FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 1 and 27

[WT Docket No. 12–357; FCC 13–88]

Service Rules for Advanced Wireless Services H Block—Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915–1920 MHz and 1995–2000 MHz Bands

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Commission adopts rules to auction and license ten megahertz of paired spectrum at 1915–1920 MHz and 1995–2000 MHz—the H Block. This action implements the Congressional directive in the Middle Class Tax Relief and Job Creation Act of 2012 (Spectrum Act) that we grant new initial licenses for these spectrum bands through a system of competitive bidding. In so doing, we extend the widely deployed broadband Personal Communications Services (PCS) band, which is used by the four national wireless providers, as well as regional and rural providers, to offer mobile service across the United States. This additional spectrum for mobile use will help ensure that the speed, capacity, and ubiquity of the Nation's wireless networks keep pace with the skyrocketing demand for mobile services.

DATES: Effective September 16, 2013 except for 47 CFR 1.2105(a)(2)(xii), 27.12, and 27.17, which contain information collection requirements that have not been approved by the Office of Management and Budget (OMB), Control Number 3060–1184. The Commission will publish a document in the **Federal Register** announcing the effective date of those sections.

We also note that several rules that are not being amended herein are subject to OMB review because they are imposing a new information collection upon a new group of respondents, i.e., the H Block licensees. The rules in question are 47 CFR 1.946 and 27.10. The Commission will publish a document in the **Federal Register** announcing the approval of information collection for those sections.

ADDRESSES: Federal Communications Commission, 445 12th Street SW., Washington, DC 20554. A copy of any comments on the Paperwork Reduction Act information collection requirements contained herein should be submitted to the Federal Communications Commission via email to *PRA@fcc.gov* and to Judith B. Herman, Federal Communications Commission, Room 1–B441, 445 12th Street SW., Washington, DC 20554 or via the Internet at *Judith B. Herman@fcc.gov.*

FOR FURTHER INFORMATION CONTACT: Matthew Pearl of the Broadband Division, Wireless Telecommunications Bureau, at (202) 418–BITS or *Matthew.Pearl@fcc.gov.* For additional information concerning the Paperwork Reduction Act information collection requirements contained in this document, contact Judith B. Herman at (202) 418–0214, or via email at *PRA@fcc.gov.*

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *H Block Report and Order,* FCC 13–88, adopted on June 27, 2013 and released on June 27, 2013. The full text of this document is available for inspection and copying during normal business hours in the FCC Reference Information Center, Room CY–A257, 445 12th Street SW., Washington, DC 20554. The complete text may be purchased from the Commission's duplicating contractor, Best Copy and Printing, Inc. (BCPI), Portals II, 445 12th Street SW., Room CY–B402, Washington, DC 20554, (202) 488–5300, facsimile (202) 488–5563, or via email at *fcc@bcpiweb.com.* The complete text is also available on the Commission's Web site at *http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0627/FCC–13–88A1.pdf.* Alternative formats (computer diskette, large print, audio cassette, and Braille) are available by contacting Brian Millin at (202) 418–7426, TTY (202) 418–7365, or via email to *bmillin@fcc.gov.*

Synopsis

I. Introduction

1. Today we increase the Nation's supply of spectrum for flexible-use services, including mobile broadband, by adopting rules to auction and license ten megahertz of paired spectrum at 1915–1920 MHz and 1995–2000 MHz—the H Block. This action implements the Congressional directive in the Middle Class Tax Relief and Job Creation Act of 2012 (Spectrum Act) that we grant new initial licenses for these spectrum bands through a system of competitive bidding. In so doing, we extend the widely deployed broadband Personal Communications Services (PCS) band, which is used by the four national wireless providers, as well as regional and rural providers, to offer mobile service across the United States. This additional spectrum for mobile use will help ensure that the speed, capacity, and ubiquity of the Nation's wireless networks keep pace with the skyrocketing demand for mobile services.

II. Background

2. In February 2012, Congress enacted Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Spectrum Act). The Spectrum Act includes several provisions to make more spectrum available for commercial use, including through a system of competitive bidding, and to improve public safety communications. Among other things, the Spectrum Act states that the Commission, by February 23, 2015, shall allocate the H Block bands—1915–1920 MHz and 1995–2000 MHz—for commercial use, and through a system of competitive bidding grant new initial licenses for the use of each band, subject to flexible use service rules. Congress provided, however, that if the Commission determines that either of the bands cannot be used without causing harmful interference to commercial licensees in 1930–1995 MHz (PCS downlink), then the Commission shall not allocate such band for commercial use or grant new licenses for the use of such band. Additionally, Sections 6401(c)(4) and 6413 of the Spectrum Act specify that the proceeds from an auction of licenses in the 1995–2000 MHz band and in the 1915–1920 MHz band shall be deposited in the Public Safety Trust Fund. Section 6413 of the Spectrum Act specifies how the funds deposited into the Public Safety Trust Fund shall be used, and these purposes include the funding of (or reimbursement to the U.S. Treasury for the funding of) the nationwide, interoperable public safety broadband network by the First Responder Network Authority (FirstNet). The rules we adopt today will enable the H Block spectrum to be the first spectrum specified by the Spectrum Act to be licensed by auction, and thus likely will represent the first steps toward this statutory goal.

3. In response to the Spectrum Act and to help meet the growing demand for wireless spectrum, in December 2012, the Commission adopted the *H Block NPRM.* In the *H Block NPRM,* the Commission proposed to increase the Nation's supply of spectrum for mobile broadband by applying Advanced Wireless Services (AWS) flexible use wireless service rules in 10 megahertz of spectrum adjoining the widely deployed Broadband PCS (PCS) band, at 1915–1920 MHz and 1995–2000 MHz.

4. The *H Block NPRM* also represents a renewed Commission effort to bring this spectrum to market. The Commission first proposed licensing,

operating, and technical rules for this spectrum band in 2004. The 2004 *AWS–2 NPRM* sought comment on strict power and out-of-band emission (OOBE) limits for mobile transmissions in the 1915–1920 MHz band, because of concerns about potential harmful interference to PCS mobile reception. Service Rules for Advanced Wireless Services in the 1915–1920 MHz, 1995–2000 MHz, 2020–2025 MHz and 2175–2180 MHz Bands, WT Docket No. 04–356, Notice of Proposed Rulemaking, 19 FCC Rcd 19263 (2004). In response to those proposals, most commenters agreed with such concerns. In 2008, the Commission issued a *Further Notice of Proposed Rulemaking* in which it sought to supplement the record. Service Rules for Advanced Wireless Services in the 1915–1920 MHz, 1995–2000 MHz, 2020–2025 MHz and 2175–2180 MHz Bands, WT Docket Nos. 07–195, 04–356, Further Notice of Proposed Rulemaking, 23 FCC Rcd 9859 (2008). Those 2008 proposals included strict OOBE limits for the Lower H Block of $90 + 10 \log_{10}$ (P) dB, where (P) is the transmitter power in watts, within the PCS band, and a power limit of 23 dBm/MHz Equivalent Isotropically Radiated Power (EIRP). The record again reflected the commenters' calls for strict interference limits, particularly the OOBE limit, in 1915–1920 MHz to avoid harmful interference to PCS mobile receivers. In the *2008 NPRM,* the Commission also proposed prohibiting mobile transmissions in the 1995–2000 MHz band, and proposed the typical interference rule of an OOBE limit of $43 + 10 \log_{10}$ (P) dB, where (P) is the transmitter power in watts, for base and fixed stations for emissions outside of the 1995–2000 MHz band, and a power limit of 1640 watts EIRP for emissions less than 1 MHz and 1640 watts/MHz for emissions greater than 1 MHz in non-rural areas and double these power limits in rural areas.

5. The spectral proximity of the AWS–4 Band (2000–2020 MHz and 2180–2200 MHz) to the Upper H Block is relevant to the present discussion. The Commission's December 2012 *AWS–4 Report and Order* established licensing, operating, and technical rules for terrestrial AWS–4 operations in the 2000–2020 MHz and 2180–2200 MHz bands. The technical rules for the AWS–4 uplink at 2000–2020 MHz balanced the public interest benefits associated with potential uses of the relevant bands. Specifically, the Commission placed limited restrictions on AWS–4 uplink operations that allow for flexible use of the AWS–4 band while also potentially enabling full flexible downlink use of the 1995–2000 MHz band. The Commission explained that it based its determination on, among other things, the asymmetrical nature of broadband traffic (with more downlink than uplink being used), the fact that any limitations on AWS–4 were more than offset by the considerable increase in flexibility that the Commission was providing AWS–4 licensees by granting them terrestrial use rights under the Commission's part 27 rules. In sum, the Commission stated that the AWS–4 technical rules would enable both the AWS–4 band and the 1995–2000 MHz band to be used for providing flexible use services in the most efficient manner possible.

6. In December 2012, the Commission adopted the *H Block NPRM.* Comments on the *H Block NPRM* were due on February 6, 2013 and replies were due March 6, 2013. Fifteen comments and seven replies were filed in response to the *H Block NPRM.* In addition, as permitted under our rules, numerous *ex parte* presentations have been submitted into the record.

7. As observed in the *H Block NPRM,* circumstances have changed in the years since the Commission previously sought comment on the H Block spectrum bands. Wireless broadband technologies and the wireless broadband industry have evolved considerably. Additionally, Congress enacted the Spectrum Act. Accordingly, we provided notice that our determinations here would be based solely on the record developed in response to the *H Block NPRM,* and we invited parties to re-file in this docket earlier comments with any necessary updates.

III. Discussion

8. In this *H Block Report and Order,* we implement the Spectrum Act provisions pertaining to the H Block and build upon recent Commission actions to increase the availability of spectrum for wireless use by adopting rules to grant licenses for the H Block for terrestrial fixed and mobile use via a system of competitive bidding. As explained below, we adopt H Block terrestrial service, technical, and licensing rules that generally follow the Commission's part 27 flexible use rules, modified as necessary to account for issues unique to the H Block bands. Specifically, we take the following actions:

- We find that the Commission's prior action to allocate the H Block for Fixed and Mobile use satisfies the requirement of the Spectrum Act that we allocate this spectrum for commercial use.
- We find that we are required to adopt flexible use service rules for the H Block and that we are required to license this spectrum using a system of competitive bidding, unless we determine that either the 1915–1920 MHz band or the 1995–2000 MHz band cannot be used without causing harmful interference to the broadband PCS downlink band at 1930–1995 MHz.
- We find that, consistent with the technical rules we adopt, the use of both the 1915–1920 MHz band and the 1995–2000 MHz band can occur without causing harmful interference to broadband PCS downlink operations at 1930–1995 MHz.
- We adopt as the H Block band plan the 1915–1920 MHz band paired with the 1995–2000 MHz band, configured as 5 + 5 megahertz blocks, and licensed on an Economic Area (EA) basis.
- We adopt technical rules for the H Block, including rules governing the relationship of the H Block bands to adjacent and nearby bands, with a particular focus on adopting rules for the 1915–1920 MHz band that protect operations in the broadband PCS band at 1930–1995, as required by the Spectrum Act.
- We adopt technical rules that authorize the 1915–1920 MHz band for mobile and low power fixed operations (uplink) and the 1995–2000 MHz band for base and fixed operations (downlink).
- We adopt cost sharing rules that require H Block licensees to pay a *pro rata* share of expenses previously incurred by UTAM, Inc. and by Sprint in clearing incumbents from the 1915–1920 MHz band and the 1995–2000 MHz band, respectively.
- We adopt a variety of flexible use regulatory, licensing, and operating rules for H Block licensees.
- We adopt procedures to assign H Block licenses through a system of competitive bidding.

A. Spectrum Act Provisions for 1915–1920 MHz and 1995–2000 MHz

9. The Spectrum Act, among other requirements, provides that the Commission shall allocate for commercial use and license using a system of competitive bidding the H Block no later than February 23, 2015.

10. Section 6401(b) of the Spectrum Act provides that for certain spectrum bands, including H Block, the Commission must allocate the spectrum for commercial use and grant new initial licenses for that spectrum through a system of competitive bidding by February 23, 2015. Middle Class Tax Relief and Job Creation Act of 2012, Section 6401(b), 47 U.S.C. 1451(b).

However, section 6401(b) also provides that the Commission may not allocate the H Block for commercial use nor grant H Block licenses should it determine that such spectrum cannot be used without causing harmful interference to commercial mobile service licensees operating in the frequencies between 1930 megahertz and 1995 megahertz.

11. To implement these requirements, in the *H Block NPRM,* the Commission sought comment on the Spectrum Act's four main statutory elements relating to the H Block: (1) Allocation for commercial use; (2) flexible use; (3) assignment of licenses; and (4) a determination regarding interference. Below, we address the relevant comments and discuss our conclusions.

1. Allocation for Commercial Use

12. The Spectrum Act requires the Commission to allocate the H Block spectrum bands, 1915–1920 MHz and 1995–2000 MHz, for commercial use. As the Commission observed in the *H Block NPRM,* the Spectrum Act does not define the phrase, ''allocate . . . for commercial use.'' The Commission posited that the Spectrum Act requires us to make any necessary changes to the Non-Federal Table of Allocations to reflect that the H Block bands could be used commercially by, and licensed to, non-Federal entities under flexible use service rules unless the band cannot be used without causing harmful interference to commercial mobile service licensees in the PCS downlink band. The Commission observed that the H Block spectrum's pre-existing allocation was for non-Federal, Fixed and Mobile use on a primary basis and designated for use in the commercial PCS/AWS bands, and that this prior allocation appeared to be fully consistent with section 6401 of the Spectrum Act. The Commission sought comment on this tentative conclusion. In response, commenters agreed with the Commission's tentative conclusion that the H Block's existing allocation met the requirements of the Spectrum Act.

13. We find that the existing allocation of the H Block for non-Federal Fixed and Mobile use on a primary basis meets the ''commercial use'' allocation requirement of section 6401(b)(1)(A) of the Spectrum Act. As the record indicates, the Commission has already allocated both blocks of the H Block spectrum for non-Federal Fixed and Mobile use on a primary basis. Specifically, in 2004, the Commission adopted the present spectrum pairing. Thus, no further action to allocate the H Block spectrum bands for commercial use pursuant to the Spectrum Act is necessary.

2. Flexible Use

14. The Spectrum Act also requires the Commission to license the H Block under flexible use service rules. In the *H Block NPRM,* the Commission proposed that any service rules adopted for the H Block permit a licensee to employ the spectrum for any non-Federal use permitted by the United States Table of Frequency Allocations, subject to our part 27 flexible use and other applicable rules, including service rules to avoid harmful interference. Part 27 licensees must also comply with other Commission rules of general applicability. *See* 47 CFR 27.3; *see* also infra section III.E.6. (Regulatory Issues, Other Operating Requirements). In addition, flexible use in international border areas is subject to any existing or future international agreements. *See infra* section III.C.3. (Canadian and Mexican Coordination). Thus, the Commission proposed the H Block may be used for any fixed or mobile service that is consistent with the allocations for the band. Commenters uniformly supported this proposal.

15. We adopt the Commission's proposal to license the H Block under flexible use service rules. We find the Spectrum Act's direction on this matter clear and direct—we are required to grant licenses ''subject to flexible-use service rules.'' Accordingly, adopting the flexible use service rules for the H Block, which we do in the sections below, will give effect to the legislative mandate. Adoption of flexible use service rules, moreover, is consistent with prior congressional and Commission actions that promote flexible spectrum allocations and the record before us. As CCA comments, flexible use allows licensees to innovate and ''rapidly respond to changing consumer demands for wireless services . . . [and] encourage[s] the similarly timely deployment of innovative commercial wireless services to the public.''

3. Assignment of Licenses

16. The Spectrum Act mandates that the Commission grant new initial licenses for the 1915–1920 MHz and 1995–2000 MHz bands through a system of competitive bidding pursuant section 309(j) of the Communications Act. In the *H Block NPRM,* the Commission proposed applying competitive bidding rules to resolve any mutually exclusive applications accepted for H Block licenses. Parties uniformly supported the Commission's proposal to assign the H Block spectrum through a system of competitive bidding. For example, MetroPCS voiced its support that the Commission was correctly interpreting the Spectrum Act and that the H Block should be licensed through competitive bidding. We agree and find that the Spectrum Act's requirement that we grant H Block licenses ''through a system of competitive bidding'' clear and unambiguous. Thus, as detailed below, we adopt rules to govern the use of a competitive bidding process for licensing the 1915–1920 MHz and 1995–2000 MHz bands.

4. Determination of No Harmful Interference to the 1930–1995 MHz Band

17. The Spectrum Act states that the Commission may not allocate for commercial use or license the H Block if the Commission ''determines that'' the H Block ''cannot be used without causing harmful interference to commercial mobile licensees'' in the 1930–1995 MHz band (PCS downlink band). Neither the Spectrum Act nor the Communications Act defines the term ''harmful interference.'' In performing its statutory role to maximize the public interest in the spectrum, the Commission has adopted a definition for this term, as well as for the unmodified term ''interference.'' Commission rule 2.1(c) defines ''interference'' to mean ''[t]he effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy.'' That same rule defines ''harmful interference'' to mean ''[i]nterference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with [the International Telecommunications Union] Radio Regulations.'' In the *H Block NPRM,* the Commission proposed to use this definition of harmful interference in performing the analysis required by the Spectrum Act. No party opposed the use of this definition.

18. We find it appropriate to use the Commission's existing definition of harmful interference. We presume that Congress was aware of this rule, defining both interference and harmful interference, when it crafted the Spectrum Act and used the term harmful interference. Because the Spectrum Act offers no alternative to the Commission's pre-existing definition of

harmful interference, we believe it reasonable to conclude that Congress intended for it to apply to the situation here. *See Hall* v. *U.S.,* 132 S.Ct. 1882, 1889 (2012) (''We assume that Congress is aware of existing law when it passes legislation[.]'' (internal quotation marks omitted)). Applying the existing definition of harmful interference to the Spectrum Act provision at issue, we find that we may not allocate for commercial use or license the H Block if we determine that the H Block cannot be used without causing serious degradation, obstruction, or repeated interruption to commercial mobile licensees in the PCS downlink band. We further find that we need not set technical rules so restrictive as to prevent all instances of interference, as opposed to harmful interference. Determining *ex ante* when operations in one band will seriously degrade, obstruct, or repeatedly interrupt operations in another band necessarily involves the Commission examining the particular interference scenario that is likely to arise and exercising its predictive judgment, which is entitled to deference. *See Northpoint Technology, Ltd.* v. *FCC,* 414 F.3d 61, 69 (D.C. Cir. 2005) (deferring to the Commission's interpretation of ''harmful interference'' as the phrase was applied under the Rural Local Broadcast Signal Act of 1999); *see also American Radio Relay League, Inc.* v. *FCC,* 524 F.3d 227, 233 (D.C. Cir. 2008) (''considerable deference'' on ''highly technical question'' involving harmful interference). For example, in 1999, Congress adopted a statute that directed the Commission to ''ensure that no facility [to be newly] licensed or authorized under the [newly enacted Rural Local Broadcast Signal Act of 1999] . . . cause [] harmful interference to the primary users of that spectrum.'' In determining technical rules to ensure that the incumbent primary operators were not subject to harmful interference, the Commission established interference parameters designed such that the presence of the new operators' signals ''would not be perceptible to the [incumbent operator's] customer in most cases.'' The DC Circuit found this ''qualitative requirement'' to represent a reasonable application of the Commission's harmful interference definition. *Northpoint,* 414 F.3d at 69–71. In this similar statutory circumstance, we now establish technical rules (below) for the H Block that will permit use of this block without causing harmful interference (although not necessarily eliminating all interference) to PCS downlink operations.

a. Upper H Block: 1995–2000 MHz

19. The Commission allocated the 1995–2000 MHz band for fixed and mobile use in 2003. In 2004, this spectrum was designated for PCS/AWS base station operations and the Commission proposed service rules. Before the *H Block NPRM* in December 2012, no party had filed technical data or analysis indicating that base station operations in the Upper H Block would cause harmful interference to licensees in the PCS downlink band. Accordingly, in the *H Block NPRM,* the Commission tentatively concluded that base station operations in the Upper H Block posed no likelihood of harmful interference to PCS operations in the 1930–1995 MHz band and that licensing of the Upper H Block could proceed.

20. In light of the technical rules we impose on operations in the Upper H Block, described below, we conclude that operations in the 1995–2000 MHz band will not cause harmful interference to PCS operations in the 1930–1995 MHz band. The rules we adopt herein determine the Upper H Block will be used for base station (*i.e.,* downlink) transmissions. As the 1930–1995 MHz PCS band is used for downlink transmissions, the 1995–2000 MHz band, in many respects, will operate as an extension of the PCS band. As explained below, in contrast to an uplink band adjacent to a downlink band, similarly used bands (*i.e.,* downlink next to downlink) generally do not raise difficult interference scenarios. More specifically, the technical rules we adopt include power limits and OOBE limits for operations in the Upper H Block that are comparable to limits already imposed upon PCS licensees governing the transmission of electromagnetic signals into adjacent PCS bands to prevent harmful interference. As the technical rules we impose for the Upper H Block reflect similar technical constraints as the existing PCS rules—and these rules have allowed robust service to develop in these bands—we find no basis to conclude that the 1995–2000 MHz band ''cannot be used without causing harmful interference'' to PCS downlink operators at 1930–1995 MHz. Additionally, in response to the *H Block NPRM,* no commenters raised concerns about the potential for harmful interference from the Upper H Block into the 1930–1995 MHz band. In sum, because the 1995–2000 MHz band is adjacent to another downlink band, the technical rules we adopt are comparable to the existing PCS rules for preventing harmful interference and the record demonstrates no concern for harmful interference from the 1995–2000 MHz band into PCS operations in 1930–1995 MHz, we determine the Upper H Block can be allocated for commercial use, assigned via a system of competitive bidding, and licensed subject to flexible use service rules without causing harmful interference to PCS pursuant to the Spectrum Act.

b. Lower H Block: 1915–1920 MHz

21. In designating the 1915–1920 MHz band for PCS/AWS mobile operations in 2004, the Commission concluded that any harmful interference from the Lower H Block to the PCS downlink band (*i.e.,* 1930–1995 MHz) could be addressed through service and technical rules. Subsequently, in the *H Block NPRM,* the Commission tentatively concluded that it would be possible to license the Lower H Block under flexible service rules without causing harmful interference to commercial mobile licensees in the 1930–1995 MHz band. Acknowledging the prior concerns with mobile operations in 1915–1920 MHz, the Commission sought comment on the proposed band plan and service rules, and it specifically sought technical analysis on the potential for harmful interference into the PCS downlink band. In response, parties submitted four technical studies and offered numerous comments discussing the potential for harmful interference from Lower H Block operations into operations in the 1930–1995 MHz band. As detailed below, commenters suggest that, with appropriate technical rules, deployment in the Lower H Block can occur without causing harmful interference to the 1930–1995 MHz PCS band.

22. We adopt the Commission's tentative conclusion set forth in the *H Block NPRM,* and determine that operations in the 1915–1920 MHz band, subject to appropriate technical rules, will not cause harmful interference to PCS operations in the 1930–1995 MHz band. As we explain below, in designating the Lower H Block for uplink use, we must address the issue of uplink spectrum in close frequency proximity to the downlink spectrum in the 1930–1995 MHz PCS band. Our analysis is based on our prior findings with respect to similar services, our experience evaluating the probabilistic nature of mobile-to-mobile interference, and our evaluation of the technical studies submitted into the record that examine this specific scenario. Notably, the proponents of these studies acknowledge that the interference scenario at issue—namely, mobile-to-

mobile interference between mobile transmitters operating in the Lower H Block and mobile receivers operating in the PCS downlink band—is inherently a probabilistic one. That is, a number of low probability events all need to occur before an actual Lower H Block transmission would seriously degrade, obstruct, or repeatedly interrupt the ability of the PCS mobile device to receive the PCS signal. As such, the rules we establish below are designed to prevent harmful interference. These rules are not, nor could they reasonably be, designed to prevent all possible instances of interference generally. In sum, we find the technical rules we adopt below will enable commercial use of the Lower H Block without causing harmful interference to PCS operations in the 1930–1995 MHz band. Accordingly, we find no basis to conclude that the 1915–1920 MHz band ''cannot be used without causing harmful interference'' to PCS downlink operators at 1930–1995 MHz. We therefore determine, consistent with our findings above, that the Lower H Block can be allocated for commercial use, assigned via a system of competitive bidding, and licensed subject to flexible use service rules pursuant to the Spectrum Act. Consequently, we reject Savari's proposal that we make the 1915–1920 MHz band a combination unlicensed PCS (UPCS) and licensed low power band. *See* Savari Comments at 14; *infra* Section III.B.1. (Band Plan, Block Configuration).

B. Band Plan

23. Band plans establish parameters and provide licensees with certainty as to the spectrum they are authorized to use. Here, Congress has identified the H Block bands—1915–1920 MHz and 1995–2000 MHz—as the frequencies for the band plan. To establish the specific band plan for these frequencies, the Commission must determine the block configuration, whether to license the blocks on a geographic area basis and, if so, the appropriate service area. In the *H Block NPRM,* the Commission proposed licensing the H Block as paired 5 megahertz blocks, with the Upper H Block used for high power base stations and the Lower H Block used for mobile and low power fixed operations. The Commission also proposed licensing the H Block on a geographic licensing scheme based on Economic Areas (EAs). Finally, the Commission also sought comment on how best to license spectrum in the Gulf of Mexico. The Commission sought comment on these proposals, including on their associated costs and benefits.

24. In the band plan, based on the record before us, we adopt the H Block band plan of 1915–1920 MHz paired with 1995–2000 MHz, configured as 5 + 5 megahertz blocks, and will license the H Block on an EA basis, including for the Gulf of Mexico. In so doing, we find that 1915–1920 MHz shall be used for mobile and low power fixed (*i.e.,* uplink) operations and 1995–2000 MHz shall be used for base station and fixed (*i.e.,* downlink) operations.

1. Block Configuration

25. In 2004, the Commission designated the H Block for licensed fixed and mobile services, including advanced wireless services. The Commission further decided to pair 1915–1920 MHz with 1995–2000 MHz because it found that doing so would promote efficient use of the spectrum and allow for the introduction of commercial wireless mobile and fixed services. The Commission also observed that it would be advantageous to use the Lower H Block for low power or mobile operations as the adjacent 1910–1915 MHz band is used by PCS mobile operations, and that high power base stations in the band could result in harmful interference to operations in the PCS band.

