirements for, federal entities that operate authorized Federal Government stations in eligible frequencies that incur relocation or sharing costs because of planning for an auction or transitioning such frequencies from federal use to exclusive non-federal or shared use. NTIA expects to publish the revised Annex O by December 2012 and, pursuant to the *Tax Relief Act*, will seek public input on the common format for agency transition plans.³¹

5350-5470 MHz and 5850-5925 MHz Bands

Prior to enactment of the *Tax Relief Act*, NTIA, in conjunction with the PPSG, selected the 5350-5470 MHz and 5850-5925 MHz bands to study for potential sharing with unlicensed devices. The *Tax Relief Act* requires NTIA to conduct a study evaluating known and proposed spectrum-sharing technologies and the risk to federal users if Unlicensed-National Information Infrastructure (U-NII) devices were authorized to operate in these bands.³² NTIA, in consultation with DoD and other impacted agencies, is performing a qualitative study of both bands simultaneously and combining them into a single report.

2700-2900 MHz Band

As shown in Table 2-3 below, NTIA and the PPSG reprioritized the 200 megahertz of spectrum in the 2700-2900 MHz band since the last report to consider for both non-federal exclusive use and shared use, instead of just exclusive use.³³ NTIA proposed that the lower part of the band, although not evaluated yet, could potentially be cleared for non-federal exclusive use only if frequency assignments for airport surveillance radar operations can be compressed to operate closer together within the band, the other part of the band could potentially be made available on a shared basis under a geo-location database approach. The band could be considered to determine the feasibility of “re-packing” radar systems so that they operate closer in frequency to open up the lower portion of the band for commercial broadband use.

As a first step, prior to NTIA considering a “re-packing” feasibility assessment, the Federal Aviation Administration (FAA), a major stakeholder of this band, provided its procedures for determining proposed frequency separations between radar frequency assignments. The FAA

³⁰ See NTIA, *Manual of Regulations and Procedures for Federal Radio Frequency Management* (May 2011 Revision of the January 2008 Edition), available at <http://www.ntia.doc.gov/page/2011/manual-regulations-and-procedures-federal-radio-frequency-management-redbook>.

³¹ See 47 U.S.C. § 923(h)(1).

³² See *Tax Relief Act* § 6406(b), 126 Stat. 231. This provision requires the Assistant Secretary to submit to the FCC and the Committee on Energy and Commerce of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the portion of the study with respect to the 5350-5470 MHz band not later than eight months after the date of enactment of the *Tax Relief Act* (*i.e.*, by October 22, 2012). It further requires the Assistant Secretary to submit a report on the portion of the study with respect to the 5850-5925 MHz band not later than 18 months after the date of enactment (*i.e.*, by August 22, 2013).

³³ Compare *Second Interim Report* at 8, Table 2-3.

provided NTIA and the PPSG the methodology used to engineer frequencies that meet the Interference-to-Noise interference criteria as recommended in International Telecommunication Union (ITU) Recommendation M.1464-1, which the FAA currently uses. The FAA and other impacted federal agencies have also been conducting a literature study on sharing with commercial services such as wireless broadband. NOAA and the DoD are two other major stakeholders in this band.

4200-4400 MHz Band

As reported previously, the FAA has been conducting a technical analysis of the 4200-4400 MHz band and preparing for testing pulse radio altimeters with assistance from the affected federal agencies.³⁴ This analysis will confirm whether, and to what extent, radio altimeters operate in the 4200-4220 MHz and 4380-4400 MHz sub-bands and how they would potentially be impacted by the introduction of wireless broadband uses. The FAA developed test plans and requested that federal agencies submit altimeters for testing. The FAA has used test aircraft to perform some testing and demonstrated impact to performance. However, the level of performance degradation has been difficult to ascertain.