26. In the *H Block NPRM,* the Commission observed there was no apparent reason to alter the proposed pairing or use of the 1915–1920 MHz and 1995–2000 MHz bands. To ensure the PCS bands were adequately protected from harmful interference due to operations in the Lower H Block, the Commission also proposed to prohibit high power base station operations in 1915–1920 MHz. In response to these proposals, commenters generally supported the Commission's goal of maintaining the pairing of the H Block spectrum and the designated uplink/downlink bands. Additionally, some commenters addressed the Commission's inquiry for alternative configurations of the H Block, which we discuss below. No party presented cost or benefit data in support of its position.

27. We adopt the proposal to maintain the pairing of 1915–1920 MHz with 1995–2000 MHz. In doing so, we observe that Congress, in enacting the Spectrum Act and directing us to license these bands, did not express disagreement with the Commission's earlier determination to pair these bands. We find this approach in the public interest and find that the benefits of this approach likely outweigh any potential costs. As several commenters discuss, pairing the lower and upper portions of the H Block will promote the efficient use of this spectrum and allow for the proliferation of wireless services. In addition, consistent with the record, we expect that adopting the paired spectrum band plan will facilitate the deployment of wireless fixed and mobile services in rural areas. Further, by licensing the H Block as a paired band, we allay the concerns some commenters expressed about the risk of a stranded, standalone block of spectrum that may be unsuitable for mobile broadband use.

28. Additionally, configuring the H Block as a 5 + 5 megahertz band will allow for flexibility and efficiency in the deployment of wireless services and technologies. Five megahertz blocks can support a variety of wireless broadband technologies. While we do not prescribe a specific technology for use in the H Block, we expect that most users of the band will deploy 4G or 3G Frequency Division Duplex (FDD) technologies. Various globally-standardized technologies, including Wideband-Code Division Multiple Access (W–CDMA), High Speed Packet Access (HSPA), and their variants, use 5 + 5 megahertz paired blocks when deployed as FDD. Long Term Evolution (LTE), which commenters indicate is the most likely technology to be deployed in the H Block in the near term, supports a variety of block sizes, including multiples of 5 megahertz. Thus, as C Spire comments, adopting a 5 + 5 megahertz band plan allows an operator using today's LTE technology to deploy in the band.

29. In adopting this band plan, we also adopt the proposal to prohibit high powered fixed and base station operations in the Lower H band, *i.e.,* 1915–1920 MHz. Limiting base station operations to the 1995–2000 MHz band will reduce the potential for harmful interference to PCS operations. Because the PCS spectrum immediately proximate to the Lower H Block is used for mobile operations, a high powered signal emanating from 1915–1920 MHz, such as from a base station, may cause harmful interference due to receiver overload. As we discuss below and have concluded previously, the power limits necessary to avoid this potential problem preclude the use of base stations in this band. Therefore, based on the record before us, we determine the 1915–1920 MHz band will be used for mobile operations (uplink) and the 1995–2000 MHz band will be used for base station operations (downlink).

30. *Alternatives.* Our decision today to pair 1915–1920 MHz band with the 1995–2000 MHz band moots concerns that some commenters have raised regarding the possibility of either band standing alone. Specifically, by pairing

these two spectrum bands together, neither the Lower H Block nor Upper H Block will become a standalone ''stranded'' five megahertz block. In addition, we find it unnecessary to address Savari's suggestion that, as part of its plan to have the Commission license the H Block as a low power guard manager band, the Commission permit the H Block licensee to partner the 1915–1920 MHz band with unlicensed PCS channels in the adjacent 1920–1930 MHz band. Because we decline to adopt Savari's predicate proposal that the H Block be licensed under a low power guard band manager approach, we need not reach the issue of ''partnership'' with adjacent UPCS channels.

31. *Interoperability.* As discussed below, the H Block spectrum is adjacent to the PCS spectrum and the technical rules we adopt for the H Block would permit the H Block effectively to be operated as an extension of the PCS band. The Commission historically has been interested in promoting interoperability, beginning with the licensing of cellular spectrum. Although the Commission did not adopt a rule to require band-wide interoperability for PCS, it stressed the importance of interoperability by acknowledging industry efforts to establish voluntary interoperability standards. We continue to believe that interoperability is an important aspect of future deployment of mobile broadband services and generally serves the public interest. We note that no party has requested that we impose an interoperability requirement here to further the public interest. We strongly encourage all stakeholders in this ecosystem to develop new equipment in a manner that promotes, rather than hinders, interoperability. We intend to closely monitor the development of the equipment market in the H block and neighboring PCS band as well as other future developments in this band in order to assess whether additional action will need to be taken to promote interoperability.

2. Service Area

a. Geographic Area Licensing

32. In the *H Block NPRM,* the Commission proposed to adopt a geographic area licensing approach for the H Block, reasoning that such an approach is well-suited for the types of fixed and mobile services that would likely be deployed in these bands.

33. We adopt a geographic area licensing scheme for the H Block for the reasons that the Commission articulated in the *H Block NPRM,* namely that it is well-suited for the types of fixed and mobile services that we expect to be deployed in the H Block and will maintain consistency with numerous other bands. Given the record before us, we conclude that this approach is in the public interest and that the benefits of geographic area licensing likely outweigh any potential costs. We find it particularly significant that geographic area licensing in the H Block is consistent with the Commission's licensing approach for other similar commercial bands, including AWS–1, Broadband PCS, Commercial 700 MHz, and AWS–4. As the Commission has observed in the past, geographic licensing also carries many additional benefits, including: (1) Providing licensees with substantial flexibility to respond to market demand, which results in significant improvements in spectrum utilization and allows new and innovative technologies to rapidly develop; (2) permitting economies of scale because licensees can coordinate usage across an entire geographic area to maximize spectrum use; and (3) reducing regulatory burdens and transaction costs because wide-area licensing does not require site-by-site approval, thus allowing a licensee to aggregate its service territories without incurring the administrative costs and delays associated with site-by-site licensing. Further, geographic area licensing in the H Block will allow the Commission to assign initial licenses through a system of competitive bidding in accordance with the Spectrum Act. Finally, we observe that the record supports geographic area licensing for the H Block, which no commenter has opposed.

b. Service Area Size

34. In the *H Block NPRM,* the Commission proposed to license the H Block on an Economic Area (EA) basis. The Commission sought comment on this approach and asked commenters to discuss and quantify the economic, technical, and other public interest considerations of any particular geographic licensing scheme for this band, as well as the impact that any such scheme would have on rural service and competition. Alternatively, the Commission sought comment on nationwide licensing for the H Block, including whether it would maximize or limit the opportunity for licensees to provide the widest array of services and would provide the necessary incentives to expand existing technologies and create new ones. The Commission requested that commenters compare the advantages and disadvantages of nationwide licensing to those of EA licensing. Further, the Commission sought comment on licensing areas smaller than EAs for the H Block, including whether it would facilitate use by smaller and rural operators and whether the benefits of such an approach would outweigh the potential diseconomies of scale. Finally, the Commission requested comment on whether there are any other geographic licensing methods for the H Block that would better meet the Commission's goals.

35. Comments on the proposal were mixed. Some commenters, including both small and large carriers, supported EA-based licensing, while other commenters opposed EAs and advocated license areas smaller than EAs. While one commenter supported either nationwide or large regional (*i.e.,* Major Economic Areas) licenses, several other commenters opposed such a licensing scheme. One party also supported ''roadway or highway license[s].'' No party, however, provided cost or benefit data to support its position.

36. We will license the H Block on an EA basis. As explained below, licensing based on EAs has been used for similar bands and is a useful and appropriate geographic approach. We believe that licensing the H Block on an EA basis will help us to meet several statutory goals, including providing for the efficient use of spectrum; encouraging deployment of wireless broadband services to consumers; and promoting investment in and rapid deployment of new technologies and services. Given the record before us, we conclude that licensing the H Block on an EA basis is in the public interest and that the benefits of this approach likely outweigh any potential costs.

37. We believe that licensing on an EA-basis strikes the appropriate balance in license size for this band. We find it particularly significant that the two bands adjacent to the H Block, PCS G Block and AWS–4, are licensed on an EA basis. As the record indicates, adopting the same size geographic area as is used in adjacent bands may encourage rapid deployment in and use of the spectrum. Thus, to the extent that licensees for either of those bands ultimately obtain licenses for the H Block, EAs may present opportunities for efficiencies that other geographic license sizes would not offer. For example, AT&T states that EA-based licensing here would be consistent with the Commission's adoption of EA-based licensing in other spectrum bands that will likely be used for mobile broadband. Sprint, moreover, states that the consistent use of EA-based licensing

in PCS, AWS–4, and now H Block will encourage quick deployment in the H Block spectrum.

38. We also believe that licensing this band using EAs will facilitate access to spectrum for both small and large carriers. We believe that it will facilitate access by smaller carriers because EAs are small enough to provide spectrum access opportunities to such carriers. At the same time, EAs are large enough that large carriers can aggregate them up to larger license areas, including into Major Economic Areas (MEAs) and Regional Economic Area Groupings (REAGs), thus achieving economies of scale.

39. Several commenters supported EA-based licensing. For example, as stated above, AT&T and Sprint support EA-based licensing because this band is adjacent to other bands that have been licensed on an EA-basis. MetroPCS explains that EA-based licensing helps to ensure that the bidder that most highly values the spectrum in a particular area acquires that license. C Spire argues that EA-based licensing would ''allow for efficient geographic aggregation of licenses. And CCA asserts there are numerous advantages to EA-based licensing, including that it provides ''rural and regional carriers [with] reasonable opportunities to bid.''

40. Other commenters opposed EAs as either too large or too small. Commenters proposing smaller geographic license areas advocated for Cellular Market Areas (CMAs), including both Metropolitan Statistical Areas (MSAs) and Rural Service Areas (RSAs). They argued that small and rural carriers cannot afford EAs and that, because EAs include both urban and rural areas, large carriers that purchase EAs can focus their buildout efforts on urban centers to the detriment of rural customers. Another commenter argued that that the H Block should be licensed on a larger-than-EA basis either on a nationwide basis or on a Major Economic Area (MEA).

41. On balance, we are not persuaded that we should adopt geographic license areas smaller or larger than EAs. Rather, we find that—for the H Block—licensing the spectrum on an EA basis best balances the Commission's public interest goals of encouraging widespread geographic buildout (including in rural areas) and providing licensees with sufficient flexibility to scale their networks. We find this particularly so because, as explained above, EA-based licensing will make H Block consistent with two adjacent bands. Moreover, we note that CMAs do not ''nest'' easily into EAs, which could make it more difficult for licensees to aggregate license areas to match the neighboring bands. Finally, to the extent that an entity desires to obtain access to H Block spectrum for less than an EA geographic area, secondary market transactions (e.g. partitioning) offer a possible way to obtain such access.

42. Finally, we observe that Savari argues that, if the FCC adopts EA-based licensing, it should issue ''roadway licenses'' that cover highways and areas near highways; areas that, it implies, may lie between EAs. We disagree. To the extent that this commenter suggests that the FCC should issue roadway licenses between EAs, we are not aware of geographic areas that exist between EAs. More generally, we believe that EA, rather than roadway, licenses will lead to more widespread service to consumers in this band. Further, we believe the public interest lies in covering as much area as possible given the economics of the band. In many cases, even in very rural areas, this may extend beyond roadways.

3. Licensing the Gulf of Mexico

43. In the *H Block NPRM,* the Commission sought comment on whether and, if so, how to license the Gulf of Mexico. The Commission sought comment on whether the Gulf should be included as part of larger service areas, or whether the Gulf should be licensed separately.

44. We will license the H Block for the Gulf of Mexico. We find it appropriate to follow Commission precedent from the AWS–1 and AWS–4 bands, both of which licensed the Gulf as a separate EA license. Moreover, the only party who commented on this issue supports the proposal to make available an EA license for the Gulf. Finally, we determine to apply the existing definition of the Gulf of Mexico EA contained in section 27.6 of the Commission rules when licensing the Gulf. Specifically, the Gulf of Mexico service area is comprised of the water area of the Gulf of Mexico starting 12 nautical miles from the U.S. Gulf coast and extending outward.

C. Technical Issues

45. Pursuant to the statutory direction of the Communications Act of 1934, as amended, the Commission adopts rules for commercial spectrum in a manner that furthers and maximizes the public interest. Notably, when developing policies for a particular band, the Commission looks at other bands that might be affected, particularly the adjacent bands. Consequently, the Commission must often balance competing interests of adjacent bands, and potentially competing public interest considerations, when crafting rules. Because the rules for one band, particularly the interference protection rules, affect the use and value of other bands and thus the public interest benefits that can be realized through the use of those adjacent bands, we take a holistic view when establishing the technical rules for each spectrum band.

46. In this section, we adopt the technical operating rules (*e.g.,* interference rules) that will govern H Block operations and licensees. In general, our aim in establishing technical rules is to maximize the flexible use of spectrum while appropriately protecting operations in neighboring bands. Here, we also specifically consider our statutory obligations set forth in the Spectrum Act with respect to the 1930–1995 MHz broadband PCS band, which specifically requires us to determine whether either of the H Block bands ''cannot be used without causing harmful interference to commercial mobile service licensees in the [1930–1995 MHz PCS band].''

47. We base the technical rules we adopt below on the rules for the AWS and PCS spectrum bands, which have similar characteristics to the H Block and that we therefore expect would permit optimal use of the H Block by its licensees. In applying these rules to the H Block, we specifically adopt rules to adequately protect operations in adjacent bands, including the existing 1930–1995 MHz broadband PCS downlink band and the 2000–2020 MHz AWS–4 uplink band. Finally, given the record before us and the analyses provided below, we conclude that the benefits of the technical rules we adopt herein likely outweigh any potential costs.

1. Upper H Block: 1995–2000 MHz

48. The Upper H Block is immediately above the 1930–1995 MHz PCS band, which is subject to the Spectrum Act's harmful interference provision. The PCS band currently is used for base station transmit/mobile receive (*i.e.,* downlink) purposes. In the *H Block NPRM,* the Commission tentatively concluded that operating base stations in 1995–2000 MHz would be compatible with similar use of the spectrum in the 1930–1995 MHz band, and that more restrictive technical standards than those established for other AWS stations in similar bands would be unnecessary to protect the PCS band from harmful interference. No technical concerns were raised in the record about interference between the Upper H Block and PCS base stations operating below 1995 MHz. As stated above, the 1995–2000 MHz Upper H band will serve as

downlink spectrum and is thus compatible with adjacent downlink operations below the band.

49. The Upper H Block is also situated immediately below the 2000–2020 MHz band, which is allocated on a co-primary basis for Fixed, Mobile, and Mobile Satellite (Earth-to-space, *i.e.,* for mobile transmit/satellite or base station receive), and is licensed for both Mobile Satellite Service (MSS) and AWS–4 terrestrial wireless services. The Commission recently adopted service rules that permit use of the 2000–2020 MHz band for terrestrial mobile-to-base (uplink) transmissions. In so doing, the Commission concluded that certain protections were needed to avoid harmful interference between the Upper H Block and 2000–2020 MHz band. Having weighed various public interest considerations, the Commission imposed certain limited power restrictions and out-of-band emission (OOBE) limits on AWS–4 uplinks to preserve the capability for full flexible use of the Upper H Block. Additionally, the Commission concluded that 2 GHz MSS operators and AWS–4 licensees must accept harmful interference from future, lawful operations in the Upper H Block due to either Upper H Block OOBEs into the 2000–2005 MHz portion of the AWS–4 uplink band or to Upper H Block in-band power (receiver overload) into the AWS–4 uplink band. DISH Network Corp.'s (DISH) AWS–4 and 2 GHz MSS subsidiaries accepted the *Order of Proposed Modification,* which accompanied the *AWS–4 Report and Order* and which, thus, included these requirements. Commission staff subsequently issued an *Order of Modification* and issued modified licenses. Nothing in our discussion below is intended to revisit these determinations.

a. Upper H Block Power Limits

50. We adopt transmitter power limits for the Upper H Block that will maximize the full flexible use of the spectrum while ensuring against harmful interference to adjacent PCS operations and, in the case of the AWS–4 band, adequately protecting adjacent operations due to receiver overload. Receiver overload may result when signals outside of the receiver's nominal bandwidth cause the receiver to experience an increased noise level or produce non-linear responses. In setting power limits, we balance the power necessary to ensure successful communication in the band against the level of interference that adjacent services can tolerate based on their operational needs and the public interests served. In doing so here, we ensure against harmful interference to the adjacent PCS band and, in the case of the adjacent AWS–4 band, set a power limit necessary to ensure successful communication by H Block licensees based on the public interest balancing the Commission established in the *AWS–4 Report and Order.*

51. In the *H Block NPRM,* the Commission proposed and sought comment on adopting the standard base station power limits applicable to AWS and PCS stations. These power limits are 1640 watts equivalent isotropically radiated power (EIRP) for emissions with less than a 1 MHz channel bandwidth and 1640 watts/MHz for emissions greater than 1 MHz in non-rural areas. In rural areas, *i.e.,* counties with population densities of 100 persons or fewer per square mile, the power limits are 3280 watts EIRP for emissions with less than a 1 MHz channel bandwidth and 3280 watts/MHz EIRP for emissions greater than 1 MHz. The AWS and PCS rules also require providers operating in excess of the 1640 watts/1640 watts/MHz EIRP to coordinate with adjacent block licensees within 120 km. Except as detailed below, commenters generally supported these proposed power limits.

52. For H Block operations in the 1995–2000 MHz band, we adopt a power limit for operations in non-rural areas of 1640 watts EIRP for emissions less than 1 MHz and 1640 watts/MHz for emissions greater than 1 MHz. We adopt a power limit for operations in rural areas of 3280 watts EIRP for emissions less than 1 MHz and 3280 watts/MHz for emissions greater than 1 MHz. For purposes of this rule, a rural area refers to a county with a population density of 100 persons or fewer per square mile. Further, we allow operations in excess of the EIRP of 1640 watts and 1640 watts/MHz limits after coordination with adjacent PCS G Block licensees within 120 km, as is allowed for similar operations in the AWS and PCS services. We adopt these power limits because they are the same as those for base stations in other AWS services, including AWS–1 services and the recently adopted limits for AWS–4 base stations and substantially the same as for PCS base stations. Most parties that commented on this issue supported adopting these power limits. As both Sprint and U.S. Cellular observed, the Commission has consistently proposed and adopted these power limits for other services. Additionally, Sprint commented that such power levels will provide adequate protection for PCS licensees in neighboring spectrum bands. No party claimed otherwise. Based on the record and our prior experience with similar services, we conclude that these power limits are consistent with the Spectrum Act's requirement for avoiding harmful interference to the adjacent PCS band. Further, because these limits reflect established measures of efficient use of spectrum for similar services in other bands, we believe they are consistent with the goals of ensuring full, robust, commercial service for mobile broadband, as set forth in the *AWS–4 Report and Order.*

53. In adopting these power limits for H Block base stations, we acknowledge that wording in the *H Block NPRM* may have led to confusion on the part of one commenter (DISH). In the *H Block NPRM,* the Commission specifically ''propose[d] to adopt the standard base station power limits that apply to AWS and PCS stations,'' but did not include the power density limit for emissions greater than 1 megahertz in summarizing the existing rules, despite the fact that the Commission's AWS and PCS rules explicitly include such limits. In supporting the proposed power limits, Sprint correctly referenced ''standard power limits of 1640 watts/MHz for non-rural areas and 3280 watts/MHz for non-rural areas.'' In its Reply, DISH claimed that the Commission intended for the Upper H Block power to be measured across the entire 5 megahertz of the band, and that Sprint was improperly seeking to measure the power across one megahertz, thereby increasing the radiated power by 7 dB within the Upper H Block. We disagree. The Commission's intent was to propose Upper H Block power limits that would be measured across one megahertz (for emissions greater than one megahertz). In any event, we now determine to measure power limits in a manner consistent with the PCS and AWS bands. Accordingly, we now adopt the standard AWS base station power limits, as described above, based on the record presented in response to the *H Block NPRM.*

54. Further, to the extent DISH may be arguing for lower power limits than those in other AWS bands and the PCS band, its argument is unsupported and misplaced. DISH's statement that some existing PCS equipment (we are not aware of equipment presently existing for the H Block band) may operate at lower maximum power levels is not in and of itself dispositive of the appropriate maximum permissible power levels. Rather, this argument appears simply to present an example of PCS equipment operating well within the applicable PCS rules.

55. We also reject DISH's argument that symmetrical power reductions for

the H Block are necessary. DISH suggested that, should the Commission determine that (1) full-power operations of the Lower H Block would cause harmful interference into the PCS band and, (2) it is necessary to mediate this effect by reducing the power limits of the mobiles transmitting in the Lower H Block, then the Commission should adopt similarly reduced power limits for the Upper H Block (1995–2000 MHz). DISH explained that, ''[f]or instance, if the Commission decides to limit the H Block uplink transmit power across 1915–1920 MHz to 13 dBm, as opposed to the typical [3rd Generation Partnership Protect] 3GPP power level of 23 dBm, then the base station radiated power should accordingly be reduced by 10 dB to 164 Watts, as opposed to the Commission's proposal of 1640 watts.'' Because, as explained below, we do not reduce the permissible power levels for mobile devices in the Lower H Block below the 23 dBm level discussed by DISH, we dismiss as moot DISH's argument to apply symmetrical power restrictions both to the lower and upper bands.

56. In sum, we adopt a power limit of 1640 watts EIRP for emissions with less than 1 MHz channel bandwidth and 1640 watts/MHz for emissions greater than 1 MHz in non-rural areas and of 3280 watts EIRP for emissions with less than a 1 MHz channel bandwidth and 3280 watts/MHz EIRP for emissions greater than 1 MHz in rural areas as sufficient to protect PCS licensees in the 1930–1995 MHz band from harmful interference and to adequately protect AWS uplink operations, while enabling H Block licensees to operate full power base stations. Further, we allow operations in excess of the EIRP of 1640 watts and 1640 watts/MHz limits after coordination with adjacent PCS G Block licensees within 120 km, as is allowed for similar operations in the AWS and PCS services.

b. Upper H Block Out-of-Band Emissions Limits

57. To minimize or eliminate harmful interference between adjacent spectrum blocks, the Commission's rules generally limit the amount of radio frequency (''RF'') power that may be emitted outside of, or in a range of frequencies outside of, the assigned block of an RF transmission. In both the PCS and AWS–1 bands, for example, the Commission established an OOBE limit that requires emissions outside a licensee's assigned spectrum block be attenuated by a level of at least 43 + 10 $\log_{10}$ (P) dB, where P is the transmit power in watts.

58. To protect operations in adjacent and nearby bands above and below the Upper H Block, the Commission proposed, and sought comment on (including on the associated costs and benefits), a general OOBE limit for H Block base stations of 43 + 10 $\log_{10}$ (P) dB, where P is the transmit power in watts, outside of the 1995–2000 MHz band. This is consistent with the OOBE limits of the adjacent PCS operations within the 1930–1995 MHz band. In addition to this general limit, the Commission proposed that H Block operations meet a more stringent OOBE limit of 70 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, between 2005 MHz and 2020 MHz to provide interference mitigation to AWS–4 terrestrial uplink operations. As the Commission observed, this additional proposed interference protection is meant to ensure that all of the Upper H Block spectrum can be used for downlink operations, while affording additional protections to most of the AWS–4 uplink band. Commenters generally supported the proposed OOBE limits into the 1930–1995 MHz PCS band, but several commenters proposed alternative OOBE limits for emissions above 2000 MHz. Although a few commenters made general assertions regarding the costs of adopting certain OOBE limits, no party submitted any cost or benefit data.

59. For the reasons discussed below, except as otherwise specified, we adopt the proposed OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for Upper H Block base station transmissions outside of 1995–2000 MHz, including into the 1930–1995 MHz and 2000–2005 MHz bands. We also establish an OOBE limit of 70 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for transmissions from the Upper H Block into the 2005–2020 MHz AWS–4 band. We find that this approach both protects the 1930–1995 MHz band and the 2005–2020 MHz portion of the AWS–4 band from harmful interference, and provides adequate protection to the adjacent, lowest five megahertz of the AWS–4 band at 2000–2005 MHz. Thus, these OOBE limits allow us to meet the requirements set forth in the Spectrum Act with regard to the PCS downlink band, and to best manage the use of these spectrum bands in the public interest, consistent with the balancing we established in the AWS–4 proceeding. Further, as detailed below, our evaluation of the record and our consideration of how best to serve the public interest demonstrate that the various alternative proposals for OOBE limits put forth by commenters do not sufficiently balance the use of the H Block and use of the neighboring spectrum bands.

60. *General OOBE Limit.* We adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for Upper H Block transmissions outside of the 1995–2000 MHz band, except as described below. We anticipate that H Block systems will be similar in design to PCS and AWS–1, which have effectively relied on the 43 + 10 $\log_{10}$ (P) dB OOBE limit in the Commission's rules to prevent harmful interference to operations in adjacent and nearby bands. The record also contains support for this OOBE limit. We therefore adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for transmitters operating in the Upper H Block, except as detailed below.

61. *Emissions into PCS.* We adopt and apply the general OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for Upper H Block transmissions into 1930–1995 MHz. The record demonstrates support for our decision as commenters support the proposed 43 + 10 $\log_{10}$ (P) dB for base station transmissions from the 1995–2000 MHz band into the PCS bands located in 1930–1995 MHz. For example, U.S. Cellular and Sprint support an OOBE limit of 43 + 10 $\log_{10}$ (P) dB as the emissions restriction imposed on operations in the 1995–2000 MHz band. With respect to emissions into PCS, no party has opposed this limit. Moreover, inasmuch as the Upper H Block can be viewed from a technical perspective as an extension of the 1930–1995 MHz PCS band because they are both adjacent downlink bands, the 43 + 10 $\log_{10}$ (P) dB OOBE limit that applies between adjacent PCS downlink blocks logically should also apply to Upper H Block emissions into the 1930–1995 MHz PCS bands. Thus, to protect PCS operations in the 1930–1995 MHz band from harmful interference, we adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB for Upper H Block base transmissions.

62. *Emissions into AWS–4.* We adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for Upper H Block transmissions into 2000–2005 MHz and an OOBE limit of 70 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for Upper H Block transmissions into 2005–2020 MHz. We find these limits appropriately balance the difficult technical challenges associated with the Upper H Block (*i.e.,* downlink) being adjacent to the 2000–2020 MHz AWS–4 band (*i.e.,* uplink), which the Commission

addressed in the *AWS–4 Report and Order.* As the Commission previously observed, uplink spectrum bands that are adjacent to downlink spectrum bands raise difficult interference issues that require balancing the needs of both bands. In striking this balance, the Commission must determine what technical limits are appropriate, because the rules for one band affect the use and value of other bands, and the Commission seeks to maximize the efficient use of all bands. In the AWS–4 proceeding, for example, the Commission weighed the potential interference issues between the 2000–2020 MHz AWS–4 band and the 1995–2000 MHz H Block band. The Commission's assessment concluded that, to protect the utility of the Upper H Block, (1) AWS–4 uplink operations must meet a relatively strict OOBE limit of 70 + 10 $\log_{10}$ (P) dB into the 1995–2000 MHz band and into the 1930–1995 MHz PCS band, and (2) AWS–4 and 2 GHz MSS licensees would be required to accept harmful interference from lawful operations in the 1995–2000 MHz band if such interference is due to OOBE into the 2000–2005 MHz band or due to receiver overload into the 2000–2020 MHz band. In now establishing the technical rules for the Upper H Block, it is appropriate to likewise recognize the impact operations in this band may have on licensees above 2000 MHz.

63. In assessing the needs of both Upper H Block and AWS–4 uplink band, we start from an understanding of the current interference environment. Under the Commission's rules, emissions from the PCS downlink band at 1930–1995 MHz, including the G Block (1990–1995 MHz), into the AWS–4 uplink band at 2000–2020 MHz are limited to 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts. Our rules, however, are not the only factors affecting the operation and performance of AWS–4 systems. Both Sprint and DISH cite the 3GPP standards to support their differing cases for the OOBE limit into the AWS–4 band. These standards allow for an OOBE limit of −30 dBm/MHz (equivalent to attenuation of 60 + 10 $\log_{10}$ (P) dB) into the 2000–2010 MHz band, dropping to −49 dBm/MHz (equivalent to 79 + 10 $\log_{10}$ (P) dB) in the 2010–2020 MHz band. Additionally, the 3GPP standard noted that OOBE limits would only apply 5 MHz or farther from the edge of the PCS base station's operating band. This allows 5 megahertz within which the transmitter's output can roll off to meet the tighter limits.

64. Sprint (which holds all of the licenses for the PCS G Block, as well as some licenses for other PCS blocks) advocated for a limit of 60 + 10 $\log_{10}$ (P) dB across the 2005–2020 MHz band and DISH (which holds all of the AWS–4 licenses) advocated for a more stringent 79 + 10 $\log_{10}$ (P) dB limit across the 2005–2020 MHz band. In other words, relatively speaking, DISH would prefer that we impose greater restrictions on the transmissions from the Upper H Block into the AWS–4 band, while Sprint would prefer lesser restrictions on those Upper H Block transmissions. Both Sprint and DISH cite 3GPP standards in arguing for their preferred OOBE limits. Historically, while the Commission may take into consideration the determinations of third party technical standards organizations, such as 3GPP, the Commission also considers other factors not relevant to standards organizations. For instance, the Commission necessarily takes into account its enabling, and any other relevant, statute, which would not be binding on a third party standards organization. We are required, for example, to manage spectrum in the public interest, and to ''generally encourage the larger and more effective use of radio in the public interest.'' Private standards bodies may have other bases for their determinations, which may reflect compromises among the participants that are not subject to the statutory mandates that must inform our actions. Accordingly, while the Commission may independently incorporate industry standards based on the particular record before it, it does not typically adopt such interference standards as Commission rules. We again decline to do so here. Further, inasmuch as the OOBE limit we establish herein represents a ceiling, not a floor, industry remains free to set a more restrictive value through technical standards bodies, such as 3GPP.

65. In maximizing the usefulness of both bands, we seek to set appropriate limits on OOBE such that the overall interference imposed on AWS–4 uplink operations is no more than currently exists, to the greatest extent possible, without imposing a harsh and undue burden on Upper H Block downlink operations. We therefore adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for all Upper H Block emissions above 2000 MHz, including the 2000–2005 MHz portion of the AWS–4 band, except for transmissions into 2005–2020 MHz. As discussed above, this emission limit (10 $\log_{10}$) is the same level of protection that the Commission's rules currently provide AWS–4 operations from transmissions from existing PCS downlink operations in the 1930–1995 MHz band. For Upper H Block transmissions into 2005–2020 MHz, we adopt a more stringent OOBE limit of 70 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts. This layered approach, encompassing one set of interference standards for emissions into the first five megahertz and a more stringent limit on emissions into the remaining fifteen megahertz, provides some flexibility for the H Block operator to design the emission characteristics of its system to meet the tougher OOBE limits into the 2005–2020 MHz band. This approach, moreover, was contemplated by the Commission in the *AWS–4 Report and Order* where the Commission, in requiring AWS–4 licensees to accept certain interference in the AWS–4 uplink band, stated that ''base station transmit filters need 1 to 5 megahertz to roll off to a low level of emissions.'' In addition, under the 3GPP standards, out-of-band emissions from PCS LTE operations must satisfy an OOBE limit of 60 + 10 $\log_{10}$ (P) dB at 2000–2010 MHz and then transition sharply to satisfy a much stricter limit of 79 + 10 $\log_{10}$ (P) dB at 2010–2020 MHz. As a practical matter, however, out-of-band emissions tend to roll off smoothly and do not mimic the step functions of the limits set by standards bodies, such as 3GPP. As a result, the emissions from LTE operations in the PCS band will naturally decrease smoothly from the 60 + 10 $\log_{10}$ (P) dB level at 2000 MHz to the 79 + 10 $\log_{10}$ (P) dB from 2010–2020 MHz. The limit we set at 2005 MHz—70 + 10 $\log_{10}$ (P) dB—approximates the emissions level that we expect would arise at 2005 MHz as emissions roll off between 2000 MHz and 2010 MHz. Therefore, we expect that the overall harmful interference risk on the AWS–4 A Block operator from future H Block operators would be no more than exists today from existing PCS operators. That is, just as PCS operations are not expected to cause harmful OOBE interference at 2005–2020 MHz, nor are H Block operations expected to cause OOBE interference at the limit we set here.

66. In response to the Commission's proposed OOBE limits into the AWS–4 uplink band, parties commented that the proposed limits were both too lenient and too strict. DISH argued that 43 + 10 $\log_{10}$ (P) dB is insufficient to protect AWS–4 and 2 GHz MSS operations in 2000–2005 MHz and that 70 + 10 $\log_{10}$ (P) dB is insufficient protection for operations in 2005–2010 MHz. Rather, DISH suggested a three-fold approach to protect AWS–4/2 GHz

MSS operations. DISH proposed an OOBE limit of 55 + 10 $\log_{10}$ (P) dB for emissions in the 2000–2005 MHz band, an OOBE limit of 79 + 10 $\log_{10}$ (P) dB for emissions above 2005 MHz, and an OOBE limit of 116 + 10 $\log_{10}$ (P) dB for co-located sites. Conversely, Sprint opposed the *H Block NPRM's* proposal of 70 + 10 $\log_{10}$ (P) dB above 2005 MHz as imposing too stringent a restriction on Upper H Block transmissions and recommended an OOBE limit of 60 + 10 $\log_{10}$ (P) dB into and above 2005.

67. We reject both proposals as improperly balanced, with the DISH proposal overly burdensome for a full powered, flexible use H Block and the Sprint proposal too burdensome on AWS–4 operations and unnecessary to allow the Upper H Block licensees full, flexible use of that spectrum.

68. First, we reject DISH's proposal that Upper H Block operations be restricted to an OOBE limit of 55 + 10 $\log_{10}$ (P) dB between 2000 and 2005 MHz. As discussed above, we establish an OOBE limit of 43 + 10 $\log_{10}$ (P) dB between 2000 and 2005 MHz and believe this represents an appropriate balance between ensuring the utility of the Upper H Block and the AWS–4 uplink band. A level of 55, rather than 43, plus 10 $\log_{10}$ (P) dB would be 32 times more stringent and would thus restrain the full use of the H Block. DISH argues that this OOBE level is necessary because aggregate power from all H Block base stations in the direction of the satellite would inadequately protect the satellite. We agree with Sprint and U.S. Cellular that DISH's argument is an inappropriate collateral attack on the *AWS–4 Report and Order* and our related order modifying the licenses of DISH's subsidiaries, which they have accepted. The Commission explicitly addressed the issue of how to balance Upper H Block interference into the 2000–2005 MHz band, for both terrestrial and MSS operations, in the *AWS–4 Report and Order.* There the Commission stated:

> to the extent that future operations in the 1995–2000 MHz band, operating within the rules established for use of the 1995–2000 MHz band, cause harmful interference to AWS–4 operations or MSS operations due to . . . OOBE in the 2000–2005 MHz portion of the AWS–4 and 2 GHz MSS uplink band . . . AWS–4 and 2 GHz MSS licenses must accept this interference.

We therefore reject DISH's proposed OOBE limit of 55 + 10 $\log_{10}$ (P) dB between 2000 and 2005 MHz because it conflicts with the full potential use of the H Block and would be inconsistent with the *AWS–4 Report and Order.*

69. Second, we reject DISH's proposal for an OOBE limit of 79 + 10 $\log_{10}$ (P) dB at and above 2005 MHz. DISH argued this limit is needed to protect AWS–4 terrestrial operations in 2005–2020 MHz. We disagree. We find that some of the assumptions underlying DISH's analysis are overly conservative, such as the use of a one kilometer spacing between base stations in both the interfering system and the victim system in determining the minimum coupling loss (MCL). As a result, we find an OOBE limit of 79 + 10 $\log_{10}$ (P) dB at 2005 MHz to be too restrictive on Upper H Block operations. While DISH has asserted that meeting an OOBE limit more stringent than 43 + 10 $\log_{10}$ (P) dB would not be difficult for the H Block operator to meet, the evidence it cites does not support the conclusion that an H Block operator could meet an OOBE limit of 79 + 10 $\log_{10}$ (P) dB at 2005 MHz. In the three test reports cited by DISH, each LTE base station is shown to exceed the Commission's limit of 43 + 10 $\log_{10}$ (P) dB by 10 dB or more. For instance, the Samsung test report shows that the base station may be able to meet 60 + 10 $\log_{10}$ (P) dB within the AWS–4 band. However, none of the test results show whether the base stations would be able to meet DISH's proposed limit of 79 + 10 $\log_{10}$ (P) dB. In addition, we find that an OOBE limit of 70 + 10 $\log_{10}$ (P) dB, as opposed to a limit of 79 + 10 $\log_{10}$ (P) dB, is more consistent with the balancing of interference concerns between the AWS–4 and H Block bands discussed in the *AWS–4 Report and Order,* particularly in light of the Commission's determination in that order to require AWS–4 operations to protect future Upper H block operations using an OOBE limit of 70 + 10 $\log_{10}$ (P) dB. Thus, to avoid harmful OOBE interference to AWS–4 operations at 2005–2020 MHz, we find an OOBE limit of 70 + 10 $\log_{10}$ (P) dB into 2005–2020 MHz is necessary.

70. DISH further argued that an OOBE limit of 79 + 10 $\log_{10}$ (P) dB at 2005 MHz is consistent with 3GPP specifications. As an initial matter, as we stated above, while the Commission may take into consideration the determinations of third party technical standards organizations such as 3GPP, the Commission also considers other factors not relevant to standards organizations. Moreover, we observe that, while the DISH proposed OOBE limit is contained in the 3GPP specification for LTE base stations, the limit is for bands other than Bands 23, 2, and 25. Bands 23, 2, and 25 represent the AWS–4 operations, PCS operations in the 1930–1990 MHz band, and PCS + G Block operations in the 1930–1995 MHz band, respectively. Thus, the 3GPP specification, on its own terms, does not apply to the interference scenario at issue here. There is a separate set of OOBE limits that apply to these nearby bands. Notably, the relevant 3GPP specification for Band 25 only requires 60 + 10 $\log_{10}$ (P) dB between 2000 and 2010 MHz due to its proximity to the AWS–4 band. 3GPP does not require PCS operations to meet the more stringent 79 + 10 $\log_{10}$ (P) dB limit until at least 15 MHz above the PCS band (*i.e.,* above 2010 MHz). Thus, DISH's suggestion that 3GPP standards provide an example of more stringent OOBE limits is misplaced. We also observe that, as Sprint asserted, current Commission rules allow for much lower attenuation for existing PCS systems, including the G Block, over the entire AWS–4 band.

71. Third, we reject DISH's proposed OOBE limit for co-located sites. Specifically, DISH sought an OOBE limit of at least 116 + 10 $\log_{10}$ (P) dB for sites containing both an AWS–4 base station and an H Block base station. DISH argued, ''when two base stations are co-located, significantly less path loss is encountered, and a much higher interference level may be present at the victim receiver,'' which requires more stringent filters. DISH cited a 3GPP LTE standard recommendation for co-location that stated a limit of −96 dBm/100 kHz may be applied for the protection of other base station receivers. Co-location with other communication systems is a common industry practice to resolve coexistence issues. Yet the Commission typically does not impose separate OOBE requirements on co-located sites in other systems operating under either part 24 or part 27. Instead, these interference concerns are routinely negotiated between the affected parties, taking advantage of the flexibility afforded by our rules for affected parties to resolve interference issues at spectral and geographic boundaries. Because co-location is a network design decision, network operators possess incentives to deploy in an efficient and productive manner that minimizes potential harmful interference. In some cases, interference scenarios can be improved through the use of co-location. Additionally, our rules contain a savings provision. In the case that harmful interference results from OOBE, the Commission may, at its discretion, require greater attenuation than the specified limits. Furthermore, while not dispositive of our regulatory determination, the 3GPP standards DISH references specifically exempt base station transmitters operating within 10 megahertz of the affected

receiver's operating band, which is the case here. Indeed, the standard itself states that ''the current state-of-the-art technology does not allow a single generic solution for co-location with other systems'' and points to site engineering solutions. In sum, we find that to impose a limit of 116 + 10 $\log_{10}$ (P) on the Upper H Block would be unduly burdensome on the licensee and that setting any OOBE for the specific case of co-location would be inconsistent with general Commission practice. Therefore, we decline to establish a rule pertaining to co-location interference issues.

72. We also reject Sprint's proposal to adopt a 60 + 10 $\log_{10}$ (P) dB attenuation requirement from 2005–2020 MHz. Sprint argued an OOBE limit of 70 + 10 $\log_{10}$ (P) dB would significantly increase the cost of deployment in the Upper H Block, but made no attempt to quantify this cost or provide any cost data. According to Sprint, such increases in costs both could stifle interest in an auction of the H Block and would not provide any substantive improvement in interference. This argument is inconsistent with Sprint's agreement in the 3GPP standards process to protect operations in the 2010–2020 MHz band at a level of 79 + 10 $\log_{10}$ (P) dB. In addition, DISH asserted that an OOBE limit of 60 + 10 $\log_{10}$ (P) dB is insufficient to protect AWS–4 operations. We agree with DISH. In this instance, a stricter OOBE limit is warranted because the Upper H Block (downlink) is adjacent to the AWS–4/2 GHz MSS uplink band, which raises real interference concerns. An OOBE limit of 70 + 10 $\log_{10}$ (P) dB, as opposed to a limit of 60 + 10 $\log_{10}$ (P) dB, is more consistent with the balancing of interference concerns between the AWS–4 and H Block bands discussed in the *AWS–4 Report and Order,* particularly in light of the Commission's determination in that order to require AWS–4 operations to protect future Upper H block operations using an OOBE limit of 70 + 10 $\log_{10}$ (P) dB. Thus, to avoid harmful OOBE interference to AWS–4 operations at 2005–2020 MHz, we find an OOBE limit of 70 + 10 $\log_{10}$ (P) dB into 2005–2020 MHz is necessary.

73. *Measurement Procedure.* Finally, to fully define an emissions limit, the Commission's rules generally specify details of the measurement procedure to determine the power of the emissions, such as the measurement bandwidth. For AWS–1, for example, the measurement bandwidth used to determine compliance with this limit for both mobile stations and base stations is generally 1 megahertz, with some modification within the first 1 MHz. The Commission also applied the same OOBE measurement procedure to AWS–4 and to PCS operations. To treat the Upper H Block in an equivalent manner to these similar bands, we therefore adopt the same requirement that compliance with the emissions limits established herein will be determined by using a 1 MHz measurement bandwidth.

c. Co-Channel Interference Between Licensees Operating in Adjacent Regions

74. As discussed above, we determine to license the H Block on an EA geographic license area basis. The Commission observed in the *H Block NPRM* that should the H Block be licensed on a less than nationwide basis, it would be necessary to ensure that licensees do not cause harmful interference to co-channel systems operating along their common geographic boundaries. To resolve any such interference, the Commission proposed adopting a boundary limit approach, with a specific boundary field strength limit of 47 dBμV/m. The Commission also sought comment on whether licensees operating in adjoining areas should be permitted to employ alternative, agreed-upon signal limits at their common borders. With one exception, commenters did not oppose the Commission's proposals to protect adjacent licensees from co-channel interference. Sprint, however, argued that the field strength limit be adjusted to accommodate for varying channel bandwidths.

75. We adopt the proposed boundary limit approach for co-channel interference. As discussed above, the Commission will license the H Block on a geographic area basis that is less than nationwide, *i.e.,* an EA basis. To prevent licensees that operate systems along common geographic borders from causing harmful interference to one another, the Commission must provide operating limits to ensure such licensees do not cause interference to co-channel systems. Adopting a boundary limit approach establishes a default standard, which will enable licensees to deploy facilities in boundary areas without the need for prior coordination. Licensees may use this operating limit as a starting point for negotiations to exceed the limits with agreement of adjacent area licensees. Moreover, in other bands where spectrum has been allocated for fixed and mobile services, similar to the H Block, the Commission has uniformly adopted the boundary limit method to minimize harmful co-channel interference. For instance, the PCS, AWS–1, and AWS–4 bands all use a boundary limit approach. In response to the Commission's proposal, commenters favored the boundary limit approach over a coordination requirement. For example, Sprint comments that ''applying a boundary limit consistent with prior proceedings can enable future H Block licensees to deploy facilities in boundary areas without the delays associated with significant pre-coordination efforts while protecting adjacent licensees from co-channel interference at their borders.'' Additionally, no commenter proposed a coordination approach for limiting co-channel systems from interfering with one another. Consequently, we find that a boundary limit approach is the best method to address potential harmful co-channel interference between licensees operating in adjacent geographic regions.

76. We set the field strength limit at the boundary at 47 dBμV/m. As the Commission observed in the *H Block NPRM,* in other bands where spectrum has been allocated for fixed and mobile services and licensed for flexible use, similar to the H Block, the Commission has generally adopted a boundary field strength limit of 47 dBμV/m. For example, in the PCS, AWS–1, and AWS–4 bands, the Commission adopted a field strength limit of 47 dBμV/m at the boundary of licensed geographic areas. Because this limit has worked well in limiting co-channel interference in other bands, we find it appropriate to adopt it here for the similarly situated Upper H Block.

77. In adopting this boundary limit, we decline to adopt the alternative limit proposed by Sprint in its Reply. While supporting the boundary limit approach used in other bands, Sprint asserted that we should modify the boundary limit to set a reference measurement bandwidth. In making this recommendation, Sprint claimed that because today's LTE transmissions operate on wider channels than earlier technologies such as CDMA or Digital AMPS, a 47 dBμV/m limit will effectively result in a comparatively lower field strength limit. Specifically, Sprint proposed to adjust the field strength limit from 47 dBμV/m to 62 dBμV/m per MHz. Sprint argued that the power spectral density for a 30 kHz Digital AMPS carrier at a 47 dBμV/m field strength is equivalent to a 62 dBμV/m LTE carrier with a 1 MHz bandwidth, adjusting the field strength limit by the ratio of the bandwidths (10*$\log_{10}$(1 MHz/30 kHz) = 15 dB). Sprint stated that its proposed boundary limit would better enable 4G–LTE buildout of the H Block while also providing the appropriate interference

protections. Sprint further suggested that the boundary limits with Canada and Mexico should similarly be based on power density levels.

78. Although we agree with Sprint on a conceptual level that a boundary limit that adjusts for large differences in channel bandwidths may be appropriate, we are not persuaded that Sprint's proposed limit represents the optimal solution. Sprint derived the value for the field strength based on a comparison against a 30 kHz Digital Amps signal. Other technologies may be a more appropriate reference upon which to base the value for the field strength. Also, there are other metrics that may be used to limit the signal at the boundary, such as power flux density. We observe that the Commission has already adopted a bandwidth-independent approach when setting boundary limits with Canada and Mexico. For example, certain international limits are expressed as a power flux density (*i.e.,* dBW/m²/MHz), a measure of power, whereas field strength is a measurement of voltage. As Sprint noted, other parties have proposed to set boundary limits in a bandwidth neutral manner, but there is no established consensus on what the value of the limit should be. With no consensus regarding an alternative boundary limit approach, and not having received record input from any other party on Sprint's proposal, we are not prepared to adopt it at this time. We intend to explore the issue of whether to apply a measurement bandwidth to co-channel boundary limits in future service rules proceedings and we encourage all interested parties to explore this issue in such proceedings to develop a full record of the technical concerns and ramifications of such an approach.

79. Finally, we adopt the Commission's proposal that adjacent affected area licensees may voluntarily agree upon higher field strength boundary levels that the 47 dBμV/m we adopt above. This concept is already codified in the field strength rules for both PCS and AWS services, as Sprint acknowledged. No party opposed extending this approach to the H Block. Accordingly, to maintain consistency with the PCS and AWS bands, we permit adjacent area licensees to agree to a higher field strength limit.

2. Lower H Block: 1915–1920 MHz

80. The Lower H Block is immediately above the 1850–1915 MHz PCS band, which is used for mobile transmit/base receive (*i.e.,* uplink) purposes. As the Commission observed, use of the Lower H Block as proposed in the *H Block NPRM* is compatible with this adjacent PCS band. Accordingly, the Commission stated that technical standards more restrictive than those already established for AWS and PCS stations to protect PCS operations below 1915 MHz likely would not be necessary.

81. The Lower H Block is also situated immediately below the 1920–1930 MHz band, which is allocated for Unlicensed PCS purposes (UPCS) and the 1930–1995 MHz PCS base transmit/mobile receive (*i.e.,* downlink) band. As explained below, UPCS operations are not entitled to interference protection from appropriately licensed operators in the Lower H Block. The 1930–1995 MHz band, however, presents technical challenges for use of the Lower H Block. As detailed below, when certain worst-case conditions are present, the potential exists for mobile transmitters in the 1915–1920 MHz band to cause harmful interference to mobile receivers in the 1930–1995 MHz band.

82. As discussed above, the Spectrum Act requires the Commission to conduct an auction of the H Block spectrum unless we determine that the H Block frequencies cannot be used without causing harmful interference to commercial mobile service licensees operating between 1930–1995 MHz (PCS downlink). Against this backdrop, commenters generally argued that the Commission should carefully examine the issue of mobile power limits for the Lower H Block and that, if possible, these limits should be based on technical studies. Four parties submitted technical reports into the record that address the possibility of Lower H Block operations causing harmful interference to PCS operations in the 1930–1995 MHz band. Sprint filed a test report accompanying its Reply filing. On April 18, 2013, Verizon Wireless submitted a technical study. On May 13, 2013, and May 14, 2013, T-Mobile and AT&T separately filed a joint test report.

83. *Sprint and Verizon Wireless Test Reports.* Both Sprint and Verizon Wireless contracted with V–COMM Telecommunications Engineering (V–COMM) to conduct tests on the effects of mobile operations in the Lower H Block on several of each operator's existing CDMA handsets. The handset's receiver performance was tested against interference due to overload (*i.e.,* blocking), intermodulation, and OOBE.

84. *AT&T and T-Mobile Study.* AT&T and T-Mobile contracted with 7Layers to perform tests on the effects of mobile operations in the Lower H block on several of each operator's existing GSM, UMTS and LTE handsets. The mobile receiver's performance was tested against interference due to overload, intermodulation and OOBE.

85. We discuss these test reports and the interference scenarios they examined more fully below. At the outset, however, we observe that AT&T, Sprint, T-Mobile, and Verizon Wireless all stated that, subject to appropriate power limits and OOBE limits, mobile operations in the Lower H Block can occur without causing harmful interference to PCS operations in the PCS band at 1930–1995 MHz. Based on our analysis of the record, which we explain in detail in the sections immediately below, we agree that appropriate technical rules will ensure that mobile or low power fixed operations in the Lower H Block do not cause harmful interference to PCS downlink operations.

a. Lower H Block Power Limits

86. We adopt transmitter power limits for the Lower H Block that will maximize the full flexible use of the spectrum while protecting adjacent operations from harmful interference due to receiver overload. As explained above, receiver overload may result when signals outside of the receiver's nominal bandwidth cause the receiver to experience an increased noise level or produce non-linear responses. Accordingly, we must examine the power limits necessary to avoid harmful interference to PCS downlink licensees under the Spectrum Act and, within this constraint, maximize full flexible use of the Lower H Block.

87. In the *H Block NPRM,* the Commission observed that parties commenting in earlier dockets had expressed concern regarding power limits for the Lower H Block. These comments argued for the establishment of power limits for operation in the Lower H Block that would adequately protect PCS operations in the 1930–1995 MHz band. As discussed above, since these earlier comments, the mobile broadband industry has undergone rapid evolution and new technologies have been developed and adopted. These advances prompted the Commission to seek comment on how newer filtering techniques and duplex designs have improved to adjust for potential harmful interference. Specifically, the Commission sought comment on an appropriate power limit for 1915–1920 MHz mobile devices in light of these advances.

88. The Commission also observed that the 1915–1920 MHz band is allocated for fixed services, but that the possibility of interference from fixed station antennas to PCS mobiles will likely be less than anticipated

interference from Lower H Block mobiles to PCS mobiles because fixed devices are generally located at a fixed height above the ground and thus are vertically separated from PCS mobile devices. Accordingly, the Commission sought comment on what the power level should be for fixed stations operating in the Lower H Block.

89. The record contains three technical studies that examined the potential for Lower H Block operations to cause harmful interference, including overload, intermodulation and interference from out-of-band emissions, to PCS downlink operations. All of these studies assumed that the Lower H Block device would be an LTE FDD mobile device. The Sprint Test Report and the Verizon Wireless Test Report both used existing CDMA devices for the PCS devices. The AT&T/T-Mobile Study used LTE, UMTS, and GSM PCS devices. The studies included testing of the receiver performance of existing PCS devices against overload interference, as well as intermodulation interference that would be caused, in part, by receiver overload. As stated above, receiver overload occurs when the power from a signal outside of the receiver's operating frequency range causes the receiver's performance to degrade. A strong radio frequency (RF) signal can cause the detector in the receiver to operate in a non-linear manner, thereby reducing its ability to decode the desired signal. Intermodulation interference may occur when two RF frequencies pass through a non-linear element in the receive path of the receiver. Two signals at different frequencies passing through a non-linearity will mix and create new frequencies that are related to the sum and the difference of the original signals. These are termed intermodulation products. Although the non-linearity may be caused by hardware flaws, the most common cause of intermodulation interference—and the historical concern for the bands at issue—is from non-linearity that results from receiver overload. Notably, in earlier tests, third order intermodulation products were found to occur within the PCS mobile receiver's B Block frequency range (1950–1965 MHz) due to the mixing the of the PCS mobile device's transmitter frequency (1870–1885 MHz) with the Lower H Block mobile device's transmitter frequency (1915–1920 MHz). Below, we describe the three tests, first presenting the test set-up for all of the tests, followed by the results for all of the tests.