Federal Communications Commission Activities

The FCC has continued its work to repurpose 300 megahertz of spectrum for mobile broadband as recommended in the National Broadband Plan. Since the last interim progress report, the FCC's focus has been on the following:

- Implementing incentive auction authority granted by Congress to free up spectrum for mobile broadband;
- Finalizing the Wireless Communication Service (WCS) rulemaking to enable mobile broadband operations in the 2.3 GHz band;
- Modifying its rules to authorize terrestrial Advanced Wireless Services (AWS-4) in the 2000-2020 MHz and 2180-2200 MHz bands currently allocated to the mobile satellite service (MSS); and
- Taking additional steps to repurpose the spectrum identified in NTIA's *Fast-Track Report* including seeking comment on the 1695-1710 MHz band in the AWS-4 proceeding and announcing a forthcoming notice of proposed rulemaking regarding the 3550-3650 MHz band.

The *Tax Relief Act* grants incentive auction authority to the Commission, which it is currently implementing. On April 27, 2012, the Commission released a *Report and Order* related to the sharing of broadcast television channels with other stations in anticipation of the incentive

³⁴ See *id.* at 7.

auction.³⁵ Such sharing will allow stations to relinquish spectrum for new mobile broadband uses while continuing to provide television service to viewers. On September 28, 2012, the Commission adopted a Notice of Proposed Rulemaking that seeks comment on the three major components of the incentive auction for broadcast television spectrum: (1) a “reverse auction” in which broadcast television licensees submit bids to voluntarily relinquish spectrum usage rights in exchange for payments; (2) a reorganization or “repacking” of the broadcast television bands in order to free up a portion of the ultra-high frequency (UHF) band for other uses; and (3) a “forward auction” of initial licenses for flexible use of the newly available spectrum.³⁶ The FCC is also seeking comment on whether to establish additional bid options for participants in the reverse auction.³⁷

With regard to the rules governing 2.3 GHz WCS, the FCC received a joint proposal in connection with resolving pending petitions for reconsideration of the most recent action amending the WCS rules to facilitate mobile broadband operations.³⁸ The proposal supports a comprehensive arrangement to protect satellite radio reception from interference and allow WCS licensees in the 2.3 GHz band to deploy new mobile broadband services using LTE technology. The FCC adopted an order at its October 2012 open meeting modifying the rules consistent with the joint proposal to facilitate wireless broadband service in 30 megahertz of WCS spectrum while protecting other radio services against harmful interference.³⁹

With regard to the AWS-4 rules for the 2000-2020 MHz and 2180-2200 MHz bands, the FCC is reviewing the record in WT Docket No. 12-70 and plans to consider, by the end of this year, service rules that establish conditions under which the spectrum will be licensed for terrestrial mobile broadband. The FCC proposal focuses on the authorization of terrestrial mobile broadband service in this 40 megahertz of spectrum that is currently allocated to the MSS.⁴⁰ It also sought comment on various approaches to maximizing the usefulness of the 1995-2000 MHz, which is required to be auctioned under the *Tax Relief Act*. The FCC also requested

³⁵ See FCC, *Innovation in the Broadcast Television Bands: Allocations, Channel Sharing and Improvements*, Report and Order in ET Docket No. 10-235, FCC 12-45 (Apr. 27, 2012), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-12-45A1.pdf.

³⁶ See FCC, *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking in GN Docket No. 12-268, FCC 12-118 (Oct. 2, 2012), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-12-118A1.pdf.

³⁷ *Id.*

³⁸ See AT&T Inc. and Sirius XM Radio Inc. Written Ex Parte Presentation – Joint Submission with Proposals that Resolve Open Issues on Reconsideration, WT Docket No. 07-293 et al. (June 15, 2012), available at <http://apps.fcc.gov/ecfs/document/view?id=7021923273>.

³⁹ See FCC, *Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band*, Order on Reconsideration in WT docket No. 07-293, FCC 12-130 (October 17,2012), available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db1023/FCC-12-130A1.pdf.

⁴⁰ See FCC, *Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, Notice of Public Rulemaking and Notice of Inquiry in WT Docket No. 12-70 et al., FCC 12-32 (Mar. 21,2012), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-12-32A1.pdf.

comment on alternative band plans, including pairing the 1695-1710 MHz band as an uplink band with the 2180-2200 MHz band as a downlink, opening up the possibility of the 2000-2020 MHz band becoming an extension downlink band of the existing Personal Communications Services.