90. *Sprint and Verizon Wireless Test Reports—Test Setup.* In performing tests for Sprint and for Verizon Wireless, V–COMM tested the performance of a number of each operator's existing CDMA devices against overload and intermodulation interference using the same test procedure. Although both types of interference may be caused by strong power levels, the effects of the interference are seen at different receiver frequencies. The greatest potential for overload occurs where the edge of the receiver's passband is closest to the transmitter's operating frequency range. Therefore, tests for overload were conducted with the receiver tuned to the lowest channel in the PCS A Block, closest to the Lower H Block. The tests for intermodulation were conducted at three different receiver operating frequencies within the PCS B Block downlink band.

91. In the testing, V–COMM subjected each of the PCS CDMA receivers to several different interfering signals, each with different center frequencies, channel bandwidths and types of modulation. The set of interfering signals were 5 MHz, 3 MHz or 1.4 MHz bandwidth LTE carriers, centered at 1917.5 MHz, 1916.5 MHz and 1919 MHz, respectively. The types of modulation used represented several worst case conditions, such as maximizing power at the control channels located near the edges of the band, a fully loaded device with all resource blocks allocated, or all power concentrated in a single resource block located on a frequency where it would be most likely to create intermodulation products.

92. In total, twelve different types of interfering signals were tested for each device. First, the receiver sensitivity of each device was measured to determine the minimum received power level at which the device would perform properly in the absence of noise. Successful operation was defined as a 0.5% Frame Error Rate (FER). The level of the desired signal was set at either 1 dB or 3 dB above the measured sensitivity level. Then an interfering signal was introduced and its power level increased until the same 0.5% Frame Error Rate was achieved, marking the 1 dB or 3 dB receiver desensitization level. The 1 dB or 3 dB desensitization level is the power of the interfering signal at which the receiver's sensitivity is degraded by 1 dB or 3 dB, respectively. For each test case, both the 1 dB receiver desensitization and 3 dB receiver desensitization levels were recorded.

93. V–COMM then related the interference levels measured in each test case to their effect on the user's experience in two scenarios. In so doing, V–COMM determined the power level of the out-of-band emissions at the output of the H Block transmitter necessary to generate the measured interference levels at the PCS receiver's antenna terminals. The difference between these two signal levels is determined primarily by the distance between the transmitting and receiving devices and by the manner in which the user is handling the device, which affects the amount of head and/or body losses in the transmission path. The two user scenarios were: (1) Both the transmitting and receiving mobile devices were assumed to be held in the user's hand, as would be likely for data use; and (2) both the transmitting and receiving mobile devices were assumed to be held to the user's head, as would be likely for a voice call. The analysis then set forth assumptions of 3 dB for body loss, 8 dB for head loss, a 0 dBi receive antenna gain for both mobile devices, a separation of 1 meter, and free space path loss to the two user scenarios. Application of these assumptions determined the effective interfering signal level at the receiver input of -21 dBm and of -31 dBm, respectively, for the data and voice user scenarios. The device was deemed to operate normally if the power level of the interfering signal that caused receiver desensitization exceeded these values.

94. *AT&T/T-Mobile Test Report—Test Setup.* AT&T and T-Mobile developed a joint test plan to test the performance of several of each operator's GSM, UMTS and LTE devices against interference due to receiver overload, intermodulation and out-of-band emissions from an H Block mobile transmitter. The tests were performed by 7Layers, a third party. Because much of the 7Layers testing took place after the filing of the Sprint Test Report, AT&T and T-Mobile included several test cases that subjected their devices to similar conditions to those used by Sprint. The test report, submitted jointly by AT&T and T-Mobile, did not provide details of the test setup used. However it did identify several differences between the 7Layers tests and those performed by V–COMM for Sprint and Verizon Wireless. The most significant difference between the test plans is how the desired signal level was set. The 7Layers tests initially set the level of the desired signal at 3 dB above the reference sensitivity level set by the 3GPP standard for the technology under test. To provide a more direct comparison to the Sprint and Verizon Wireless test reports, however, 7Layers then performed its tests using the sensitivity measured for each device individually, both at 1 dB

above measured sensitivity and again at 3 dB above measured sensitivity. Despite characterizing the set of test conditions using a 1 dB desensitization level as representing worst case scenarios, the AT&T Test Report used this assumption in reaching its conclusions. The AT&T/T-Mobile Test Report did so, while at the same time it raised particular concern about the usefulness of testing to 1 dB of desensitization above each device's measured sensitivity, stating that ''it is not typically used during conformance or performance testing, primarily because the measurement uncertainty associated with it is rather high. The measurement metric (throughput or BER/FER) displays highly non-linear behavior.''

95. The AT&T/T-Mobile Test Report is different from the Sprint and Verizon Wireless test reports in other ways, as well. Notably, 7Layers subjected each PCS receiver to two different interfering signals to simulate an H Block mobile device. Both signals represented 5 megahertz LTE carriers operating at a center frequency of 1917.5 MHz, but used different resource block allocations. One signal spread the mobile's power over all 25 resource blocks representing a fully loaded mobile, while the other concentrated the mobile's power in 5 resource blocks, but did not define which five blocks were assigned. By comparison, the Sprint and Verizon Wireless test reports used a total of twelve different LTE signals. Another significant difference in the test plans is that the AT&T/T-Mobile Test Report included for the UMTS PCS devices two desired signal conditions, reflecting both lightly loaded and heavily loaded cell conditions for these devices, whereas the Sprint and Verizon Wireless test reports used one signal condition. The AT&T/T-Mobile used two conditions to simulate ''cell breathing'' on a CDMA network. In the heavily loaded scenario, the power allocated to each user in the downlink spectrum was reduced and the effective cell coverage was reduced.

96. AT&T and T-Mobile reported results for two GSM devices, up to three UMTS devices (depending on the test scenario), and one LTE device. These results note the power of the interfering signal that would create the specified degradation of the receiver. AT&T and T-Mobile also interpreted the results differently than Sprint and Verizon Wireless, using slightly different assumptions for the user scenario. AT&T and T-Mobile used 25 dBm EIRP as the actual operating power of the H Block mobile, rather than using the nominal 23 dBm EIRP assumed by Verizon Wireless and Sprint. The AT&T/T-Mobile Test Report also did not include any body loss for either the transmitting or receiving mobile. The report therefore used an interfering signal level of −13 dBm as a pass/fail criterion. For point of comparison, Sprint and Verizon Wireless set a −21 dBm criterion for the level of allowed interference for the data user scenario. The AT&T/T-Mobile Test Report also observed that the receive antenna gain used by Sprint and Verizon Wireless was likely optimistic, stating that most mobile receivers have a −1.5 to −3 dBm antenna gain. However, the AT&T/T-Mobile Test Report still adopted the 0 dBi value as it is typically used in link budget calculations.

97. *Sprint Interference Tests—Results.* In the Sprint Test Report, in the tests for receiver overload from Lower H Block in the PCS A Block, all six Sprint devices tested met the 3 dB desensitization level at a separation of 1 meter for all 24 test cases (12 interfering signals, 2 user scenarios). Four of the six devices met the 1 dB desensitization level at a separation of 1 meter, with the exception of one device for three test cases (out of the twenty-four total cases tested for that device). That device in that single case experienced blocking at 2 dB below the target level of −21 dBm for data use, which is equivalent to a separation of 1.3 meters. The other two Sprint devices experienced a 1 dB desensitization of their receivers at distances significantly greater than 1 meter in a majority of cases. V–COMM observed that the average interfering signal level that caused a 1 dB desensitization of the receiver was −22 dBm for a majority of devices, equivalent to a 1.1 meter separation.

98. In the Sprint Test Report, in tests for intermodulation and overload of the PCS B Block receiver, the results showed better performance than were observed for overload alone in the PCS A Block. Again, as with the overload tests, all devices met the 3 dB desensitization level for all test cases. Moreover, all devices experienced less than 1 dB of desensitization for the voice call in all instances. There were fewer failures in the data use scenario as well, with four of the six devices meeting the 1 dB desensitization level at less than 1 meter for data use. The other two devices experienced a 1 dB desensitization of their noise floor at distances of greater than 1 meter in half or more of the cases. These results for intermodulation were significantly better than were the results from testing in 2004.

99. After observing the difference in the results for the 1 dB and 3 dB desensitization levels, V–COMM conducted a test using the worst case interfering signal at a 2 dB desensitization level. At this level, all devices passed under the two user scenarios for both overload in the PCS A Block and overload plus intermodulation in the PCS B Block. In other words, no PCS device experienced a 2 dB or greater rise in the noise floor at a 1 meter separation from an H Block mobile device operating at 23 dBm, which is full power under the 3GPP LTE specification.

100. *Verizon Wireless Test Report—Results.* In the Verizon Wireless Test Report, in the tests for receiver overload from Lower H Block in the PCS A Block, all eight Verizon Wireless devices met the 3 dB desensitization level for all test cases. Four of Verizon Wireless's eight devices met the 1 dB desensitization level at a separation of 1 meter for both user scenarios. Of the other four devices, two experienced overload at the 1 dB desensitization level in approximately half of the test cases. V–COMM observed that the average interference levels for 1 dB desensitization for the six best devices was −21 dBm, which represents an H Block device transmitting at a 1 meter separation and at full power under the 3GPP LTE specification of 23 dBm EIRP.

101. In the tests for intermodulation and overload of the PCS B Block receiver, Verizon Wireless observed better performance than it observed for overload alone in the PCS A Block. As with the overload tests, all devices met the 3 dB desensitization level for all test cases. Six of the eight devices met the 1 dB desensitization level at 1 meter of separation for all of the voice call scenarios. There were ten instances out of a total of 144 (combination of six devices, two user scenarios and 12 interfering signals) in which the device experienced more than 1 dB of desensitization at a 1 meter separation. The two poorest performing devices experienced a 1 dB desensitization of the receiver at a distance of 1 meter in approximately half of the user scenarios. These results for intermodulation were significantly better than were the results from testing in 2004.

102. Just as it did for Sprint, V–COMM also conducted a set of tests using the worst case interfering signal at a 2 dB desensitization level. At this level, all devices passed for the two user scenarios for both overload in the PCS A Block and overload plus intermodulation in the PCS B Block. In other words, no device experienced more than a 2 dB rise of the noise floor at a 1 meter separation from an H Block mobile device operating at 23 dBm,

which is full power under the 3GPP LTE specification.

103. *AT&T and T-Mobile Test Report—Results.* The AT&T/T-Mobile Test Report stated that ''all three airlink technologies displayed reasonable immunity to blocking and/or overload from an emulated H Block device.'' In the AT&T/T-Mobile Test Report, under typical design conditions for light traffic, seven of the ten test cases met their stated criteria. The two GSM devices did not meet their interference criteria of −13 dBm, and ''display[ed] noticeable performance impairment when the H Block device transmits at a power level within 2dB from its nominal maximum output power.'' As explained above, AT&T and T-Mobile assessed the test results under different assumptions than did Sprint and Verizon Wireless. Based on examination of the test reports by Commission staff, under the data use scenario defined by Sprint and Verizon Wireless, all of AT&T and T-Mobile's devices would meet the criteria for receiver overload corresponding to 3 dB desensitization, for either worst case or typical design. Under 1 dB desensitization performance conditions, AT&T and T-Mobile's devices met their criteria in only one of six test cases.

104. In the tests for intermodulation, the AT&T/T-Mobile Test Report stated that ''[n]o B Block performance impairment was noted . . . until the device was exposed to very high H Block signal levels.'' Using AT&T and T-Mobile's assumptions, we observe their devices met their criteria in 15 of 18 test cases, over all desensitization levels, when lightly loaded. Based on Commission staff examination, all of the devices would have passed under Sprint and Verizon Wireless's user scenarios.

105. Looking separately at the results for the UMTS devices under high traffic conditions, the AT&T/T-Mobile Test report recorded more sensitivity to interference than under light traffic for the typical design case. Two of four receiver blocking test cases met their stated criteria, as did two of the four intermodulation test cases. We observe that all eight high traffic test cases would meet the criteria under the Sprint and Verizon Wireless data use scenario. Looking at a total of eight test cases for blocking (two devices, two interfering signal types, and two desensitization levels) and eight test cases for intermodulation, the UMTS devices were unable to meet the target BER under high traffic conditions before any interfering signal was applied in all but two of the sixteen cases. In other words, the devices were unable to perform acceptably in the complete absence of interference when the desire signal was set at only 1 dB or 3 dB above the device's sensitivity in high traffic.

106. *Power Limit Proposals Based on Interference Testing.* As a result of these studies, the four largest wireless providers all proposed the Commission adopt mobile and fixed power limits of 25 dBm EIRP, which is equivalent to a power limit of 300 milliwatts EIRP. First, in submitting its initial test results, Sprint concluded that ''intermodulation interference is no longer a significant threat to today's PCS devices.'' With regard to receiver overload, Sprint determined that the ''potential for receiver blocking in today's PCS devices has decreased significantly to a point where blocking interference is unlikely.'' Based on the evidence provided in the test data, Sprint proposed that a mobile power limit of 23 dB EIRP with a +/− 2 dB tolerance would protect adjacent PCS devices in the 1930–1995 MHz band. Second, Verizon Wireless recognized a similar improvement in the performance of its devices over time, stating that the newly tested devices ''showed less sensitivity to interference than they did in 2004.'' Specifically, the Verizon Wireless Test Report concluded that ''based on receiver blocking test results, an H-Block mobile power limit of +23 dBm EIRP will prevent interference to the majority of PCS CDMA devices tested at 1 meter device separation.'' Relying on the tests, Verizon Wireless stated that a power limit of 25 dBm EIRP ''is the minimum needed to protect existing PCS operations from substantial interference.'' Third, T-Mobile generally supported the 25 dBm EIRP proposed by Sprint and Verizon Wireless. T-Mobile was concerned, however, that H Block operations at a power level within 2 dB of the nominal maximum output power of 23 dBm could cause harmful interference for consumers with GSM devices and therefore requested that the Commission ''require future H Block licensees . . . provide notification to PCS A Block licensees when they turn on service in the H Block on a market-by-market basis.'' Fourth, AT&T stated that it ''supports an H Block power limit of +23 dBm (+/− 2 dB) as ''sufficient to ensure reasonable coexistence between LTE devices operating in the FCC's proposed H Block and UMTS and LTE devices operating in the PCS A and B Blocks.'' AT&T further stated that ''by the time LTE is widely deployed in the Lower H Block, GSM usage in the PCS Downlink Band on AT&T's network will be much less common than today, as AT&T deploys advanced technologies.''

107. Based on the record before us, we adopt a power limit for fixed and mobile devices operating in the Lower H Block of 300 milliwatts EIRP, which is equivalent to 25 dBm EIRP. As stated above and in the *H Block NPRM,* earlier testing conducted in 2005 identified the primary concern with full power mobile operations in the Lower H Block as intermodulation interference to PCS B Block receivers, with some additional concern regarding overload interference to PCS A Block receivers. The primary remedy to address receiver overload and intermodulation is through limits on mobile transmit power. At that time, parties argued for a severe reduction in the permissible mobile transmit power limit, such as imposing very strict power limits (*e.g.,* 6 dBm EIRP) on the 1917–1920 MHz portion of the band, to address this problem. As detailed above, all of the studies showed that technological improvements over the past several years have resulted in mobile devices in the PCS band that can tolerate or mitigate against greater interference levels before overload or intermodulation interference rises to the level of causing harmful interference. In particular, while the testing performed in earlier years showed intermodulation interference to be a significant concern (and a much greater concern than overload interference), the new testing does not identify intermodulation as causing harmful interference. For example, in describing the results for both the Sprint Test Report and the Verizon Wireless Test Report, V–COMM stated that ''CDMA devices tested generally showed less sensitivity (better rejection) to intermodulation interference as compared to [r]eceiver [b]locking—this is different from the 2004 devices tested.''

108. Consistent with the results of their studies, AT&T, Sprint, T-Mobile, and Verizon Wireless all proposed a power limit of 25 dBm EIRP, which is equivalent to 300 milliwatts EIRP, for operations in the entire Lower H Block. For example, Sprint ''recommend[ed] that the Commission adopt a uniform H Block mobile device power limit of +23 dBm EIRP, with a +/− 2 dB implementation margin of tolerance . . . to protect adjacent PCS operations above 1930 MHz.'' Verizon Wireless similarly stated that a power limit of 25 dBm EIRP is ''the minimum needed to protect existing PCS operations from substantial interference.'' AT&T and T-Mobile, in their joint test report, stated that a full power H Block mobile will not create significant impairment to UMTS or LTE devices, but that GSM devices ''display noticeable performance impairment when the H Block device transmits at a power level

within 2 dB from its nominal maximum output power or 23 dBm.'' In proposing a power limit of 25 dBm EIRP based on tests that showed significant instances of observed interference, the parties implicitly stated that the overall probability of interference was sufficiently low that it was deemed acceptable and did not rise to the level of harmful interference. No party opposed 25 dBm EIRP as a power limit across the Lower H Block or suggested that this power limit would lead to harmful interference to operations outside of the Lower H Block.

109. We adopt the proposed limit of 25 dBm EIRP, which is equivalent to 300 milliwatts EIRP, as the power limit for mobile and low power fixed operations in the entire Lower H Block and find, consistent with the Spectrum Act harmful interference condition, that operations subject to this power limit will not cause harmful interference to operations in the PCS downlink band. In adopting a power limit of 300 milliwatts EIRP, we observe that this limit is lower than the limits for other, comparable bands. For example, the power limit for mobile operations in the lower PCS Band (1850–1915 MHz) and in the AWS–4 Band is 2 watts EIRP, and in the AWS–1 Band is 1 watt EIRP. We nevertheless adopt the 300 milliwatts EIRP limit because it will protect against harmful interference to the PCS band, as required by statute, while enabling mobile devices deployed in the Lower H Block to operate at power levels sufficient to provide generally robust service quality, consistent with our goal of enabling efficient use of the band. Notably, in performing the testing and reaching the recommendations, the tests all were conducted assuming an LTE mobile device operating at the maximum power level indicated in the 3GPP LTE specifications—23 dBm. Consequently, adopting a power limit at 300 milliwatts (23 dBm, plus a 2 dBm tolerance) will enable the most likely H Block devices to operate without suffering any actual power restriction. That is, this power limit will permit mobile devices using LTE technology to operate at full power based on their design specifications. Moreover, 300 milliwatts EIRP is the level uniformly supported by the interference tests in the record as protecting against harmful interference into the 1930–1995 MHz PCS band.

110. Although we expect that setting the power limit at 300 milliwatts EIRP will not negatively affect mobile operations in either the Lower H Block or the 1930–1995 MHz PCS band, we observe that the test reports may not have fully captured the probabilistic nature of the interference scenario and that some of the assumptions used in performing the calculations in the interference tests may be overly conservative. It is important to identify these concerns with the test report inputs now so that they can be accounted for in future interference studies submitted to the Commission and because they also affect our analysis of OOBE interference, below. For the purpose of establishing the appropriate power limits, including under the Spectrum Act, the Commission determines what transmitter power level will prevent harmful interference, not simply detectable interference. For mobile-to-mobile interference, this is a probabilistic assessment. As we discuss further below in the discussion of OOBE limits, we find that the studies do not sufficiently account for the low probability of mobile-to-mobile interference actually occurring.

111. We are also concerned with some of the specific assumptions used in the test reports. In its analysis of the test data and stated conclusions for both the Sprint Test Report and the Verizon Wireless Test Report, V–COMM bases its conclusions on a number of assumptions, some of which may not be the most appropriate assumptions for calculating interference limits between nearby mobile systems. V–COMM bases its conclusions on the receiver's performance assuming a 1 meter separation between devices, a 1 dB desensitization level, and a data use case, which assumes 3 dB body loss and no head loss. Similarly, the AT&T/T-Mobile Test Report based its conclusions on a 1 meter device separation and a 1dB desensitization level. Further, unlike Verizon Wireless and Sprint, AT&T and T-Mobile made no provision for head or body loss.

112. First, one of several factors that will determine the likelihood of this probabilistic interference actually occurring is the separation distance between the mobile devices. As discussed below, a 2 meter separation between devices is a more appropriate separation distance than the 1 meter separation distance used in the studies. The Commission has adopted a 2 meter separation in the evaluation of other mobile-to-mobile interference scenarios, most recently in the AWS–4 proceeding. Further, AT&T and T-Mobile's concerns regarding the usefulness of testing under worst case conditions were demonstrated by the results for the high traffic test cases. The tested UMTS devices were unable to perform reliably under high traffic conditions, irrespective of the interference environment. Thus, the AT&T/T-Mobile test report lacks sufficient evidence to support any determination of harmful interference under high traffic conditions.

113. Second, as explained further below in setting OOBE limits, a 3 dB desensitization level is a more appropriate criterion than a 1 dB level upon which to judge harmful interference to mobile devices in cellular networks, which are designed to work in the presence of interference. For example, we observe that industry technical specifications for many types of devices that are currently used in the PCS band allow for a 3 dB degradation of the receiver sensitivity. The 3GPP2 standard for CDMA mobile devices sets the receiver performance requirements for intermodulation spurious response and receiver blocking based on a desired signal level of 3 dB above the reference sensitivity level. Based on the 3GPP2 standard for intermodulation, a CDMA device operating at 1% FER with a desired signal 3 dB above the reference sensitivity level is defined in the standard to be operating normally, and thus may be judged as not experiencing harmful interference. Similarly, the 3GPP standards for UMTS and LTE technologies allow the receiver sensitivity to degrade by 3 dB in response to interference. The LTE standard for receiver blocking is, moreover, is based on a desired signal level 6 dB above the receiver's reference sensitivity, requiring the receiver to perform in the presence of a strong interferer.

114. Third, as explained below, we believe it more appropriate to assume that the devices will be subject to both head and body loss, rather than just body loss. In both the Sprint Test Report and the Verizon Wireless Test Report, V–COMM tested for two different user scenarios. In one scenario, it assumed body loss only (that is, signal loss from proximity to the body, but not the head)—the data scenario. In the other scenario, it assumed signal loss from both the user's body and head—the voice scenario. For the data user scenario, V–COMM used a figure of 3 dB for body loss; for the voice scenario, it used 3 dB for body loss and another 5 dB for head loss. AT&T and T-Mobile did not apply any head or body loss in their analysis of the test results. As we describe further below, we believe it is more reasonable to use the voice user scenario, which includes both head and body loss assumptions, when determining interference rules.

115. We discuss our concerns with the use of these assumptions more fully below in establishing the OOBE limit.

116. Nevertheless, because, as explained above, the power limit that results from these tests will permit the deployment of full power H Block mobile devices in the 1915–1920 MHz band while also protecting commercial mobile service licensees in the 1930–1995 MHz band from harmful interference due to receiver overload, we find it unnecessary to adjust the studies for purposes of establishing power limits for operations in this band. Accordingly, we find it in the public interest, and consistent with the Spectrum Act's condition to protect the PCS downlink band from harmful interference, to set the power limit for mobile and fixed use in the 1915–1920 MHz band at 300 milliwatts EIRP.

b. Lower H Block Out-of-Band Emissions Limits

117. To minimize harmful interference between adjacent spectrum blocks, the Commission's rules generally limit the amount of RF power that may be emitted outside of the assigned block of an RF transmission. As explained below, we establish an OOBE limit for transmissions outside of the 1915–1920 MHz band of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, except that for emissions into the 1930–1995 MHz band we set an OOBE limit of 70 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts.

118. To minimize harmful electromagnetic interference between operators, the Commission has previously concluded that, in certain circumstances, attenuating transmitter OOBE by 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, is appropriate. This limit is generally applied in cases where adjacent services have similar characteristics, such as base-to-base or mobile-to-mobile and adhere to similar power limits. As such, this limit applies to most of the services authorized under parts 24 and 27, including transmitters operating in adjacent blocks in the 1850–1915 MHz PCS band, which is adjacent to the Lower H Block. The Commission proposed requiring the attenuation level of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, to emissions from transmitters in the 1915–1920 MHz band, generally. As explained above, the Spectrum Act requires additional analysis with regard to Lower H Block transmissions into the 1930–1995 MHz band. As stated in the *H Block NPRM* and above, the proximity of mobile-to-mobile operations may require stricter OOBE limits than the Commission might impose in other interference scenarios. Specifically, the Commission proposed an OOBE limit of 70 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for emissions into the 1930–1995 MHz PCS Band. Finally, the Commission proposed to apply the measurement procedure used in the PCS band to these OOBE limits.

119. As explained above, the record contains three studies that examined the appropriate technical parameters for H Block operations needed to avoid causing harmful interference, including OOBE interference, to existing PCS downlink operations at 1930–1995 MHz.

120. *Sprint and Verizon Wireless Test Reports—Test Setup.* For the Sprint Test Report and the Verizon Wireless Test Report, V–COMM tested both Sprint and Verizon Wireless devices for their performance against out-of-band emissions. Two interference cases were tested. For both sets of tests, the CDMA device was tuned to the PCS A Block and subjected to a desired signal representing first a 1 dB desensitization level, and, second, a 3 dB desensitization level, from the device's measured sensitivity level. A co-channel additive white Gaussian noise (AWGN) signal representing the interfering H Block device was then injected into the device's RF antenna port. The power level of the interfering signal level was increased until the FER was no more than 0.5%, and the results recorded.

121. *AT&T and T-Mobile Test Reports—Test Setup.* As discussed above, AT&T and T-Mobile did not provide details of their test setup, but noted some differences with Sprint and Verizon Wireless's test plan. In performing that evaluation, a key difference from the V–COMM tests was that 7Layers set the desired signal level according to typical design at the device's reference sensitivity. Additional tests were conducted to determine the levels at which 1 dB and 3 dB degradation of the device's measured sensitivity occurs. The AT&T/T-Mobile Test Report did not include GSM devices in the typical design conditions. We observe that the analysis within the AT&T/T-Mobile Test Report did not calculate the necessary OOBE limit directly from the results, but simply decided whether the limit calculated in the V–COMM tests would be sufficient.

122. *Sprint and Verizon Wireless Test Reports—Test Results.* For the Sprint Test Report and the Verizon Wireless Test Report, V–COMM reported an average interference level of −107 dBm when the desired signal was at the 3 dB desensitization level, and an average interference level of −113 dBm when the desired signal was at the 1 dB desensitization level. Examining the same two user scenarios as for the blocking and intermodulation tests, V–COMM interpreted these results as equivalent to an OOBE limit −53 dBm/MHz for the voice user scenario at the 3 dB desensitization level and 1 meter of separation between devices, and −63 dBm/MHz for the data use scenario under the same conditions. For the 1 dB desensitization level, the results showed an equivalent OOBE level of −59 dBm/MHz for voice use and −69 dBm/MHz for data use. V–COMM stated that an OOBE limit of −69 dBm/MHz would prevent desensitization of more than 1 dB for devices at a 1 meter separation. It further stated that an additional implementation margin of 3 dB would be appropriate, resulting in a recommended OOBE limit of −66 dBm/MHz based on the data use scenario. V–COMM asserted that this limit would be ''consistent with OOBE limits proposed in the FCC NPRM[s] in 2004 and 2008'' and ''also consistent with 3GPP OOBE limits for UMTS and HSPA devices.''

123. *AT&T and T-Mobile Test Reports—Test Results.* The AT&T/T-Mobile Test Report stated that the OOBE tests ''showed the greatest difference between airlink technologies.'' The report noted that ''UMTS and LTE displayed good immunity to wideband noise emissions from a nearby H Block transmitter.'' The report also stated that ''GSM devices displayed relatively poor rejection of OOBE interference.'' In the AT&T/T-Mobile Test Report, the average interference level for typical design conditions that produced 3 dB of desensitization of the receiver was −93.8 dBm. Similarly, the average interference levels for worst case conditions were −109.64 dBm and −104.8 dBm for 1 dB and 3 dB desensitization levels, respectively. This compares to the average levels of −113 dBm and −107 dBm for 1 dB and 3 dB desensitization levels, respectively, reported by both Sprint and Verizon Wireless.

124. *OOBE Proposals Based on Interference Testing.* Based on the testing, the parties generally proposed that the Commission adopt an OOBE limit of −66 dBm/MHz, which is equivalent to 96 + 10 $\log_{10}$ (P) dB (where (P) is the transmitter power in watts) for Lower H Block emissions into the 1930–1995 MHz band. Sprint, however, recognized that this level may be overly stringent. Sprint suggested that, if the low probability of the occurrence of the factors needed for mobile-to-mobile interference were fully taken into account, the necessary OOBE attenuation could be lower. Sprint then observed that ''[t]he 3GPP OOBE

standards for similar mobile-to-mobile coexistence situations are more typically −50 dBm/MHz [*i.e.,* 80 + 10 $\log_{10}$ (P) dB] (or −40 dBm/MHz [*i.e.,* 70 + 10 $\log_{10}$ (P) dB] when the two bands have little separation).'' Verizon Wireless disagreed with Sprint, arguing that, ''[a]lthough Sprint is correct as to the circumstances in which interference will occur, [Sprint] is wrong to imply that these circumstances occur only rarely.'' Instead, Verizon Wireless argues that ''mobile devices are most likely to be located very near each other at indoor locations where users are likely to receive a weaker signal . . . [which is] precisely what [OOBE] limits are designed to protect against.'' Neither AT&T nor T-Mobile addressed Sprint's suggestion that the OOBE could be set at a less stringent level than 96 + 10 $\log_{10}$ (P) dB. T-Mobile, while supporting the 96 + 10 $\log_{10}$ (P) dB OOBE limit, expressed concern that the AT&T/T-Mobile Test Report showed that GSM devices had ''a relatively poor rejection of OOBE interference at a separation distance of 1 meter.'' To address this concern, T-Mobile requested that the Commission require H Block licensees to notify PCS A Block licensees on a market-by-market basis when the H Block licensees turn on service. T-Mobile explained that this ''would enable full use of the H Block for LTE service while also assisting PCS licensees in network planning to reduce the probability of interference.''

125. For the reasons discussed below, except as otherwise specified, we adopt the proposed OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for Lower H Block transmissions outside of 1915–1920 MHz. We adopt this limit below 1915 MHz and above 1920 MHz, with additional protections required for the 1930–1995 MHz band. For emissions into the 1930–1995 MHz band, we establish an OOBE limit of 70 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts.

126. *Emissions below 1915 MHz.* We adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB where (P) is the transmitter power in watts, for Lower H Block transmissions below 1915 MHz. Immediately below the Lower H Block is the 1850–1915 MHz PCS band, which is used for mobile transmit/base receive. As the Commission observed in the *H Block NPRM,* because it is anticipated that the Lower H Block systems will be similar in design to PCS and AWS–1, use of the 1915–1920 MHz band would be compatible with this adjacent PCS spectrum. That is, both bands will serve as mobile uplink bands. Thus, the OOBE level currently in the Commission's rules to protect adjacent PCS uplink blocks from harmful interference from each other should also be sufficient to protect PCS blocks in the 1850–1915 MHz band from Lower H Block emissions. Additionally, the OOBE limit of 43 + 10 $\log_{10}$ (P) dB where (P) is the transmitter power in watts, has effectively served to prevent harmful interference to operations in bands adjacent and nearby to PCS and AWS–1 operations. The Commission thus tentatively concluded that a more restrictive OOBE limit than those established for PCS and AWS–1 transmissions was not necessary for Lower H Block transmissions below 1915 MHz; a conclusion now supported by the record. As Sprint comments, ''[n]o industry commenter disputes the Commission's conclusion that [Lower] H Block uplink operations would not cause harmful interference to PCS operations located immediately below the uplink at 1850–1915 MHz.'' We therefore adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB where (P) is the transmitter power in watts, for Lower H Block operations below 1915 MHz.

127. *Emissions above 1920 MHz.* Except as specified below for emissions into the 1930–1995 MHz band, we adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for Lower H Block transmissions above 1920 MHz. The OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, applies to most of the services authorized under parts 24 and 27, which have effectively relied on this limit in the Commission's rules to prevent harmful interference to operations in adjacent bands. We authorize H Block under part 27, and thus anticipate that H Block systems will be similar in design to PCS and AWS–1. Additionally, with respect to the immediately adjacent 1920–1930 MHz band, that band is designated for unlicensed use and operations in that band are required to accept interference from licensed operations, including those in the Lower H Block. Furthermore, except as discussed below regarding the 1930–1995 MHz band, no commenter opposed an OOBE limit of 43 + 10 $\log_{10}$ (P) dB above 1920 MHz. Therefore, we adopt an OOBE limit of 43 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, for Lower H Block transmissions above 1920 MHz, subject to the exceptions below.

128. *Emissions into 1930–1995 MHz.* In order to prevent harmful interference into the PCS downlink band at 1930–1995 MHz, as required by statute, we adopt a requirement that out-of band emissions into the 1930–1995 MHz band be attenuated below the transmitter power level by at least 70 + 10 $\log_{10}$ (P) dB, where (P) is the transmitter power in watts, (equivalent to −40 dBm/MHz) for fixed and mobile devices operating in the Lower H Block. We conclude that as a result of our adoption of this OOBE limit, licensees in the 1930–1995 MHz band will not experience a level of interference that seriously degrades, obstructs, or repeatedly interrupts their services. We base our finding on Commission precedent, experience with the probabilistic nature of mobile-to-mobile interference, and analysis of the test data submitted into the record.

129. *Commission Precedent.* We find an OOBE limit at 70 + 10 $\log_{10}$ (P) dB, where (P) is the mobile transmitter power in watts, is consistent with Commission precedent. The interference scenario before us involves setting limits for Lower H Block mobile device out-of-band emissions that prevent harmful interference to PCS devices in the 1930–1995 MHz band. Last year, in the *AWS–4 Report and Order,* the Commission addressed the issue of mobile-to-mobile interference from AWS–4 mobile devices operating in the AWS–4 2000–2020 MHz uplink band to operations in the PCS downlink band and to future Upper H Block operations in 1930–2000 MHz. In the AWS–4 proceeding, the Commission had proposed an OOBE limit of 70 + 10 $\log_{10}$ (P) dB, where P is the transmitter power in watts, from AWS–4 operations in the 2000–2020 MHz band into frequencies below 2000 MHz. The Commission proposed this attenuation level because it was previously set forth in the part 25 rules for Ancillary Terrestrial Component (ATC) operations in the 2000–2020 MHz band into spectrum below 1995 MHz. Parties in the AWS–4 proceeding generally supported the proposed OOBE level, and no party to that proceeding proposed an alternative limit. After reviewing the record before it—a record compiled after enactment of the Spectrum Act—the Commission adopted a maximum attenuation level of 70 + 10 $\log_{10}$ (P) dB for AWS–4 transmissions into both the Upper H Block below 2000 MHz and the PCS band below 1995 MHz.

130. The scenario in the AWS–4 proceeding is on point with that facing us here. In both cases the interference scenario is mobile-to-mobile interference. In both cases, the Commission was faced with establishing an OOBE limit for transmissions from nearby operations into the PCS downlink band at 1930–1995 MHz. In the AWS–4 proceeding, the Commission also examined the same interference scenario into the immediately adjacent

Upper H Block. Further, in one important respect, the interference scenario before us now represents a scenario less likely to result in harmful interference than the one we addressed in the AWS–4 proceeding. Specifically, the Lower H Block is 10 megahertz away from the PCS downlink band, whereas the AWS–4 uplink band is 5 megahertz away from the PCS band and directly adjacent to the Upper H Block. Lower H Block operators will thus have 10 megahertz of frequency separation from the PCS band for emissions from their devices to roll off, while AWS–4 operators have no frequency separation for roll off between the AWS–4 uplink band and the Upper H Block. Stated otherwise, the interference scenarios here and in the AWS–4 proceeding effectively bookend the 1930–2000 MHz frequencies, with the emissions entering those from frequencies from below 1930 MHz and from above 2000 MHz needing to meet the same attenuation levels, but with Lower H Block operators having 10 megahertz rather than 5 megahertz or zero megahertz of separation in which to roll off to achieve the limit. Accordingly, we find it consistent with AWS–4 precedent to set the OOBE limit for Lower H Block operations into 1930–1995 MHz at 70 + 10 $\log_{10}$ (P) dB, where (P) is the mobile transmitter power in watts.

131. In adopting the 70 + 10 $\log_{10}$ (P) dB OOBE limit also set in the AWS–4 proceeding, we observe that this limit is the most stringent limit in the Commission's rules for operations in a commercial uplink band protecting another band. For example, for the 800 MHz cellular band and the Lower and Upper 700 MHz bands (generally), the Commission adopted an OOBE limit of 43 + 10 $\log_{10}$ (P) dB (with a measurement bandwidth of 100 kHz, which is equivalent to 33+ 10 $\log_{10}$ (P) dB with a measurement bandwidth of 1 MHz); and for the broadband PCS band, the AWS–1 band, and the AWS–4 band (except below 2000 MHz), the Commission adopted a mask of 43 + 10 $\log_{10}$ (P) dB (with a measurement bandwidth of 1 MHz). Moreover, within these bands are examples of mobile-to-mobile interference scenarios at frequency separation distances similar to those that exist between the Lower H Block and the PCS downlink band. For example, Lower 700 MHz C Block mobile devices are required to attenuate transmissions at 43+ 10 $\log_{10}$ (P) dB (with a measurement bandwidth of at least 100 kHz) above 716 MHz, including into the Lower 700 MHz A Block downlink band at 728 MHz. Similarly, in determining the OOBE limit for Upper 700 MHz C Block mobile devices into the nearby public safety downlink band, the Commission set the limit at the equivalent of 43 + 10 $\log_{10}$ (P) dB (with a measurement bandwidth of 1 MHz). In addition, when 3GPP decided that public safety mobile devices required greater protection than the Commission limit, it set a higher limit of 65 + 10 $\log_{10}$ (P) dB (with a measurement bandwidth of 1 MHz or greater). As part of the 3GPP deliberations, Verizon Wireless, a licensee of significant Upper 700 MHz C Block spectrum, agreed that this level provided sufficient protection to our Nation's first responders. Yet, here, in the H Block proceeding, wireless providers are advocating for a limit that is 31 dB (*i.e.,* more than 1,000 times) more stringent than the protection afforded public safety. We would expect, to the contrary, that protection levels sufficient for public safety would normally be sufficient to protect commercial mobile service providers.

132. Not only is the OOBE limit of 96 + 10 $\log_{10}$ (P) dB much more stringent than the limits the Commission has adopted in any other band, it may be very difficult to realize. Sprint submitted a presentation from Avago Technologies that showed one solution using an FBAR (Film Bulk Acoustic Resonator) filter to meet the OOBE limit. The proposed filter was designed to support a single ten megahertz passband covering only the PCS G Block and the proposed H Block. As Sprint is the sole licensee for the PCS G Block, the filter design is very specialized for Sprint's purposes and is unlikely to be useable by other operators that may need to use larger passbands or other more commonly used filter technologies. It is important that the limits we set for H Block operations maximize the utility of the band for all potential licensees and provide for the public good.

133. *Probabilistic Interference.* In evaluating the interference scenario here, it is important to account for its probabilistic nature. In order for mobile-to-mobile harmful interference actually to occur, a number of worst case factors must all happen in conjunction with each other. These factors include that the two mobile devices (1) must be in operation at the same time, (2) must be located in very close proximity to each other, (3) must remain in close proximity for a significant period of time (*i.e.,* proximity must not be transient), (4) must be operating in a weak signal environment with both (a) the interfering mobile transmitter operating at maximum power and (b) the PCS mobile receiver receiving a weak signal and using frequencies most likely to lead to interference (*e.g.,* the interfering device must be capable of using the Lower H Block, actually transmitting on the Lower H Block, and transmitting on a resource block(s) near the upper edge of that band; the PCS device must similarly be operating on a receiver frequency near or at the lower edge of the PCS band), and (5) must be operating in a line of sight environment with respect to each other. Indeed, the Commission has described this issue for these bands previously, stating that ''[t]he worst case occurs when the mobile transmitter is operating at maximum power (near the edge of its service area) at the upper edge of the band (near 1920 MHz) and the mobile receiver is trying to receive a weak signal (near the edge of its service area) at the lower edge of the band (near 1930 MHz) and only free space loss is considered.''

134. In addition, mobile devices do not transmit continuously; rather, they transmit data in bursts. For example, for LTE devices, mobile data is organized in resource blocks, which allocate a set of subcarrier frequencies for a 1 ms (millisecond) time interval. The frequency and duration of these bursts, or number of allocated resource blocks, depends upon traffic loads and signal conditions. For interference to PCS mobile devices to occur the H Block mobile must be transmitting in the same time interval that the PCS device is receiving. Thus, by transmitting in bursts, the likely use of LTE devices in the H Block would further dilute the probability of interference occurring. In addition, wireless networks constantly measure performance and seek to switch devices to alternative resources to improve call quality (*e.g.,* handoff to another channel or another base station).

135. The record supports this description of the factors that generally need to occur to give rise to mobile-to-mobile interference. For example, Sprint stated that ''many factors come into play for such mobile-to-mobile interference.'' It observed that interference would only occur if ''(1) the PCS device is attempting to receive a weak signal at the bottom end of the PCS band; (2) the two mobile devices are located very near to each other; and (3) the H block device is transmitting at the same instant, with high power and in the resource blocks at the upper end of the H block.'' Verizon Wireless concurred, expressly stating that ''Sprint is correct as to the circumstances in which interference will occur.'' Accordingly, we reiterate that mobile-to-mobile interference will occur only in specific

situations, such as those described above.

136. The risk of mobile-to-mobile interference occurring is influenced by the low probability of these worst-case circumstances occurring—they may occur, but do so infrequently—and by network management practices, such as hand off and power management, that are designed to mitigate against harmful interference. For example, Sprint states that LTE ''spreads across the bandwidth, dynamically controlling the power and number of subcarriers assigned to a particular device and reducing the need for constraining OOBE limits.'' Moreover, as Sprint observes, ''[p]robability certainly plays a large factor as to when [the above] conditions would occur in the real world.'' We believe that the probability of each of the described mobile-to-mobile interactions actually occurring is small individually, and quite small viewed in combination. Thus, we disagree with Verizon Wireless's assertion that the combination of circumstances resulting in interference does not ''occur only rarely . . . [because] mobile devices are most likely to be located very near to each other at indoor locations where users are likely to receive a weaker signal.'' Although the confluence of worst case scenarios may occur more often indoors than outdoors, it does not necessarily follow that these situations occur indoors with any frequency; nor has Verizon Wireless provided any evidence showing that these factors occur frequently indoors. Further, in areas where wireless providers anticipate recurring high density use of mobile devices, providers typically engineer their networks to provide robust coverage, including for indoor locations.

137. We apply our discussion of the probabilistic nature of mobile-to-mobile interference to our evaluations of the test reports, immediately below.

138. *Test Reports.* While we believe it appropriate to act consistently with the Commission's recent determination in the AWS–4 proceeding that an attenuation limit of $70 + 10 \log_{10} (P)$ dB, where P is the transmitter power in watts, from the AWS–4 uplink band into the PCS downlink band at 1930–1995 MHz to set that same limit here for transmissions from the Lower H Block into the PCS downlink band, we believe it appropriate to test this conclusion against the test reports submitted into the record here. As explained above, parties submitted three test reports into the record. We assess these reports based on our engineering expertise and with the goal of auctioning the Lower H Block in a manner that maximizes its usefulness while protecting the PCS band from harmful interference, as required by the Spectrum Act.

139. We have a number of concerns with the test reports. In particular, as we discuss above, although we do not question the science behind the reports, we find a number of assumptions used by the parties in their interference tests are overly conservative for use in setting reasonable OOBE limits. Specifically, we find the testing (1) failed to fully account for the low probability of mobile-to-mobile interference, (2) assumed an overly conservative required separation distance of 1 meter, (3) relied on limiting interference to an overly conservative 1 dB desensitization level, (4) relied on an overly restrictive user scenario that accounted for body loss only, as opposed to head and body loss, and (5) included an unnecessary manufacturer's tolerance. We address each of our concerns with the test reports, below, in turn.

140. First, the test reports do not fully account for the highly probabilistic nature of OOBE interference from the Lower H Block into the PCS downlink band. As explained above, many low probability factors must occur in conjunction for interference to occur in a mobile-to-mobile scenario. Because our charge is to prevent harmful interference, rather than all interference, accounting for the likelihood that an instance of interference will occur is important in assessing whether the interference scenario rises to the level of harmful interference. For example, as the Commission has said previously, whether the user would actually notice the interference may be an important element of determining if interference is harmful. Except for one factor—separation between devices, which we discuss immediately below—no information provided in the test reports indicates that they accounted (or attempted to account) for the probabilistic nature of the interference. Because the test reports did not fully account for the probabilistic nature of the interference at issue, we believe they overstate the protection from OOBE interference needed by licensees operating in the 1930–1995 MHz band.

141. Second, we examine the one probabilistic factor included in the test reports—separation distance. The selection of the separation distance between devices is a key factor in determining the probability of that interference could occur. As stated above, the Sprint Test Report, the Verizon Wireless Test Report, and the AT&T/T-Mobile Test Report all assumed a separation of 1 meter between devices. A 1 meter separation is often used as a minimum separation distance in industry analyses of mobile-to-mobile interference. Distances of less than 1 meter risk the possibility that near field antenna coupling effects may distort the propagation between the two devices and undermine the assumption of free space path loss. Again, as discussed earlier, the simple presence of interference is not necessarily the same as harmful interference. To determine what interference is sufficient to be considered harmful, one should consider whether there is a reasonable probability that the conditions necessary to create that interference will occur. The Commission has previously supported a separation of 2 meters as an appropriate assumption for the purposes of determining an acceptable level of interference. For example, in the *AWS Sixth Report and Order,* the Commission expressed support for a 2 meter separation distance, stating that ''this short distance coupled with the low probability of occurrence of the worst-case scenario (both mobiles at the edge of coverage, both operating at the edge of the band, both simultaneously active, and both in close proximity to each other), make interference of this nature highly unlikely.'' More recently, in the *AWS–4 Report and Order,* the Commission found it reasonable to rely on the 2 meter separation distance proposed by Motorola Mobility in calculating interference limits. Accordingly, we believe that a 1 meter separation distance represents an overly conservative value and that it is a more realistic scenario to assume that the devices at issue are likely to be at least 2 meters apart.

142. Third, we turn to inputs used in the test reports that are not associated with the probabilistic nature of the interference scenario, and start with the desensitization level. While the reports use a 1 dB desensitization level, we believe a 3 dB level is more appropriate. The Sprint and Verizon Wireless test reports include results of the testing for both the 1 dB and 3 dB desensitization levels, but focused their analysis of the results on the 1 dB desensitization level. For purposes of the AT&T/T-Mobile Test Report, AT&T and T-Mobile designed their test plan to use a 3 dB desensitization of the receiver's sensitivity. The desensitization was based on the device's reference sensitivity per the standard for the technology, rather than by the individual device's measured sensitivity (the approach used by Sprint and Verizon Wireless). AT&T and T-Mobile described this test strategy as a typical design test, observing that most link

budgets, which drive the design of the network, use the standard's reference sensitivity. Further, they stated that the reference sensitivity, as opposed to the individual device's measured sensitivity allows all devices ''to be tested in exactly the same environment'' for a better comparison of device performance.

143. A 1 dB desensitization level is defined as the level of interference at which the effective noise floor of the system will rise by 1 dB, that is, the receiver sensitivity will be reduced by 1 dB. This occurs when the interfering signal level is 6 dB below the noise floor of the receiver. Similarly, 3 dB desensitization occurs when the level of interference is equal to the level of the receiver's system noise. 1 dB desensitization is most commonly used as an interference protection criterion for noise-limited receiver systems. However, mobile cellular systems are inherently interference-limited; that is, the prevailing interference is greater than noise sources. These systems are designed to perform in a strong interference environment, much of which is often self-generated, coming from other network elements (*e.g.,* other nearby base stations in the same or adjacent bands).

144. We believe that a noise-limited interference criterion (1 dB desensitization) is too restrictive for modern cellular systems. This is reflected in industry standards for receiver performance, such as the 3GPP2 standard for CDMA devices. As described above, the 3GPP2 standard for cdma2000 mobile devices sets several receiver performance requirements, including response to receiver overload (blocking) and intermodulation. For example, 3GPP2 Requirement 3.5.2 for Single Tone Desensitization, similar to the intermodulation tests performed by V–COMM, sets the level of the desired signal at either 3 dB or 10 dB above the reference sensitivity level. Similarly, under the 3GPP2 standard, receiver blocking also permits sensitivity to degrade by 3 dB above its reference level in the presence of overload interference while maintaining a 10% FER. CDMA is not the only technology to require the receiver to operate properly in the presence of interference. The 3GPP standard for UMTS and LTE devices specifies an in-band blocking requirement that sets the interfering signal level 6 dB or more above the reference sensitivity level. Further, for GSM, the desired signal is set at 3 dB above reference sensitivity for in-band and out-of-band blocking. These examples demonstrate that a desensitization of 3 dB in the presence of a specific interferer is acceptable in the above standards for determining receiver performance and may be considered normal operation. In other words, these standards bodies have considered a 3 dB desensitization level as an acceptable level of performance and have not viewed it as indicative of harmful interference. In addition, in other proceedings, other parties and the Commission have used a 3 dB desensitization of the receiver in analyzing similar mobile-to-mobile interference scenarios. For example, in addressing a similar mobile-to-mobile interference scenario in the AWS–4 proceeding, the Commission viewed as reasonable a 3 dB desensitization level recommended by Motorola Mobility. Finally, although the AT&T/T-Mobile Test Report used a 1 dB desensitization level for its conclusions, the report states that a 1 dB desensitization level is not typical. The AT&T/T-Mobile Test Report characterized the desired signal conditions used in the Sprint and Verizon Wireless tests as representing worst case conditions. The report noted that ''the disadvantage to this approach is that we utilize an operating point that is probably well above the device's actual sensitivity. Thus, a stronger interfering signal is required to realize impairment in performance.'' Moreover, in specifically commenting on the appropriate desensitization level, the report states: ''The 1 dB desense point was used by AT&T/T-Mobile only because this is one of two operating points utilized in the filings from Sprint and Verizon Wireless. It is not typically used during conformance or performance testing, primarily because the measurement uncertainty associated with it is rather high. The measurement metric (throughput or BER/FER) displays highly non-linear behavior.'' We observe that neither Sprint nor Verizon Wireless explain why they used a 1 dB desensitization level. We therefore find that the 3 dB desensitization level to be a more appropriate metric for determining the presence of harmful interference.

145. Fourth, we assess the two user scenarios contained in the Sprint Test Report and the Verizon Wireless Test Report and the different assumptions contained in the AT&T/T-Mobile Test Report. In the Sprint and Verizon Wireless reports, V–COMM made certain assumptions on how the device would be used and set up two user scenarios, one simulating data use and the other simulating a user making a voice call. V–COMM assumed that, during data use, the device would be in held in the user's hand and would experience 3 dB in body loss. If both the interfering and receiving devices were held in the hand, a total of 6 dB of body losses would occur. In the case of a user making a voice call, where the device was held to the user's head, there would be 8 dB of combined head and body losses. Thus, if both the transmitting and receiving users were engaged in a voice call, there would be a total of 16 dB of head and body losses. The analysis provided in the AT&T/T-Mobile Test Report made no provision for either head or body loss in setting the criteria for their analysis. The report stated, however, that ''additional losses, such as those attributable to the presence of the user's hand, holding the device to the head, etc., would reduce both the Lower H Block power level and OOBE further.'' This statement effectively acknowledges that head and body loss may be appropriate, yet the report does not apply any in the analysis.