Additionally, the FCC is preparing a rulemaking proceeding that may consider small cell technology use in the 3550-3650 MHz spectrum band. The FCC Chairman announced in July that the Commission plans to initiate this proceeding later in 2012.⁴¹ When considering the transition to sharing with non-federal systems and devices, the FCC may also consider whether the exclusion zones for the 3550-3650 MHz band along the coastal areas of the continental United States could potentially be reduced to provide spectrum access in those areas.⁴²

Reevaluation and Reprioritization of Selected Bands

During this reporting period, NTIA, in coordination with the PPSG, reevaluated the spectrum bands from the previous reporting period for potential repurposing within the same two categories from the last interim report: (1) those offering potential for repurposing to exclusive non-federal use and (2) those offering potential for repurposing to shared federal/non-federal.⁴³ This reevaluation was based on additional feedback from various industry sources.

Further, prior to the enactment of the *Tax Relief Act*, NTIA, in conjunction with the PPSG, identified the 5350-5470 MHz and 5850-5925 MHz spectrum bands for potential sharing with unlicensed devices. NTIA and the PPSG used a subset of the band selection factors that were previously developed for the *Ten-Year Plan*.⁴⁴ Table 2-2 below shows the revised band selection factors and their brief descriptors, which NTIA and the PPSG used to reevaluate the bands for reprioritization for potential non-federal exclusive use and for potential sharing with both licensed services and unlicensed devices.

⁴¹ See Prepared Remarks of FCC Chairman Julius Genachowski, President's Council of Advisors on Science & Technology, Washington, D.C. (Jul. 20, 2012), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-315355A1.pdf.

⁴² In developing the coastal exclusion zone distance, NTIA assumed that the shipborne radar was operating 10 kilometers (km) from the coast line. See *Fast Track Report* at Section 4. As the FCC noted, this differs from the 81 km distance specified for the 3650-3700 MHz band. See *March 2011 Public Notice* at 3, n.22.

⁴³ See *Second Interim Progress Report* at 8, Table 2-3. These categorizations may not have been entirely accurate and were unclear because repurposing a band to exclusive non-federal use could be supported by maintaining some temporary and permanent protected federal sites via geographic exclusion zones, coordination zones, and operational sharing as occurred at 1710-1755 MHz. See 47 C.F.R. § 27.1134; FCC and NTIA, *Coordination Procedures in the 1710-1755 MHz Band*, Joint Public Notice in WT Docket No. 02-353, 21 FCC Rcd 4730 (Apr. 20, 2006), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-06-50A1.pdf. Similarly, a band that offers opportunities for sharing, could also allow for a portion to be reallocated for exclusive non-federal use.

⁴⁴ See *Ten-Year Plan* at 10-11. NTIA anticipated that these evaluations would also include determinations of which bands are "best suited for one or more of the following four repurposing options in order of preference: (1) Exclusive non-federal use (licensed); (2) Federal shared with non-federal (licensed); (3) Federal and/or non-federal use shared with unlicensed; and (4) Exclusive unlicensed."

Table 2-2 Revised Band-Selection Factors		
Non-federal exclusive use	Non-federal/federal shared use (licensed wireless services)	Non-federal/federal shared use (unlicensed wireless devices)
<ul style="list-style-type: none"> • Available bandwidth • Estimated revenue potential • Technology • Comparable spectrum • Relocation costs • Achievable within ten years • Level of difficulty of required international agreements* 	<ul style="list-style-type: none"> • Shared bandwidth • Geographical coverage • Estimated revenue potential • Technological complexity • Achievable within ten years • Level of difficulty of required international agreements* • Sharing cost 	<ul style="list-style-type: none"> • Shared bandwidth • Geographical coverage • Achievable within ten years • Level of difficulty of required international agreements*

* Bands obligated by U.S.-Canada or U.S.-Mexico bilateral agreement(s) will require international consideration if repurposed.