146. The specific values of head and body loss can be affected by a number of factors, particularly frequency, and do not have uniformly accepted values. For example, in the recently concluded AWS–4 proceeding, Motorola assumed a 10 dB head and body loss. Both Sprint and Verizon Wireless have adopted an 8 dB head and body loss in their respective test reports. We accept these proposed values for body loss and head loss as within the range of reasonableness for our calculations here. V–COMM calculated the OOBE limit required under both user scenarios. The OOBE limit proposed by both Sprint and Verizon Wireless was based on the assumption that both devices are being used for data. In previous Commission analyses of mobile-to-mobile interference, however, the user scenario has been for voice use; that is, in prior Commission analysis, the total losses attributable to head and body losses have been in the range of as much as 6 to 10 dB for each device (both the transmitting and receiving device). Moreover, interference does not affect voice and data in the same manner. The user is much more likely to notice interference during a voice call than during data use. The provision of voice service requires low latency in the transmission link. Therefore, noise due to interference can be immediately perceptible to the voice user. Harmful interference potentially can cause the voice call to terminate. Data traffic, on the other hand, can be much more sporadic, even under good signal conditions, and can often tolerate some data losses. If interference prevents data from being received and properly

decoded, the information may be retransmitted until it is received correctly. This retransmission may cause delays in the data transmission, and effectively slow the data throughput rate, but the data session likely will continue through to completion. Significantly, these delays are likely imperceptible to the user in most data scenarios. As explained above, we consider that interference should be judged harmful when it is readily perceptible to the user in most cases. Consequently, because instances of interference are more likely to be perceptible to the voice user than to the data user, we find it more appropriate to use the voice user case when setting the appropriate attenuation level necessary to avoid OOBE interference.

147. Fifth, we are concerned that the Sprint Test Report and the Verizon Wireless Test Report use a 3 dB ''implementation margin'' to adjust the proposed OOBE limit. The AT&T/T-Mobile Test Report did not include an implementation margin. It is not clear what issue an implementation margin is designed to address or why it is appropriate. In using a 3 dB implementation margin, the test reports adjust the proposed OOBE limit from −69 dBm/MHz to −66 dBm/MHz (*i.e.,* from 99 + 10 $\log_{10}$ (P) dB to 96 + 10 $\log_{10}$ (P) dB). Thus, unlike all of the test report inputs discussed above, inclusion of this input results in making the OOBE less strict. The Sprint and Verizon Wireless test reports state that the adjusted OOBE limit ''is consistent with OOBE limits proposed in the FCC NPRM in 2004 and 2008 . . . [and] with 3GPP OOBE limits for UMTS and HSPA devices . . . . OOBE of all devices tested in 2004 comply with −66 dBm/MHz . . . pursuant to CTIA's H-Block tests.'' No reason was provided to support a need for the OOBE limit we are now establishing to be consistent with earlier testing or earlier Commission proposals. Rather, as we explain above, technology has advanced considerably since earlier tests were performed and we would expect that the purpose of any new testing would be to provide temporally relevant data, not to match earlier data. Thus, we question the propriety of including this implementation margin.

148. In light of all of these concerns with the test reports, we decline to use them as the basis to establish the OOBE limit for Lower H Block emissions into the 1930–1995 MHz band. Rather, as explained above, we find it more appropriate to rely on Commission precedent for the same mobile-to-mobile interference scenario we face here, but from the other end of the PCS band, to establish the OOBE limit. We find that relying on this precedent is preferable to making the numerous adjustments that would be necessary to rely on the studies, particularly given that it may not be possible to fully adjust the studies to account for all of the issues detailed above, including, in particular, the probabilistic nature of the interference. Finally, we observe that our rules contain a savings provision that permits the Commission, in the event that harmful interference occurs, to require greater attenuation than the level we set here.

149. *Measurement Procedure.* The Commission proposed to apply the measurement procedure used in the immediately adjacent PCS uplink band (1850–1915 MHz) to the OOBE limit set for the Lower H Block. For this PCS band, the measurement bandwidth for mobile stations is one megahertz or greater, with some modification in the one-megahertz bands immediately outside and adjacent to the frequency block where a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. No party commented on this proposal. To treat mobile operations in the Lower H Block in an equivalent manner to mobile operation in the adjacent PCS band, we therefore adopt the Commission's measurement procedure proposal.

150. *Commenter Notification Proposal.* We adopt a proposal set forth by T-Mobile to require Lower H Block licensees to notify operators in the A Block of the PCS downlink band (1930–1945 MHz) when the H Block licensee turns on service. T-Mobile proposed to require H Block licensees ''to provide notification to PCS A Block licensees when they turn on service in the H Block on a market-by-market basis.'' T-Mobile argues that this requirement is needed because ''GSM devices may not be adequately protected'' by our Lower H Block power limit and OOBE limit rules. T-Mobile asserts that this notification requirement would ''assist[] PCS licensees in network planning to reduce the probability of interference.''

151. For the reasons stated above, we cannot determine that PCS licensees will experience harmful interference from Lower H Block operations. Nevertheless, we adopt a notification requirement out of an abundance of caution and in light of the specific statutory condition requiring that H Block operations not cause harmful interference to PCS licensees. Although the Commission does not generally require part 27 licensees to provide notification to operators in adjacent or nearby bands when they commence service, the Commission has done so in at least one instance. Specifically, the Commission has required providers of 2.3 GHz WCS, a part 27 service, to provide notification to certain providers operating in nearby spectrum with notice 30 days before commencing operations of a new transmitting site. Here, we have a statute that requires H Block operations not cause harmful interference to PCS downlink operations and a PCS licensee with considerable operations in the lower portion of the PCS A Block—the spectrum in closest proximity to the Lower H Block—stating that a notification requirement would ''assist PCS licensees in network planning to reduce the probability of interference.'' Thus, while we believe that the technical rules we adopt above are sufficient to prevent harmful interference from Lower H Block operations to PCS licensees operations in the 1930–1995 MHz band, we find adoption of a notification requirement appropriate as an additional safeguard against harmful interference. In the event, contrary to our predictive judgment, that we determine following such notification that H Block uplink operations do result in harmful interference to A Block PCS downlink operations in any particular location, we will take appropriate action to address such situations.

152. In adopting this notification requirement, we provide basic parameters for how the notification shall be provided. We do so to avoid confusion, despite the lack of details contained in the T-Mobile proposal. T-Mobile requested H Block licensees provide PCS A Block licensees with notification when the H Block licensee ''turn[s] on service'' on a ''market-by-market basis.'' T-Mobile did not define these terms. Because the interference scenario between the Lower H Block and the PCS downlink band is one of mobile-to-mobile interference, we find it logical (for the sole purpose of the notification requirement we adopt here) to equate turning on service to when a consumer mobile device begins to operate in the band, *i.e.,* when service is first provided to a consumer. In addition, we find it logical to relate the term market (for the sole purpose of the notification requirement we adopt here) to the geographic license area we adopt for the H Block—Economic Areas (EAs). Accordingly, we require each Lower H Block licensee to provide all PCS A Block (1930–1945 MHz) licensees within the geographic scope of the Lower H Block license with written notification that the H Block licensee

has begun providing service; such notice must be provided on the date when the Lower H Block licensee first begins to provide service to a consumer using the Lower H Block.

3. Canadian and Mexican Coordination

153. In the *H Block NPRM,* the Commission proposed to apply the approach used by AWS–1 operations to coordinate with Canada and Mexico to H Block operations. We adopt this approach and observe that because of our shared borders with Canada and Mexico, the Commission routinely works in conjunction with the United States Department of State and Canadian and Mexican government officials to ensure the efficient use of the spectrum as well as interference-free operations in the border areas. Until such time as any adjusted agreements, as needed, between the United States, Mexico and/or Canada can be agreed to, operations must not cause harmful interference across the border, consistent with the terms of the agreements currently in force. We note that further modifications of the rules might be necessary in order to comply with any future agreements with Canada and Mexico regarding the use of these bands.

4. Other Technical Issues

154. In addition to the specific technical issues addressed above, the Commission also proposed applying additional part 27 rules to the H Block band. Specifically, the Commission proposed applying the following rule sections: § 27.51 (Equipment Authorization); § 27.52 (RF Safety); § 27.54 (Frequency Stability); § 27.56 (Antenna structures; air navigation safety); and § 27.63 (Disturbance of AM broadcast station antenna patterns). The Commission reasoned that because H Block will be licensed as an Advanced Wireless Service under part 27, these rules should apply to all licensees of H Block spectrum, including licensees who acquire their H Block license through partitioning or disaggregation. No commenters opposed this proposal. In the *H Block NPRM,* the Commission directed commenters desiring to address a change in the Commission's RF exposure standards to file in both the H Block proceeding and in ET Docket No. 03–137. *See H Block NPRM,* 27 FCC Rcd at 16276 para. 53 n.95. Numerous parties submitted comments, replies, or *ex parte* filings into either the H Block proceeding or ET Docket No. 03–137, or in most instances into both dockets, advocating that the Commission re-examine its RF exposure standards. On March 27, 2013, the Commission adopted a *First Report and Order, Further Notice of Proposed Rulemaking, and Notice of Inquiry* on RF exposure issues. *See* Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies, ET Docket No. 13–84, *Notice of Inquiry,* and Proposed Changes in the Commission's rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields, ET Docket No. 03–137, *First Report and Order and Further Notice of Proposed Rulemaking,* 28 FCC Rcd 3498 (2013). ET Docket No. 03–137 is mainly procedural, and does not reach the issue of whether the Commission's limits on human exposure to RF energy are appropriate. ET Docket No. 13–84 is a new docket in which the Commission seeks information and comment as to whether it should undertake a rulemaking to revise its existing RF exposure standards. We hereby incorporate comments addressing the RF exposure standards filed in the H Block proceeding, as well as those in ET Docket No. 03–137, until the release date of this *H Block Report and Order,* into the open proceeding on RF exposure issues in ET Docket No. 13–84, as appropriate. Further, the Commission will periodically monitor the H Block proceeding for 30 days following publication of the *H Block Report and Order* in the **Federal Register** to ensure that any additional misfiled relevant comments addressing the RF exposure standards are appropriately considered in ET Docket No. 13–84. Accordingly, because these rules generally apply to all part 27 services, and because, as we explain above, we find it appropriate to license the H Block under our part 27 regulatory framework, we conclude that the potential benefits of our proposal would outweigh any potential costs and adopt the proposal to apply these additional part 27 rules to licensees of H Block.

155. In the *H Block NPRM* the Commission observed that H Block spectrum is adjacent to Broadband PCS spectrum, which is administered under part 24, and that it is therefore possible that a single entity could obtain licenses for both bands in the same geographic area and seek to deploy a wider channel bandwidth in that area across both bands. If we permit operations under such a scenario, we need to determine which rule part should govern the combined operations across the band. In the *H Block NPRM,* the Commission proposed to allow such operations and, should there be a conflict in the rules applicable to both bands, to apply the more restrictive rule across the combined operations. No party commented on these proposals. We continue to believe it is in the public interest to permit operations across the PCS downlink band and the Upper H Block in the event that an entity obtains licenses to operate in the same geographic area in both bands. In particular, because we adopt an EA-based licensing scheme for H Block, and the PCS G Block, 1990–1995 MHz has been licensed on an EA basis, we believe that by allowing an operator to unify operations across adjacent blocks may benefit the public interest by providing consumers with better, more affordable services through increased service coverage and eliminate redundancy. To ensure that this decision does not negatively affect adjacent band licensees, we also adopt the Commission's proposal to apply the more restrictive rule across the combined band in situations where the part 24 and part 27 interference or other technical rules differ. For example, in the event a single licensee operates in a unified manner in a geographic area across both the PCS G Block at 1990–1995 MHz and the Upper H Block, that entity would be required to comply with the H Block requirement for OOBEs from the combined 1990–2000 MHz band into frequencies above 2000 MHz.

D. Cost-Sharing

156. *Background—1915–1920 MHz Band.* The 1915–1920 MHz band has historically been a subset of a larger band at 1910–1930 MHz that is currently allocated for Fixed and Mobile services on a primary basis. Before 1993, the 1910–1930 MHz band was allocated for Fixed services and used for fixed point-to-point microwave links. In 1993, the Commission designated the 1910–1930 MHz band for use by Unlicensed Personal Communications Service (UPCS) devices. To facilitate the introduction of UPCS systems, the Commission designated the Unlicensed PCS Ad Hoc Committee for 2 GHz Microwave Transition and Management (now known as ''UTAM, Inc.'') as the sole entity to coordinate and manage the transition. In accordance with the Commission's policies established in the *Emerging Technologies* proceeding, UTAM subsequently relocated virtually all of the incumbent microwave links, thereby clearing the 1910–1930 MHz band for use by UPCS systems.

157. In 2003, the Commission sought comment on re-designating all or a portion of the 1910–1920 MHz segment for AWS use. In 2004, the Commission re-designated the 1910–1915 MHz band from the UPCS to Fixed and Mobile services and assigned that spectrum to

Sprint Nextel, Inc. (''Sprint'') as replacement spectrum for Sprint's operations being relocated from the 800 MHz band. Sprint then reimbursed UTAM soon after it received its licenses for the 1910–1915 MHz and 1995–2000 MHz bands from the Commission. Shortly after re-designating the 1910–1915 MHz band, the Commission also re-designated the 1915–1920 MHz band from UPCS to use by licensed AWS operations. In so doing, the Commission acknowledged that ''UTAM must be fully and fairly reimbursed for relocating incumbent microwave users in this band'' and determined ''that UTAM should be made whole for the investments it has made in clearing the UPCS bands.'' Relative to the Lower H Block, the Commission specifically concluded that ''UTAM is entitled to reimbursement of twenty-five percent—on a *pro-rata* basis—of the total costs it has incurred . . . as of the date that a new entrant gains access to the 1915–1920 MHz spectrum band.'' The Commission also determined that AWS licensees would be required to pay their portion of the twenty-five percent of costs prior to commencement of their operations. In total, the relocation costs attributable to the Upper H Block licenses amounts to $12,629,857.

158. *1995–2000 MHz Band.* The 1995–2000 MHz band is part of the 1990–2025 MHz band that the Commission reallocated from the Broadcast Auxiliary Service (BAS) to emerging technologies such as PCS, AWS, and Mobile Satellite Service (MSS). Consistent with the relocation and cost-sharing principles first established in the Commission's *Emerging Technologies* proceeding, each new entrant had an independent responsibility to relocate incumbent BAS licensees. Under these procedures, the first new entrant into the band that incurs relocation expenses for the relocation of incumbents from portions of the band that the new entrant will not occupy is, as a general matter, eligible to obtain reimbursement from subsequent entrants in the band. More specifically, the Commission determined that an AWS entrant's cost-sharing obligation for the 1995–2000 MHz band will be triggered upon the final grant of the long form application for each of its licenses. Sprint, which is the PCS licensee at 1990–1995 MHz, completed the BAS transition for the entire 35 megahertz in 2010. In 2011, Sprint notified the Commission that it entered into a private settlement with DISH to resolve the dispute with MSS licensees with respect to MSS licensees' obligation to reimburse Sprint for the MSS licensees' shares of the BAS relocation costs related to the 2000–2020 MHz band. Accordingly, the only remaining cost-sharing obligations in the 1990–2025 MHz band are attributable to the remaining, unassigned ten megahertz of spectrum in the 1990–2025 MHz band: 1995–2000 MHz and 2020–2025 MHz. Because the 1995–2000 MHz band represents one-seventh of the relocated BAS spectrum, the relocation costs collectively attributable to the Upper H Block licenses amounts to a total of $94,875,516.

159. *H Block NPRM. In the 2012 H Block NPRM,* the Commission again sought comment on how to apportion UTAM's reimbursement among Lower H Block licensees and Sprint's reimbursement among Upper H Block licensees. The Commission observed that it is important to provide auction bidders with reasonable certainty as to the range of the reimbursement obligation associated with each license under various auction outcomes. Further, with regard to the Lower H Block, the Commission also expressed concern that the rules enable UTAM to be fully reimbursed as soon as possible given that UTAM cleared the band over ten years ago. The Commission therefore proposed to require Lower H Block licensees to pay a *pro rata* amount of the twenty-five percent owed to UTAM based on the gross winning bids of the initial H Block auction. Specifically, the Commission proposed that the reimbursement amount owed (''RN'') be determined by dividing the gross winning bid (''GWB'') for an H Block license (*i.e.,* an individual EA) by the sum of the gross winning bids for all H Block licenses won in the initial auction and then multiplying by $12,629,857, the total amount owed to UTAM for clearing the 1915–1920 MHz band. This amount—$12,629,857—is the amount UTAM has identified for years as the amount collectively owed by future Lower H Block licensees to UTAM for UTAM's clearing of the 1910–1930 MHz band; that is, this amount represents one-fourth of UTAM's total reimbursable clearing costs for the entire 1910–1930 MHz band. *See* UTAM Comments at 3; Letter from Michael Stima, Managing Director, UTAM, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 04–356, at Attach. 1 (filed May 21, 2007); *H Block NPRM,* 27 FCC Rcd at 16278 para. 58. No party has disputed this amount in the record before us. The Commission also observed that Sprint has already cleared the Upper H Block, thereby enabling licensees to benefit from the band clearing as soon as they obtain licenses. The Commission thus proposed the same cost-sharing formula for the upper band, as it did for the lower band, applying Sprint's (rather than UTAM's) clearing costs of $94,875,516 in the formula for the Upper H Block.

160. The Commission proposed these formulas in an effort to ensure that UTAM and Sprint receive full reimbursement after the first auction by effectively apportioning the reimbursement costs associated with any unsold H Block licenses among the winning bidders of all of the licenses sold in the first auction—with an exception in the event a successful bidder's long-form application is not filed or granted, and subject to one contingency, discussed below. The Commission imposes payment obligations on bidders that withdraw provisionally winning bids during the course of an auction, on those that default on payments due after an auction closes, and on those that are disqualified. *See* 47 CFR 1.2110(f)(2)(i). To the extent such were to occur and a winning bidder were not awarded a license, the Commission proposed that the EA license at issue be deemed to have triggered a reimbursement obligation that will be paid to UTAM by the licensee acquiring the license at a re-auction. Further, the Commission proposed that winning bidders of H Block licenses in the first auction would not have a right to seek reimbursement from other H Block licensees including for licenses granted as a result of subsequent auctions. The Commission sought comment on these proposals, including on their associated costs and benefits.

161. In addition, the Commission sought comment on the relative costs and benefits of adopting its alternative population based cost-sharing formula as the general rule for the H Block. The Commission acknowledged that using a population based approach in all events would offer bidders greater certainty as to the obligation attached to each license, but would decrease the likelihood that UTAM would be fully compensated for clearing the band after the initial auction.

162. Regardless of which basis the Commission adopts for its cost-sharing formula, the Commission proposed a contingency that would be triggered in the unlikely event that licenses cover less than forty percent of the population of the United States won in the first auction. In such a scenario the population would be measured using 2010 Census data, which is the most recent decennial census data. The

Commission proposed that, in such an event, winning bidders—in the first auction, as well as in subsequent auctions—would be required to timely pay UTAM and Sprint, respectively, their *pro rata* share calculated by dividing the population of the individual EA granted as a result of auction by the total U.S. population and then multiplying this quotient by $12,629,857 for UTAM and by $94,875,516 for Sprint. This contingency would ensure that UTAM and Sprint are reimbursed as soon as possible while also protecting H Block winning bidders from bearing an undue burden of the reimbursement obligations due to UTAM and to Sprint.

163. The Commission also sought comment, including on the costs and benefits, on the appropriate sunset date for the reimbursement obligation for the Upper H Block. Specifically, the Commission proposed a sunset date for cost-sharing obligations of Upper H Block licensees to Sprint of ''ten years after the first [AWS Upper] H Block license is issued in the band.'' The Commission reasoned, in part, that because bidders can internalize their reimbursement costs into their bids for H Block licenses, and because winning bidders are the ultimate beneficiaries of the band clearing, this sunset date does not impose undue burdens on the H Block winning bidders.

164. Finally, the Commission proposed that winning bidders must pay UTAM and Sprint, respectively, the amount owed, as calculated pursuant to the formula ultimately adopted by the Commission, within thirty days of grant of their long-form license applications. The Commission sought comment on this proposal, including on its associated costs and benefits.

165. *The Record.* Commenters generally supported the adoption of reimbursement formulas that apportion the relocation costs attributable to the Lower H Block and attributable to the Upper H Block, respectively, on a *pro rata* basis among H Block licensees. Commenters were mixed on whether we should adopt a cost-sharing formula that is based on gross winning bids or population. For example, C Spire and MetroPCS argued that a population based formula provide bidders with greater certainty as to their reimbursement obligations. CCA and Sprint opposed a population based formula, arguing that it could delay final reimbursement for UTAM and Sprint in the event that all geographic areas are not licensed in the initial auction. Commenters supported the Commission's proposal to require prompt payment of cost-sharing reimbursement obligations. Sprint, moreover, proposed that the Commission take the additional step of not issuing the actual licenses until reimbursement payments are made. Finally, Sprint is the only party that commented on the proposed sunset date for the Upper H Block cost-sharing requirements, arguing in support of the Commission's proposal.

166. We adopt the cost-sharing proposals and formulas made by the Commission in the *H Block NPRM* both for the Lower H Block and for the Upper H Block. We conclude, given the record before us and Commission precedent, that this approach is in the public interest and that the benefits of this approach likely outweigh any potential costs. First, as detailed above, the Commission has long established that cost-sharing obligations for both the Lower H Block and the Upper H Block should be apportioned on a *pro rata* basis against the relocation costs attributable to the particular band. Consistent with the record before us, we follow that precedent here.

167. Second, we adopt cost-sharing formulas based on gross winning bids, rather than on license area populations. Such an approach will enable both UTAM and Sprint, who cleared the respective bands years ago, to receive full reimbursement after the first auction, as it results in apportioning the reimbursement associated with any unsold H Block licenses among the winning bidders in the first auction. We also adopt the Commission's proposal in the *H Block NPRM,* which was supported by the only commenter that addressed it, Sprint, that winning bidders in the first auction may not seek reimbursement from other H Block licensees, including for licenses granted as a result of subsequent auctions. As we explained in the *H Block NPRM* and Sprint echoed in its comments, this approach is fair and will minimize record keeping burdens and the likelihood of disputes between parties. A gross winning bids approach is also superior to a population approach because it better reflects the market value associated with each license at the time of the auction. For example, some license areas, such as the Gulf of Mexico, may have a relative value that is not directly tied to population. In such a case, a population-based formula may not fairly apportion relocation costs among the winning bidders. In response to concerns that a gross winning bids approach can lead to greater uncertainty if fewer licenses are sold, however, we adopt the contingency proposed in the *H Block NPRM*—if licenses won in the first auction cover less than forty percent of the population of the United States, then the cost-sharing formula will be based on population in the first auction, as well as in subsequent actions. In such a scenario the population would be measured using 2010 Census data, which is the most recent decennial census data.

168. Third, to avoid confusion, we reiterate the Commission's earlier findings that Sprint may not receive reimbursement for the same costs both from AWS entrants into the Upper H Block and from the 800 MHz true-up. For example, in the *2010 BAS Order,* the Commission:

> adopt[ed] a policy affirming . . . that Sprint [ ] may not both receive credits in the 800 MHz true-up and receive reimbursement from the . . . AWS entrants for the same costs. This has been the rule since the cost sharing requirements were adopted in the *800 MHz R&O,* and is necessary; to prevent Sprint [ ] from receiving an unjustified windfall, and no party has objected to this conclusion.

169. Fourth, we adopt the Commission's proposal to require winning bidders to pay UTAM and Sprint, respectively, the amounts owed within thirty days of the grant of the winning bidders' long-form license applications. For PCS, AWS–1, and AWS–4 licensees, cost-sharing obligations are triggered when a licensee proposes to operate a base station in an area cleared of incumbents by another licensee. In this case, however, for the Lower H Block, UTAM's members received no benefit for clearing the spectrum nationwide over ten years ago, and the Commission determined in 2003 that the new PCS/AWS licensees entering the band would reap the benefits of UTAM's efforts and that UTAM should be fully reimbursed. Similarly, for the Upper H Block, rather than Sprint itself benefiting from its clearing efforts (except if Sprint is the winning bidder), other entrants in the band will reap the benefits of Sprint's clearing efforts. Consequently, we find it appropriate to set the deadline for H Block winning bidders to reimburse UTAM and Sprint, respectively, at thirty days after the grant of long-form license applications.

170. This prompt payment requirement protects the integrity of the Commission's *Emerging Technologies* band clearing and cost-sharing policies, including demonstrating fairness to UTAM and Sprint, both of whom will receive reimbursement years after clearing the band to the benefit of others. We believe that the benefit of process integrity along with the benefit of prompt payment to UTAM and to Sprint significantly outweighs any potential costs to winning bidders

resulting from their pay their reimbursements promptly (*i.e.,* within thirty days of the grant of their long-form applications). All parties who commented on this issue supported the proposed prompt payment requirement. Further, we believe that our requirement that AWS winning bidders must pay their cost-sharing obligation within thirty days is consistent with the general approach to payment timing for cost-sharing that the Commission has applied to AWS spectrum, and is consistent with the *2010 BAS Order's* approach to payment timing in the Upper H Block in particular. There, at a time when the total costs for clearing the Upper H Block were not yet known, the Commission required AWS entrants in that spectrum band to make payment within thirty days of receiving documentation of Sprint's ultimate clearing costs. Now, these costs are known for both the Lower H Block and the Upper H Block, and have been for some time. Thus, we find it appropriate to start the thirty-day reimbursement clock from the date on which the AWS entrants cost-sharing obligations inure—*i.e.,* upon final grant of the long-form application for each of their licenses.

171. Fifth, we decline to adopt Sprint's proposal that, in addition to the thirty-day prompt payment requirement, the Commission should not issue Upper H Block licenses until payment has been made. We decline to adopt this proposal because it is inconsistent with the Commission's findings on this issue in the *2010 BAS Order.* There, the Commission expressly declined to adopt policies or procedures in the event that a party fails to pay its cost-sharing reimbursements. Instead, the Commission determined to ''address complaints regarding failure to make requirement payments . . . through our existing enforcement mechanisms.'' Sprint has provided no rationale for why we should reverse this determination now, and we decline to do so.

172. Because we are requiring winning bidders to pay Sprint within thirty days of grant of their long form applications, we expect that Upper H Block licensees will reimburse Sprint well before any sunset date. However, if licenses covering less than forty percent of the population of the United States are granted as a result of the first auction, licensees in subsequent auctions will incur an obligation to reimburse Sprint at a later date, which could make the sunset date relevant. Therefore, we will adopt the Commission's proposal to set a sunset date for the cost-sharing obligations of Upper H Block licensees to Sprint of ten (10) years after the first Upper H Block licenses is issued. This approach is consistent with the record. It is also consistent with the Commission's general *Emerging Technologies* precedent, where relocation and cost-sharing obligations generally sunset ten years after the first emerging technologies licenses is issued in the relevant band. In addition, setting ten-year sunset date should not impose a significant burden on H Block winning bidders because the H Block licenses have not yet been assigned and because interested applicants will be able to factor their reimbursement obligations to Sprint into their bids.