Table 2-3 below provides the reprioritization results according to the categories and factors presented in Table 2-2 above. NTIA, in conjunction with the PPSG, determined that the next high priority bands to study would be the 5350-5470 MHz and the 5850-5925 MHz bands for potential sharing with unlicensed devices. Accordingly, NTIA has added these two bands to Table 2-3. NTIA has removed 1695-1710 MHz and 3550-3650 MHz bands from the list in Table 2-3 because they are in the transition planning phase pursuant to the *Ten-Year Plan* and NTIA's recommendation that the FCC take necessary regulatory actions to repurpose them.⁴⁵

Table 2-3 Reprioritization Results for Repurposing Federal and Shared Spectrum Bands		
Licensed non-federal exclusive use bands	Non-federal/federal shared use bands	Federal sharing w/ unlicensed devices
<ol style="list-style-type: none"> 1. 1755-1850 MHz 2. 2700-2900 MHz 3. 406.1-420 MHz 4. 1370-1390 MHz 5. 4200-4400 MHz 	<ol style="list-style-type: none"> 1. 1300-1370 MHz 2. 1675-1695 MHz 3. 2700-2900 MHz 4. 2900-3100 MHz 5. 3100-3500 MHz 6. 2200-2290 MHz 	<ol style="list-style-type: none"> 1. 5350-5470 MHz 2. 5850-5925 MHz

International Activities

NTIA joined other federal agencies participating in the 2012 World Radiocommunication Conference (WRC-12), a treaty conference that was held in Geneva, Switzerland, from January 23 to February 17, 2012. As reported in the previous interim progress report, NTIA worked with the federal agencies and the FCC to develop the United States' proposal for a future conference agenda item seeking additional global spectrum allocations for wireless broadband services,

⁴⁵ See *Ten-Year Plan* at 14-15; see also April 2011 Letter to FCC.

including International Mobile Telecommunications (IMT) systems.⁴⁶

The United States succeeded in securing a WRC-15 agenda item to consider allocation of additional spectrum to the mobile service on a primary basis to facilitate the development of terrestrial mobile broadband applications. Working in conjunction with other agencies and countries, NTIA promoted the establishment of a Joint Task Group (JTG) to conduct the necessary sharing studies. The Conference Preparatory Meeting for WRC-15 adopted the joint study approach, ensuring the opportunity for all stakeholders to participate during the sharing study work, and setting the international framework in motion to advance the Broadband Wireless Initiative at WRC-15.

Since May 2012, NTIA has worked with federal agencies to establish principles to guide participation in the JTG and convened regular meetings with the federal agencies to coordinate preparatory work. The United States participated in the first JTG meeting held in Geneva in July 2012, where NTIA authored and presented a proposed work plan for the JTG. The purpose of this meeting was to develop timelines and work plans for completing the studies to support WRC-15 allocation decisions. Member states and Sector Members of the ITU will begin to submit studies on specific bands to the November 2012 JTG meeting. Working Party 5A and 5D are scheduled to contribute the spectrum requirements and suitable frequency ranges for the operation of mobile broadband and IMT systems by the July 2013 JTG meeting. This will then enable the JTG to begin sharing studies to determine the feasibility of reallocation of those bands for IMT broadband applications.

In preparation for WRC-15, NTIA plans to work with the affected federal agencies and industry representatives to bring the incumbent and U-NII system characteristics into the ITU study process and to leverage the information gained from the 5350-5470 MHz and 5850-5925 MHz bands qualitative and quantitative studies for sharing with U-NII devices.

3. CONCLUSION

NTIA, together with the PPSG, are continuing to work diligently to implement the *Ten-Year Plan* and applicable provisions of the *Tax Relief Act*. The FCC is working closely with and updating PPSG members on proposed regulatory actions and is seeking public comment on federal and non-federal transition bands to allow completion of allocation and service rulemaking proceedings in a timely manner. The focus for the next 12 months will be on engaging industry and government stakeholders to facilitate the evaluation of expansion options for unlicensed devices in the 5 GHz bands and the transition of the 210 megahertz previously identified through innovative relocation and sharing approaches.

⁴⁶ See *Second Interim Report* at 7.