E. Regulatory Issues; Licensing and Operating Rules

173. The regulatory framework we adopt below establishes the license term, criteria for renewal, and other licensing and operating rules that will govern operations in the H Block. In the *H Block NPRM,* the Commission proposed generally to apply to the H Block the Commission's market-oriented part 27 rules, including, in particular, the Commission's part 27 rules applicable to other AWS bands, and the Commission's wireless rules that are generally applicable across multiple commercial bands. As detailed below, we adopt the proposals contained in the *H Block NPRM* on these matters except where otherwise indicated.

1. Regulatory Status

174. *Background.* In the *H Block NPRM,* the Commission proposed to apply the regulatory status provisions of section 27.10 of the Commission's rules to H Block licensees. The Commission's current service license application requires applicants for and licensees of fixed or mobile services to identify the regulatory status of the services they intend to provide because service offerings may bear on other statutory and regulatory requirements. Specifically, Section 27.10 permits applicants and licensees to request common carrier status, non-common carrier status, private internal communications status, or a combination of these options, for authorization in a single license (or to switch between them). Part 27 applicants therefore may, but are not required to, choose between providing common carrier and non-common carrier services. Thus, licensees would be able to provide all allowable services anywhere within their licensed areas, consistent with their regulatory status. Apart from this designation of regulatory status, the Commission did not propose to require applicants to describe the services they seek to provide. Finally, the Commission proposed that, if a licensee changes the service or services it offers such that its regulatory status would change, the licensee would be required to notify the Commission. A change in a licensee's regulatory status would not require prior Commission authorization, provided the licensee was in compliance with the foreign ownership requirements of section 310(b) of the Communications Act that would apply as a result of the change consistent with the Commission's rules for AWS–1 spectrum. The Commission sought comment on this regulatory status proposal, including the associated costs and benefits. Only one commenter, CCA, directly addressed the Commission's proposal, requesting that licensees be permitted to ''to provide all allowable services throughout their licensed area,'' while not being required to specify their regulatory status.

175. We adopt the Commission's proposal to apply section 27.10 of our rules to the H Block. Under this flexible regulatory approach, H Block licensees may provide common carrier, non-common carrier, private internal communications or any combination of these services, so long as the provision of service otherwise complies with applicable service rules. We find that this broad licensing framework is likely to achieve efficiencies in the licensing and administrative process and will provide flexibility to the marketplace, thus encouraging licensees to develop new and innovative services. Thus, based on the record before us, we conclude that this approach is in the public interest and that its benefits likely outweigh any potential costs.

176. We therefore require H Block applicants and licensees to identify the regulatory status of the services or services they intend to provide. Applicants and licensees are not required to describe their particular services in detail, but only to designate the regulatory status of the services. We remind potential applicants that an election to provide service on a common carrier basis typically requires that the elements of common carriage be present; otherwise, applicants must choose non-common carrier status. If potential applicants are unsure of the nature of their services and their classification as common carrier services, they may submit a petition with their applications, or at any time, requesting clarification and including service descriptions for that purpose.

177. The only commenter that directly addressed the Commission's proposal, CCA, stated that ''H Block licensees

should not be required to choose between providing common carrier and non-common carrier services'' and that they should not ''be required to describe the services they intend to provide prior to obtaining a license.'' According to CCA, the FCC should adopt a rule that permits H Block licensees ''to provide all allowable services throughout their licensed area at any time, consistent with their regulatory status.'' To the extent that CCA is asking that H Block licensees be able to provide all allowable services and be permitted to request common carrier status as well as non-common carrier status, these propositions are already embodied in the rule that we adopt. And to the extent that CCA is asking that H Block licensees not be required to describe the services they seek to provide beyond designating their regulatory status, that proposition is also already embodied in the rule that we adopt. To the extent, however, that CCA is arguing that H Block licensees should not be required to designate their regulatory status, we must disagree. This requirement applies to all part 27 services and licensees. By requiring part 27 licensees to designate their regulatory status, the Commission is able to determine whether licensees are subject to Title II and governed by common carrier requirements. Applying this requirement to H Block licensees results in the same regulatory treatment for such licensees as exists for other part 27 licensees, as this rule generally applies to all part 27 licensees.

178. Finally, consistent with the application of this rule for other bands and with the Commission's proposal in the *H Block NPRM,* we determine that, if a licensee elects to change the service or services it offers such that its regulatory status would change, it must notify the Commission within thirty days of making the change. A change in the licensee's regulatory status will not require prior Commission authorization, provided the licensee is in compliance with the foreign ownership requirements of section 310(b) of the Communications Act that apply as a result of the change. We note, however, that a different time period (other than thirty days) may apply, as determined by the Commission, where the change results in the discontinuance, reduction, or impairment of the existing service.

2. Ownership Restrictions

a. Foreign Ownership Restrictions

179. In the *H Block NPRM,* the Commission observed that sections 310(a) and 310(b) of the Communications Act impose foreign ownership and citizenship requirements that restrict the issuance of licenses to certain applicants. The Commission proposed to apply Section 27.12 of the Commission's rules, which implements section 310, to applicants for licenses in the H Block. With respect to filing applications, the Commission proposed that all applicants provide the same foreign ownership information, which covers both sections 310(a) and 310(b), regardless of whether they propose to provide common carrier or non-common carrier service in the band. The Commission sought comment on this proposal, including the associated costs and benefits.

180. In order to fulfill our statutory obligations under section 310 of the Communications Act, we determine that all H Block applicants and licensees shall be subject to the provisions of section 27.12 of the Commission's rules. All such entities are subject to section 310(a), which prohibits licenses from being ''granted to or held by any foreign government or the representative thereof.'' In addition, any applicant or licensee that would provide a common carrier, aeronautical en route, or aeronautical fixed service would also be subject to the foreign ownership and citizenship requirements of section 310(b).

181. No commenters opposed (or commented on) the Commission's proposal to require all H Block applicants and licensees to provide the same foreign ownership information in their filings, regardless of the type of service the licensee would provide using its authorization. We believe that applicants for this band should not be subject to different obligations in reporting their foreign ownership based on the type of service authorization requested in the application and that the benefits of a uniform approach outweigh any potential costs. Therefore, we will require all H Block applicants and licensees to provide the same foreign ownership information, which covers both sections 310(a) and 310(b), regardless of which service they propose to provide in the band. We expect, however, that we would be unlikely to deny a license to an applicant requesting to provide services exclusively that are not subject to section 310(b), solely because its foreign ownership would disqualify it from receiving a license if the applicant had applied for authority to provide section 310(b) services. However, if any such licensee later desires to provide any services that are subject to the restrictions in section 310(b), we would require that licensee to apply to the Commission for an amended license, and we would consider issues related to foreign ownership at that time.

b. Eligibility

182. In the *H Block NPRM,* the Commission proposed to adopt an open eligibility standard for the H Block. The Commission explained that opening the H Block to as wide a range of licensees as possible would encourage efforts to develop new technologies, products, and services, while helping to ensure efficient use of this spectrum.

183. Additionally, the Commission explained that Section 6004 of the Spectrum Act does not address eligibility to acquire licenses through transfers, assignments, or other secondary market mechanisms from the initial or subsequence licensee. Section 6004 prohibits a person from participating in an auction if they ''ha[ve] been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant.'' The Commission sought comment on whether this provision permits or requires the Commission to restrict eligibility of persons acquiring licenses on the secondary market, whether and to what extent such a restriction is consistent with other provisions of the Communications Act, and what procedures and rules, if any, should apply to persons acquiring licenses on the secondary market. We also asked how to attribute ownership under this provision for applicants that are not individuals.

184. No commenters addressed whether and how Section 6004 applies to secondary market transactions. However, one commenter, AT&T, addressed the larger issue of the open eligibility proposal by commenting that it supports such an approach.

185. We find that nothing in the record demonstrates that we should adopt restrictions on open eligibility. Therefore, we find that open eligibility for the H Block is consistent with our statutory mandate to promote the development and rapid deployment of new technologies, products, and services; economic opportunity and competition; and the efficient and intensive use of the electromagnetic spectrum. We conclude, based on the record before us, that the potential benefits of open eligibility for the H Block outweigh any potential costs.

186. On the issue of whether Section 6004 of the Spectrum Act applies to transfers, assignments, or other secondary market mechanisms, which no commenter addressed, we determine that this section does indeed apply to

such transactions. The Commission generally does not allow parties to avoid statutory or regulatory requirements through use of secondary markets. We conclude that it is reasonable to assume that Congress did not intend to permit persons barred on national security grounds from ''participating in an auction'' for certain licenses to acquire those same licenses in such an indirect fashion. In any event, given the policies reflected in section 6004, we conclude that it is appropriate to exercise our independent authority under section 308(b) of the Communications Act to extend such a national security bar to the acquisition of Commission licenses through the secondary market. Further, we determine that applicants requesting approval for a secondary market transaction must certify that the applicants are not persons barred from participating in an auction by section 6004 of the Spectrum Act. Until we have revised appropriate applications forms to add a certification, we will require applicants for spectrum subject to section 6004 to include a certification as an attachment to the application. For applicants that are not individuals, we will apply the same attribution standard that we are adopting for short-form applications.

3. Mobile Spectrum Holding Policies

187. Access to spectrum is a critical and necessary input for the provision of mobile wireless services, and ensuring the availability of sufficient spectrum is crucial to promoting the competition that drives innovation and investment. Section 309(j)(3)(B) of the Communications Act provides that, in designing systems of competitive bidding, the Commission shall ''promot[e] economic opportunity and competition and ensur[e] that new and innovative technologies are readily accessible to the American people by avoiding excessive concentration of licenses.'' Section 6404 of the Spectrum Act recognizes the Commission's authority ''to adopt and enforce rules of general applicability, including rules concerning spectrum aggregation that promote competition.'' In September 2012, the Commission initiated a proceeding to review the mobile spectrum holdings policies that currently apply to both transactions and competitive bidding. The Commission indicated that, during the pendency of this proceeding, the Commission will continue to apply its current case-by-case approach to evaluate mobile spectrum holdings during its consideration of secondary market transactions and initial spectrum licensing after auctions.

188. In the *H Block NPRM,* the Commission sought comment on whether and how to address any mobile spectrum holdings issues in the H Block, consistent with any statutory requirements and our goals for this spectrum. The Commission also sought comment on whether the acquisition of H Block spectrum should be subject to the same general mobile spectrum holding policies that apply to frequency bands that are available and suitable for wireless services. Conversely, the Commission sought comment on whether to distinguish H Block spectrum from other bands for purposes of evaluating mobile spectrum holdings. The Commission asked that commenters discuss and quantify any costs and benefits associated with the proposals that they put forth.

189. We received a limited number of comments on these issues. A few commenters argued that the Commission should take concrete steps to prevent large carriers from acquiring H Block spectrum, including adopting a bright line spectrum aggregation limit before any H Block auction, while one commenter argued that such an approach would not serve the public interest. With respect to appropriate timing of such determinations, a few commenters argued that the Commission should complete the *Mobile Spectrum Holdings Policies* proceeding before applying any revised spectrum holdings policies to H Block licensing.

190. We find that the limited record on mobile spectrum holdings policies in this proceeding does not support addressing here the issue of whether the acquisition of H Block spectrum should be subject to the mobile spectrum holding policies that apply to frequency bands that are available and suitable for wireless services, particularly given the pendency of the *Mobile Spectrum Holdings Policies* proceeding. We observe that parties commenting on spectrum holdings issues in the H Block rulemaking generally raise issues with broader applicability to the Mobile Spectrum Holdings rulemaking, rather than issues related to the characteristics of the H Block.

4. License Term, Performance Requirements, Renewal Criteria, Permanent Discontinuance of Operations

a. License Term

191. In the *H Block NPRM,* the Commission proposed a license term for H Block spectrum rights of ten years. The Communications Act does not require a specific term for spectrum licenses, and the Commission has adopted ten-year terms for many wireless radio services. In addition, the Commission proposed that, if an H Block license is partitioned or disaggregated, any partitionee or disaggregatee would be authorized to hold its license for the remainder of the partitioner's or disaggregator's original license term. The Commission sought comment on these proposals, including the associated costs and benefits, and several commenters responded that they approved of the proposed license terms.

192. We adopt a license term for H Block spectrum rights of ten years and subsequent renewal terms of ten years and we modify section 27.13 of the Commission's rules to reflect these determinations. Given the record before us, we find that this approach is in the public interest and find that its benefits outweigh any potential costs. C Spire, T-Mobile, and U.S. Cellular expressed support for ten-year license terms, and no commenter opposed license terms of that length. C Spire stated that a ten-year license term would be ''appropriate because it would provide consistency with other spectrum blocks and afford each licensee more than enough time to design, acquire the necessary equipment and devices, and deploy facilities across nearly all of the licensed area.'' U.S. Cellular and T-Mobile also pointed out that by imposing a ten-year license term, the Commission would be treating H Block the same way it treats many wireless services. We agree that our decision to license H Block in ten-year terms is consistent with most other part 27 services and with services using similar spectrum, such as the PCS spectrum that is adjacent to the H Block.

193. In addition, we adopt the Commission's proposal that, if an H Block license is partitioned or disaggregated, any partitionee or disaggregatee would be authorized to hold its license for the remainder of the partitioner's or disaggregator's original license term. No commenter addressed this proposal. We note, however, that this proposal is similar to the partitioning and disaggregation provisions that the Commission adopted for BRS, broadband PCS, 700 MHz, AWS–1, and AWS–4. We emphasize that nothing in this action is intended to enable a licensee, by partitioning or disaggregation, to be able to confer greater rights than it was awarded under the terms of its license grant; nor would any partitionee or disaggregatee obtain rights in excess of those previously possessed by the underlying Commission licensee.

b. Performance Requirements

194. The Commission establishes performance requirements to maximize the productive use of spectrum, to encourage licensees to rapidly provide service to customers, and to promote the provision of innovative services in all license areas, including rural areas. We continue to believe that performance requirements play a critical role in ensuring that licensed spectrum does not lie fallow. We therefore adopt performance requirements that will ensure the rapid deployment of wireless service in the H Block, while giving licensees sufficient flexibility to deploy services according to their business plans. Specifically, we adopt the following buildout requirements:

• *H Block Interim Buildout Requirement:* Within four (4) years, a licensee shall provide reliable signal coverage and offer service to at least forty (40) percent of the population in each of its license areas.

• *H Block Final Buildout Requirement:* Within ten (10) years, a licensee shall provide reliable signal coverage and offer service to at least seventy-five (75) percent of the population in each of its license areas.

In addition, we adopt the following penalties for failure to meet the buildout benchmarks:

• *Failure to Meet H Block Interim Buildout Requirement:* Where a licensee fails to meet the H Block Interim Buildout Requirement in its license area, the H Block license term and the Final Buildout Requirement shall be accelerated by two years (for both the license term and final requirement, from ten to eight years).

• *Failure to Meet H Block Final Buildout Requirement:* Where a licensee fails to meet the H Block Final Buildout Requirement in any EA, its authorization for each EA in which it fails to meet the requirement shall terminate automatically without Commission action.

195. We find, based on the record before us, that these performance requirements are in the public interest and that the benefits of these requirements outweigh any potential costs. We explain the rationale for these performance requirements below.

196. *Background.* In the *H Block NPRM,* the Commission proposed that, as an interim buildout requirement, a licensee must, within four years, provide signal coverage and service to at least forty percent of its total license-area population. The Commission proposed that, as a final buildout requirement, a licensee must, within ten years, provide signal coverage and offer service to at least seventy percent of the population in each license area it holds. For both the interim and final milestones, the Commission proposed EA-based requirements. The Commission explained that a four-year interim benchmark would ensure that licensees deploy facilities quickly, while a relatively low population threshold of forty percent acknowledges that large-scale network deployment may ramp up as equipment becomes available and a customer base is established. The Commission also explained that a ten-year final benchmark allows a reasonable amount of time for any H Block licensee to attain nationwide scale. The Commission sought comment on these proposed buildout requirements, including on whether the proposals struck the appropriate balance between being so low as to not result in meaningful buildout and being so high as to be unattainable. The Commission also sought comment on whether other benchmarks represent more appropriate requirements, asking that commenters discuss and quantify any costs and benefits associated with different proposals.

197. The Commission proposed specific consequences, or penalties, in the event a licensee fails to satisfy its buildout requirements. The Commission proposed that, if a licensee fails to meet the interim benchmark in its license area, the term of the license would be reduced by two years. And the Commission proposed that, if a licensee fails to meet the final benchmark, the H Block license for each license area in which it fails to meet the buildout requirement would automatically terminate without Commission action.

198. Commenters generally supported the Commission's proposals, but some had specific recommendations for modifying them. Several commenters supported the proposed forty percent interim buildout requirement, while others proposed a slightly less stringent benchmark or opposed any interim benchmark at all. Commenters generally supported the proposed seventy percent final buildout requirement, with individual commenters proposing a slightly more or less stringent benchmark. However, commenters generally opposed the proposed penalties for failure to satisfy the interim and final buildout requirements.

(i) Benchmarks

199. Consistent with the Commission's approach to performance benchmarks in other bands—including the AWS–4 band, the 2.3 GHz WCS band, and the Upper 700 MHz C-Block—we adopt objective interim and final buildout benchmarks. Requiring H Block licensees to meet our performance requirements—providing reliable coverage and service to at least forty percent of the population in each license area in four years and at least seventy-five percent of the population in each license area in ten years—will further the public interest by ensuring that spectrum will be put to use and by promoting the rapid deployment of new broadband services to the American public. It will also provide licensees with certainty regarding their construction obligations. These performance requirements are reasonable, both temporally and quantitatively, and will enable the Commission to take appropriate corrective action should the required deployment fail to occur. Further, we observe that commenters generally agreed with the proposed performance requirements, albeit with some of those commenters seeking slight modifications.

200. *EA-Based and Population-Based Benchmarks.* As discussed above, we are adopting an EA-based H Block band plan requirement and not a nationwide band plan. Setting buildout benchmarks on an EA basis is consistent with our general approach of assigning H Block spectrum rights under the Commission's part 27 rules, which includes permitting any licensee to avail itself of the Commission's secondary market mechanisms. Additionally, we will measure interim and final buildout benchmarks using percentages of license area population because using a population-based measure is more consistent with the Commission's practice in other similar bands.

201. We reject the arguments of some commenters that the benchmarks should instead be measured geographically. While we agree that it is important to ensure service is provided in rural areas, we believe that population-based benchmarks are necessary to ensure that H Block licensees have flexibility to scale their networks in a cost efficient manner while they are attempting to meet performance requirements. Specifically, because of the substantial capital investment and logistical challenges associated with a licensee building out a network, we believe that measuring benchmarks within an EA according to population is more appropriate. We also agree with MetroPCS that population served is a more accurate measure of useful coverage for this band. Finally, while we are adopting population-based benchmarks for the H Block, nothing in this decision forecloses the

consideration of geographic-based benchmarks in other bands, particularly if such bands have different technical characteristics or service rules based on factors specific to those bands.

202. *Interim Benchmark.* We find, consistent with the record, that a four-year construction milestone provides a reasonable time frame for a licensee to deploy its network and offer widespread service. Indeed, no party suggested that a longer time frame would be necessary. We also find that requiring forty percent buildout at this interim milestone would serve the public interest. Commenters were generally supportive of this requirement, and it is consistent with the interim benchmark for all licensees in the AWS–4 band and for licensees in the 700 MHz band that are subject to a population-based benchmark. It is also similar to the Commission's interim benchmark in the 2.3 GHz band, where mobile and point-to-multipoint licensees had 3.5 years to provide reliable coverage to forty percent of the population of each license area. Thus, based on our review of the record and Commission precedent, we adopt an interim performance benchmark of forty percent buildout at the four-year milestone.

203. We are not persuaded by MetroPCS's argument that interim benchmarks are unrealistic and counterproductive, and that licensees have sufficient financial incentives to build out quickly without these benchmarks. We find that the performance requirements we adopt in the H Block will provide licensees with an ability to scale networks in a cost efficient manner while also ensuring that the vast majority of the population will have access to wireless broadband services by the final benchmark. And while we recognize that licensees in many cases have economic incentives to build out, we believe that objective performance requirements are an important means of ensuring that there is meaningful deployment of broadband services in the H Block in the near future, consistent with our obligations to adopt rules and license spectrum in the public interest.

204. We disagree with U.S. Cellular and C Spire that thirty-five percent of total population is a more appropriate benchmark, and we disagree with Sprint that in cases where a licensee acquires multiple EA licenses, the benchmark should be thirty-five percent of the total population covered by all EA licenses. While we believe that forty percent and thirty-five percent are both realistic interim buildout requirements, we find that a forty percent benchmark will better ensure that underutilized spectrum is quickly utilized for the benefit of consumers in the public interest. U.S. Cellular claims that a thirty-five percent benchmark is more consistent with the Commission's treatment of the 700 MHz band; however, the thirty-five percent interim benchmark in the 700 MHz band only applied geographic-based, not population-based, benchmarks for the 700 MHz A and B blocks. In contrast, 700 MHz C Block, which is subject to population-based benchmarks, had an interim benchmark of 40 percent. Because all H Block licensees will be subject to a population-based benchmark, not a geographic-based benchmark, the example of the 700 MHz band actually suggests that we should adopt a forty-percent interim buildout requirement. Finally, we decline to adopt Sprint's proposal, which would allow a licensee with multiple EA licenses to meet the interim benchmark while underutilizing some of those EAs for no other reason than the fact that it acquired more than one EA. Where, as here, we are assigning initial licenses for spectrum, we expect applicants will file for spectrum licenses only in areas in which they intend to put the spectrum to use.

205. *Final Benchmark.* We find, consistent with the record, that a final ten-year construction milestone provides a reasonable time frame for a licensee to deploy its network and offer widespread service. We note that none of the commenters suggested that a different time frame would be necessary for the final benchmark. However, in response to the record, we modify the proposed final buildout requirement in terms of the percentage of population that must be served. While several commenters supported the proposed seventy percent final buildout requirement, AT&T proposed that the buildout requirement be seventy-five percent of total population of each EA by the end of the license term. It stated that the Upper 700 MHz C Block buildout requirements should be the default buildout standard, arguing that a default standard would ''reduce uncertainty for potential licensees and streamline its own regulatory process, expediting deployment and service to the public.'' It also pointed out that a seventy-five percent benchmark would ''ensure a rapid deployment of mobile broadband services while affording licensees adequate flexibility to deploy service.''

206. While we decline to adopt a standard buildout requirement for all bands in this proceeding, we agree that the final benchmark should be set at seventy-five percent, rather than seventy percent. In our view, a final benchmark of seventy-five percent is more closely aligned with final benchmarks in other similar bands, including 700 MHz and AWS–4. Specifically, for the 700 MHz C Block, the Commission adopted a ten year performance benchmark and a seventy-five percent buildout requirement. Applying a seventy-five percent buildout requirement here, where we similarly have a ten-year time period, treats H Block licensees in a similar manner as 700 MHz licensees. Our decision is also consistent with last year's *AWS–4 Report and Order,* in which the Commission adopted a lower benchmark level of seventy percent, along with a shorter time frame of seven years.

(ii) Agreements Between H Block and AWS–4 Licensees

207. The Commission also sought comment on whether performance requirements should be relaxed if an AWS–4 licensee reaches private operator-to-operator agreements with all 1995–2000 MHz licensees so that AWS–4 operations above 2000 MHz may operate with a more relaxed OOBE limit than $70 + 10 \log_{10}(P)$ dB into the 1995–2000 MHz band. The Commission received no comments on this issue, and accordingly, we decline to adopt an alternative performance requirement that would apply if an AWS–4 operator entered into such agreements. Should that situation arise, parties may petition the Commission for any necessary relief at that time.

(iii) Penalties for Failure To Meet Construction Requirements

208. We adopt the *H Block NPRM* proposed penalties for failure to meet the interim and final benchmarks. These penalties will provide meaningful and enforceable consequences and are necessary to ensure that licensees utilize the spectrum in the public interest. Further, we find these penalties appropriate to ensure that the buildout requirements fulfill their purpose of bringing about timely deployment without being unnecessarily strict.

209. *Penalties for Failure to Meet the Interim Benchmark.* We adopt the proposal in the *H Block NPRM* that, if a licensee fails to meet the H Block Interim Buildout Requirement in any EA, the term of the license shall be reduced by two years. If this interim penalty is triggered, the license term will be eight years instead of ten years, and therefore the licensee will be required to meet the end-of-term benchmark on an accelerated eight-year schedule, as well. We acknowledge that in the *H Block NPRM* that the main text

of the *NPRM* did not match the text of the proposed rule. *H Block NPRM,* 27 FCC Rcd at 16289 para. 81, 16303 App. A, § 27.14(q)(2). The main text of the *NPRM* stated that the final buildout requirement would need to be met ''[b]y the end of the license term,'' which would be ten years if the interim requirement was satisfied but only eight years if the interim requirement was not satisfied. *H Block NPRM,* 27 FCC Rcd at 16289 para. 81. The text of the proposed rules, however, stated that the final buildout requirement needed to be met within ten years of the grant of the license, thus suggesting that the interim penalty would result in a two-year reduction in the license term but not in the final performance benchmark. *H Block NPRM,* 27 FCC Rcd at 16303 App. A, § 27.14(q)(2). We therefore clarify that, in the event that a licensee fails to meet the interim benchmark, that *both* the term of the license and the term of the final performance benchmark will be reduced from ten years to eight years. U.S. Cellular, which was the only commenter to directly address the proposed interim buildout penalty, expressed support for a two-year license term reduction. Additionally, we believe that this penalty is sufficiently serious to promote rapid deployment of service to the H Block, while still giving licensees that fail to meet it an opportunity to meet the final benchmark and put their spectrum to use.

210. *Penalties for Failure to Meet the Final Benchmark.* We adopt the proposal in the *H Block NPRM* that, if a licensee fails to meet the H Block Final Buildout Requirement in any EA, the licensee's authority for each such area shall terminate automatically without Commission action. By only terminating specific licenses where a licensee fails to meet the final benchmark in a particular license area, a licensee's customers in other license areas would not be adversely affected. In doing so, we are adopting the final buildout penalty that the Commission proposed in the *H Block NPRM,* even though we are slightly modifying the final buildout requirement that the Commission had proposed. We see no persuasive reason that increasing the final buildout requirement from seventy percent to seventy-five percent of the population of a licensed area provides a basis for changing the penalty for failure to meet the final buildout benchmark.

211. AT&T and U.S. Cellular both opposed the proposed penalties. They argued that automatic termination is too punitive, would negatively affect investment and auction participation and revenues, and would harm the public. We disagree with these assertions. First, as a general matter, we expect that the probability is small of licensees not meeting the performance requirements because of the costs of meeting them. Further, we expect licensees will generally deploy in excess of the levels set in the buildout benchmarks and that these requirements generally represent a floor, not a ceiling, in a licensee's buildout. As for the assertion that automatic termination is too punitive, the Commission has explained in the past that we do not consider automatic termination to be overly punitive or unfair, particularly given that the Commission has applied this approach to nearly all geographically licensed wireless services. Further, the Commission has rejected the argument, and we do so again here, that an automatic termination penalty would deter capital investment, observing that the wireless industry has invested billions of dollars and has flourished under this paradigm in other spectrum bands. For the same reason, we believe that an automatic termination penalty will have little effect on auction participation. Finally, we do not agree that automatic termination would harm the public because, even if a customer loses service when a licensee loses its spectrum rights, we expect that a future licensee for that EA would ultimately serve more customers.

212. We are not persuaded by the AT&T and U.S. Cellular argument that the Commission should adopt a keep-what-you-use approach instead of an automatic termination penalty. AT&T maintained that keep-what-you-use rather than automatic termination is consistent with the requirements applicable to other comparable services; to support this assertion, it cited the rules that apply to the commercial licenses in 700 MHz. We observe, however, that the keep-what-you-use approach in 700 MHz is the exception rather than the rule and that the Commission adopted that approach for 700 MHz band spectrum, in part, in light of other specific service rule determinations for that band, including the specific geographic license areas used for parts of that band (*e.g.,* CMAs for the 700 MHz B Block). The Commission generally applies automatic termination as the remedy for failure to build out part 27 licenses. Indeed, the Commission has characterized automatic license termination as ''a common remedy for failure to build part 27 flexible use licenses.'' We believe that an automatic termination approach for the H Block will promote prompt buildout and will appropriately penalize a licensee for not meeting its performance obligations in a particular EA. We therefore decline to adopt a keep-what-you-use approach.

213. We further adopt the *H Block NPRM*'s proposal that, if a license terminates, the spectrum would become available for assignment under the competitive bidding provisions of section 309(j) of our rules. We also adopt the Commission's proposal that any H Block licensee that forfeits its H Block operating authority for failure to meet the H Block Final Buildout Requirement shall be precluded from regaining that license. These rules are consistent with the Commission's rules for other spectrum bands, such as AWS–1, AWS–4, and the Broadband Radio Service.

(iv) Compliance Procedures

214. We adopt the proposal in the *H Block NPRM* to apply to the H Block rule section 1.946(d) of our rules, which requires that licensees demonstrate compliance with the new performance requirements by filing a construction notification within fifteen days of the relevant milestone certifying that they have met the applicable performance benchmark. Additionally, we adopt the proposal in the *H Block NPRM* to require that each construction notification include electronic coverage maps and supporting documentation, which must be truthful and accurate and must not omit material information that is necessary for the Commission to determine compliance with its performance requirements.

215. We emphasize that electronic coverage maps must accurately depict the boundaries of each license area in the licensee's service territory. If a licensee does not provide reliable signal coverage to an entire EA, its map must accurately depict the boundaries of the area or areas within each EA not being served. Each licensee also must file supporting documentation certifying the type of service it is providing for each EA within its service territory and the type of technology used to provide such service. Supporting documentation must include the assumptions used to create the coverage maps, including the propagation model and the signal strength necessary to provide reliable service with the licensee's technology.

216. The licensee must use the most recently available decennial U.S. Census Data at the time of measurement to meet the population-based buildout requirements. Specifically, the licensee must base its claims of population served on areas no larger than the Census Tract level.

c. Renewal Criteria

217. As the Commission explained in the *H Block NPRM,* section 308(b) of the Communications Act recognizes the Commission's authority to require renewal applicants to ''set forth such facts as the Commission by regulation may prescribe as to the citizenship, character, and financial, technical, and other qualifications of the applicant to operate the station'' as well as ''such other information as it may require.'' The Commission proposed to adopt H Block license renewal requirements that are consistent with those adopted in the *700 MHz First Report and Order* and the *AWS–4 Report and Order.*

218. The Commission proposed that applicants for renewal of H Block licenses file a ''renewal showing,'' in which they demonstrate that they have been and are continuing to provide service to the public, and are compliant with the Communications Act and with the Commission's rules and policies. The Commission proposed that the same factors that were applied in the *AWS–4 Report and Order* and the *700 MHz First Report and Order,* be used when the Commission evaluates renewal showings for the H Block. Specifically, the Commission proposed that a renewal showing for the H Block include: the level and quality of service, whether service was ever interrupted or discontinued, whether service has been provided to rural areas, the extent to which service is provided to qualifying Tribal lands, and any other factors associated with a licensee's level of service to the public.

219. The Commission also sought comment on whether the public interest would be served by awarding H Block licensees renewal expectancies if they maintained the level of service demonstrated at the ten-year performance benchmark through the end of their license term, provided that they have otherwise complied with the Communications Act and the Commission's rules and policies during their license term. The Commission sought comment on whether H Block licensees should obtain renewal expectancies for subsequent license terms, if they continue to provide at least the level of service demonstrated at the ten-year performance benchmark through the end of any subsequent license terms.

220. Finally, the Commission proposed that, consistent with the *AWS–4 Report and Order* and the *700 MHz First Report and Order,* we would not allow the filing of any competing applications to requests for license renewal, and that if a license is not renewed, the associated spectrum would be returned to the Commission for assignment.

221. The Commission sought comment on these proposals, including the associated costs and benefits. Comments were mixed regarding the primary proposal to impose renewal requirements consistent with those adopted in the *700 MHz First Report and Order* and the *AWS–4 Report and Order* with one commenter offering qualified support for the proposed renewal standard, and other commenters opposed to it.

222. Pursuant to section 308(b) of the Communications Act and consistent with the Commission's rules as they apply to other similar bands, we find that all H Block licensees seeking renewal of their authorizations at the end of their license term must file a renewal application, demonstrating that they have been and are continuing to provide service to the public over the license term (or, if consistent with the licensee's regulatory status, it used the spectrum for private, internal communication), and are otherwise complying with the Commission's rules and policies (including any applicable performance requirements) and with the Communications Act. In so finding, we emphasize, as the Commission has done repeatedly in recent years, that the concept of a renewal showing is distinct from a performance showing. A performance showing provides a snapshot in time of the level of a licensee's service, while a renewal showing provides information regarding the level and types of service provided over the entire license term. As the Commission has explained in setting rules for other bands, a licensee that meets the applicable performance requirements might nevertheless fail to meet the renewal requirements. Specifically, we adopt the following renewal criteria requirements. We require the renewal showing to include a detailed description of the renewal applicant's provision of service during the entire license period and discuss: (1) The level and quality of service provided by the applicant (*e.g.,* the population served, the area served, the number of subscribers, the services offered); (2) the date service commenced, whether service was ever interrupted, and the duration of any interruption or outage; (3) the extent to which service is provided to rural areas; (4) the extent to which service is provided to qualifying Tribal land as defined in section 1.2110(e)(3)(i) of the Commission's rules; and (5) any other factors associated with the level of service to the public. A licensee must also demonstrate at renewal that it has substantially complied with all applicable Commission rules and policies, and the Communications Act of 1934, as amended, including any applicable performance requirements. Based on the record before us and the analysis provided below, we find these requirements to be in the public interest and that their benefits outweigh any likely costs.

223. In addition, as the Commission did in the *700 MHz First Report and Order* and the *AWS–4 Report and Order,* we will not permit the filing of competing applications against a licensee's renewal application. If a license is not renewed, the associated spectrum will be returned to the Commission and then made available for assignment. We agree with Sprint—which offered support for the proposed renewal standard—that the proposed standard is consistent with Commission precedent.

224. We are not persuaded by commenters who opposed the proposed renewal standard. For example, MetroPCS and T-Mobile argued that the FCC should refrain from imposing the proposed renewal standard on H Block licensees, claiming that the proposed standard is vague. Additionally, MetroPCS argued that the proposed standard will undermine the renewal expectancy that allows licensees to secure long-term financing. We disagree. Instead, we believe that the renewal standard provides sufficient certainty. For example, the renewal standard we adopt today is based on that used for 700 MHz commercial licensees. We are unaware of any significant effect on the ability of 700 MHz applicants or licensees to obtain financing resulting from the use of this renewal standard in the 700 MHz proceeding.

225. T-Mobile also pointed out that the same renewal standard is under consideration in the pending WRS Renewals proceeding, and therefore argued that the Commission should more broadly address it there. We agree with T-Mobile that the WRS Renewals proceeding offers the Commission an opportunity to comprehensively consider whether it should adopt a renewal standard that generally applies to all bands, and if so, what that standard should be. However, contrary to T-Mobile's suggestion that we are departing from a generic renewal standard by ''uniquely'' applying the proposed renewal standard to the H Block, the Commission has thus far declined to adopt generic criteria for renewal showings. Moreover, at least two spectrum bands, 700 MHz and AWS–4, have renewal criteria identical

or almost identical to those we adopt for the H Block. Unless we make a determination in this proceeding about the renewal standard for H Block, our service rules for this band would include no clear, codified criteria for license renewal and new licensees would be faced with this uncertainty. We also decline to delay adoption of the *H Block Report and Order* until the WRS Renewals proceeding is resolved, because we find that the benefits of adopting the H Block rules now far outweigh the costs of not doing so. As we explained above, completing the H Block proceeding in the near term has several benefits, including unleashing more spectrum to address the surging demand for mobile broadband services and implementing an important directive that Congress entrusted to the Commission. While our determination here should not be construed to prejudge the issues and arguments presented by the parties to the WRS Renewals proceeding, we observe that our action here is consistent with our proposal in that docket.

226. Finally, we decline to adopt U.S. Cellular's proposal that the Commission categorically provide licensees that satisfy the performance requirements with renewal expectancies. In the ordinary course, we expect that licensees that meet their interim benchmark and maintain that level of service while increasing service levels towards compliance with the end-of-term benchmark will likely be able to demonstrate that they satisfy the renewal criteria delineated above. However, we decline to adopt the rule U.S. Cellular proposes that equates mere compliance with the performance benchmarks with a renewal justification because, as the Commission has explained and as we reiterated above, performance requirements and renewal showings are two distinct requirements that involve different showings, serve different purposes, and have different remedies. We decline to state categorically that a licensee that simply meets the interim and final performance requirements will automatically obtain a renewal expectancy. For example, a licensee would be unlikely to obtain renewal at the end of the license term where it met the applicable ''snap shot'' interim benchmark by providing signal coverage and offering service for a single day just prior to the interim benchmark, but then merely offers service once every 180 days to avoid permanent discontinuance of operation until reaching the end-of-term benchmark. We agree with U.S. Cellular that a licensee that obtains a license renewal at the end of the initial license term under the standard set forth above, and then maintains or exceeds the end-of-term seventy-five percent population coverage and offering of service level through subsequent license terms, reasonably could expect, absent extraordinary circumstances, that it would receive subsequent license renewal.

d. Permanent Discontinuance of Operations

227. In the *H Block NPRM,* the Commission requested comment on the application of the rules governing the permanent discontinuance of operations to H Block operators. Under section 1.955(a)(3) of the Commission's rules, an authorization will automatically terminate, without specific Commission action, if service is ''permanently discontinued.'' The Commission proposed to define ''permanently discontinued'' for the H Block spectrum as a period of 180 consecutive days during which a licensee does not operate and does not serve at least one subscriber that is not affiliated with, controlled by, or related to, the provider. The Commission also proposed that licensees would not be subject to this requirement until the date of the first performance requirement benchmark, which was proposed as four years from the license grant.

228. In addition, the Commission proposed that, consistent with section 1.955(a)(3) of the Commission's rules, if a licensee permanently discontinues service, the licensee must notify the Commission of the discontinuance within ten days by filing FCC Form 601 or 605 and requesting license cancellation. However, the Commission explained that even if a licensee fails to file the required form, an authorization will automatically terminate without specific Commission action if service is permanently discontinued. The Commission sought comment on these proposals, including the associated costs and benefits.

229. We determine that section 1.955(a)(3) of the Commission's rules will apply to any H Block licensee and find that the benefits of applying this rule outweigh any potential costs of doing so. Thus, an H Block operator's authorization will automatically terminate, without specific Commission action, if service is ''permanently discontinued.'' For providers that identify their regulatory status as common carrier or non-common carrier, we define ''permanently discontinued'' as a period of 180 consecutive days during which the licensee does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to, the provider in an EA (or smaller service area in the case of a partitioned EA license). We adopt a different approach, however, for licensees that use their licenses for private, internal communications, because such licensees generally do not provide service to unaffiliated subscribers. For such private, internal communications, ''permanent discontinuance'' shall be defined as a period of 180 consecutive days during which the licensee does not operate. This approach is consistent with the discontinuance rule that the Commission has adopted for the adjacent AWS–4 band, and the only party to comment on this rule, T-Mobile, expressed support for this approach.

230. We believe that using this approach in H Block strikes the appropriate balance between affording licensees operational flexibility and ensuring that licensed spectrum is efficiently utilized. In addition, our determination will ensure that spectrum does not lie fallow and will facilitate business and network planning by providing certainty to licensees and their investors. A licensee will not be subject to the discontinuance rules until the date it must meet its first performance requirement benchmark (four years from the license grant), which provides the licensee with adequate time to construct its network.

231. Furthermore, in accordance with section 1.955(a)(3) of the Commission's rules, if a licensee permanently discontinues service, the licensee must notify the Commission of the discontinuance within ten days by filing FCC Form 601 or 605 and requesting license cancellation. However, even if the licensee fails to file the required form requesting license cancellation, an authorization will automatically terminate without specific Commission action if service is permanently discontinued.

232. Finally, as the Commission has previously explained, the operation of so-called channel keepers, *e.g.,* devices that transmit test signals, tones, and/or color bars, do not constitute ''operation'' under section 1.955(a)(3) or the Commission's other permanent discontinuance rules.

5. Secondary Markets

a. Partitioning and Disaggregation

233. Part 27 of the Commission's rules generally allows licensees to partition and disaggregate their spectrum. ''Partitioning'' is the assignment of

geographic portions of a license to another licensee along geopolitical or other boundaries. ''Disaggregation'' is the assignment of a discrete amount of spectrum under the license to a geographic licensee or qualifying entity. Disaggregation allows for multiple transmitters in the same geographic area operated by different companies on adjacent frequencies in the same band.

234. In the *H Block NPRM,* the Commission proposed to permit partitioning and disaggregation and sought comment on this proposal. The Commission's part 27 rules for terrestrial wireless service provide that licensees may apply to partition their licensed geographic service areas or disaggregate their licensed spectrum at any time following the grant of their licenses. The Commission's rules also set forth the general requirements that apply with regard to approving applications for partitioning or disaggregation, as well as other specific requirements (*e.g.,* performance requirements) that would apply to licensees that hold licenses created through partitioning or disaggregation. The Commission also proposed requiring each licensee of H Block authority who is a party to a partitioning, disaggregation, or combination of both to independently meet the applicable performance and renewal requirements. The Commission sought comment on these proposals and asked that commenters discuss and quantify the costs and benefits of these proposals on competition, innovation, and investment. Finally, the Commission sought comment on whether it should adopt additional or different mechanisms to encourage partitioning and/or disaggregation of H Block spectrum and whether such policies would promote service, especially to rural areas; and asked that commenters quantify the costs and benefits of any such proposals. We received several comments on this issue, and all were supportive of the Commission's proposal to permit partitioning and disaggregation of the H Block.

235. We adopt the proposal in the *H Block NPRM* to allow any H Block licensee to partition its service areas or disaggregate its spectrum. We conclude, based on the record before us, that permitting partitioning and disaggregation is in the public interest and that the benefits of permitting these actions outweigh any potential costs. We agree with the comments, which were universally supportive of allowing partitioning and disaggregation under part 27. CCA stated that allowing H Block licensees to partition and disaggregate would empower licensees to respond to market demand following the auction, thus spurring competition for spectrum-based services and fostering wireless innovation. MetroPCS argued that in order to promote efficient use of the H Block spectrum, the Commission should permit partitioning and disaggregation pursuant to the part 27 rules, which promote more efficient use of the band by providing licensees with additional flexibility and creating consistency among the secondary market rules for spectrum in different bands.

236. As the Commission has explained many times in the past, partitioning and disaggregation promote the efficient use of spectrum and help to expedite the provision of service to rural and other underserved areas of America as well as to niche markets. Further, by allowing H Block licensees to partition and disaggregate to the same degree as other wireless licensees providing like services, the Commission promotes competition among wireless service providers.

237. We further conclude that the public interest would be served by requiring, as we proposed in the *H Block NPRM,* each H Block licensee that is a party to a partitioning or disaggregation arrangement (or combination of both) to independently meet the applicable performance and renewal requirements. As the Commission observed in the *AWS–4 Report and Order* and the *WRS NPRM,* this approach should facilitate efficient spectrum usage and prevent the avoidance of timely construction through secondary market fiat, while still providing operators with the flexibility to design their networks according to their operation and business needs. No commenters opposed (or commented on) this approach.

b. Spectrum Leasing

238. In 2003, in an effort to promote more efficient use of terrestrial wireless spectrum through secondary market transactions and to eliminate regulatory uncertainty, the Commission adopted a comprehensive set of policies and rules governing spectrum leasing arrangements between terrestrial licensees and spectrum lessees. These policies and rules permitted terrestrially-based Wireless Radio Service ''licensees holding exclusive use [spectrum] rights'' to lease some or all of the spectrum usage rights associated with their licenses to third party spectrum lessees, which then would be permitted to provide wireless services consistent with the underlying license authorization. The Commission adopted these policies and rules in order to promote more efficient, innovative, and dynamic use of the terrestrial spectrum, to expand the scope of available wireless services and devices, to enhance economic opportunities for accessing spectrum, and to promote competition among terrestrial wireless service providers. In 2004, the Commission expanded on this spectrum leasing framework by establishing immediate approval procedures for certain categories of terrestrial spectrum leasing arrangements and extending the spectrum leasing policies to additional Wireless Radio Services. Since then, the Commission has extended these policies to still more Wireless Radio Services.

239. In the *H Block NPRM,* the Commission proposed that the spectrum leasing policies and rules established in the above-mentioned proceedings be applied to the H Block in the same manner that those policies apply to other part 27 services. The Commission sought comment on this proposal, including its effects on competition, innovation, and investment. The comments that the Commission received were supportive of this proposal.

240. We adopt the proposal in the *H Block NPRM* to apply to the H Block the Commission's current spectrum leasing policies, rules, and procedures contained in part 1 of the Commission's rules, in the same manner as those policies, rules, and procedures apply to other part 27 services. We find it in the public interest to apply the same comprehensive set of rules, policies, and procedures governing spectrum leasing arrangements between terrestrial licensees and spectrum lessees that the Commission has adopted for other wireless spectrum bands to the H Block. We believe that this decision will encourage innovative arrangements and investment in the H Block. We also observe that ''[f]or a particular spectrum band, spectrum leasing policies generally follow the same approach as the partitioning and disaggregation policies for the band.'' Thus, our decision to permit spectrum leasing of H Block spectrum is consistent with our determination above to permit partitioning and disaggregation of H Block spectrum.

241. The record unanimously supports our decision. For example, we agree with CCA that applying our current spectrum leasing rules to H Block will increase the use and utility of the H Block by allowing a diverse group of parties to efficiently and dynamically use the spectrum. We also agree with MetroPCS that applying our current spectrum leasing rules will

promote the efficient use of H Block spectrum and treat spectrum in different bands consistently in applying secondary market rules.

6. Other Operating Requirements

242. In the *H Block NPRM,* the Commission explained that even though licenses in the H Block may be issued pursuant to one rule part, licensees in this band might be required to comply with rules contained in other parts of the Commission's rules by virtue of the particular services they provide. The Commission sought comment on whether there are any provisions in existing, service-specific rules that need to be modified to ensure that H Block licensees are covered under the necessary Commission rules. In addition, the Commission sought comment on any rules that would be affected by the proposal to apply elements of the framework of these rule parts, whether separately or in conjunction with other requirements. Finally, the Commission sought comment on the costs and benefits associated with the adoption of any potential requirements. The Commission received two comments in response to this request, both of which addressed the application of the hearing-aid compatibility rules.

243. While we are generally adopting part 27 rules for the H Block, in order to maintain general consistency among various wireless communication services, we also require any licensee of H Block operating authority to comply with other rule parts that pertain generally to wireless communication services. For example, section 27.3 of the Commission's rules lists some of the other rule parts applicable to wireless communications service licensees generally; we thus find it appropriate to apply this and similar rules to the H Block. Some of these other rule parts will be applicable by virtue of the fact that they apply to all licensees, and others will apply depending on the type of service that a licensee provides. For example:

- Applicants and licensees will be subject to the application filing procedures for the Universal Licensing System, set forth in part 1 of our rules.
- Licensees will be required to comply with the practices and procedures listed in part 1 of our rules for license applications, adjudicatory proceedings, etc.
- Licensees will be required to comply with the Commission's environmental provisions, including section 1.1307.
- Licensees will be required to comply with the antenna structure provisions in part 17 of our rules.
- To the extent a licensee provides a Commercial Mobile Radio Service, such service is subject to the provisions in part 20 of the Commission's rules, including 911/E911 requirements, along with the provisions in the rule part under which the license was issued.
- To the extent a licensee provides interconnected VoIP services, the licensee will be subject to the E911 service requirements set forth in part 9 of our rules.
- The application of general provisions in parts 22, 24, 27, or 101 will include rules related to equal employment opportunity, etc.

No commenter opposed this approach. We conclude that maintaining consistency among various wireless communications services—including the H Block—is in the public interest and that the benefits of this approach outweigh any potential costs.

244. On one issue in particular, we specifically received comment seeking the application of broader rules to H Block licensees. On the issue of hearing-aid compatibility, we conclude that our Part 20 hearing-aid compatibility (HAC) requirements will apply to H Block services in the same manner and to the same extent as those requirements apply to any wireless services under the part 20 HAC rules. Thus, to the extent a licensee provides a Commercial Mobile Radio Service, such service is subject to the hearing-aid compatibility requirements in part 20 of the Commission's rules.

245. The Hearing Industries Association commented that the Commission should ''ensure the full applicability of the hearing aid compatibility rule as it unleashes new spectrum—in this instance the H Block.'' It pointed out that ''Congress has clearly directed the Commission to ensure that as devices continue to advance into multifaceted devices capable of more than traditional voice capabilities that the HAC rules continue to apply.'' HIA also argued that as technology advances and new spectrum is unleashed, ''the FCC must consider function to ensure that hearing-aid users are not locked out of fully participating in the larger economy and society.'' Thus, it argued that the HAC rules must ''focus on whether a device is used for two-way talk and how it couples with the human ear more than the name of the device or its advertised 'primary' purpose.'' Another commenter submitted arguments that addressed the Commission's HAC rules and Specific Absorption Rate (SAR) emissions rules. Mr. Johnson's comments contained general arguments that were not specifically related to H Block.

246. We agree that the Commission's HAC rules should apply to services provided in the H Block in the same manner that they apply to services provided in other bands. To the extent that comments could be read as asking for a broader review of the Commission's hearing-aid compatibility rules (or the Commission's RF safety rules), however, we decline to conduct such a review in this band-specific proceeding because we do not believe this proceeding is the appropriate proceeding for us to conduct a general review and revision of those rules.

7. Facilitating Access to Spectrum and the Provision of Service to Tribal Lands

247. The *H Block NPRM* explained that the Commission is currently considering various provisions and policies intended to promote greater use of spectrum over Tribal lands. The Commission proposed to extend any rules and policies adopted in that proceeding to any licenses that may be issued through competitive bidding in this proceeding. The Commission sought comment on this proposal and any costs and benefits associated with it.

248. We adopt the proposal in the *H Block NPRM,* deferring the application of any rules and policies for facilitating access to spectrum and the provision of service to Tribal lands to the *Tribal Lands* proceeding. Because that proceeding is specifically focused on promoting greater use of spectrum over Tribal lands, we find that it is better suited than the instant proceeding to reach conclusions on that issue.

F. Procedures for Any H Block Licenses Subject to Assignment by Competitive Bidding

249. We will conduct any auction for H Block licenses pursuant to our standard competitive bidding rules found in part 1, subpart Q of the Commission's rules and will provide bidding credits for qualifying small businesses, as proposed in the *H Block NPRM.* Below we discuss our reasons for adopting the relevant proposals.

1. Application of Part 1 Competitive Bidding Rules

250. The Commission proposed to conduct any auction for H Block licenses in conformity with the general competitive bidding rules set forth in part 1, subpart Q, of the Commission's rules, and substantially consistent with the competitive bidding procedures that

have been employed in previous auctions. Additionally, the Commission proposed to employ the part 1 rules governing competitive bidding design, designated entity preferences, unjust enrichment, application and payment procedures, reporting requirements, and the prohibition on certain communications between auction applicants. Under this proposal, such rules would be subject to any modifications that the Commission may adopt for its part 1 general competitive bidding rules in the future. The *H Block NPRM* also sought comment on whether any part 1 rules would be inappropriate or should be modified for an auction of licenses in the H Block bands.

251. Commenters generally support our proposed use of standard competitive bidding rules for an auction of H Block licenses. One of those commenters, MetroPCS, asserts that the Commission should avoid the use of procedures that may ''unduly complicate auctions'' or otherwise ''limit the ability of smaller bidders to acquire spectrum.'' Another argues that the Commission should not depart from its standard simultaneous multiple-round format for an H Block auction. Based on our review of the record and our prior experience with conducting auctions, we determine that the Commission's Part 1 bidding rules should govern the conduct of any H Block auction.

2. Revision to Part 1 Certification Procedures

252. The *H Block NPRM* proposed to implement the national security restriction of section 6004 of the Spectrum Act by adding a certification to the short-form application filed by auction applicants. Section 6004 prohibits ''a person who has been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant'' from participating in a system of competitive bidding that is required to be conducted by Title VI of the Spectrum Act. Accordingly, the Commission proposed to require that an auction applicant certify, under penalty of perjury, that it and all of the related individuals and entities required to be disclosed on the short-form application are not persons who have ''been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant.'' For purposes of this certification, the *H Block NPRM* proposed to define ''person'' as an individual, partnership, association, joint-stock company, trust, or corporation. It also proposed to define ''reasons of national security'' to mean matters relating to the national defense and foreign relations of the United States. We received no comments on our proposal to revise the part 1 certification procedures to add a national security certification requirement.

253. We will implement this Spectrum Act mandate by adding a national security certification to the various other certifications that a party must make in any application to participate in competitive bidding as required under our existing rules. As with other required certifications, an auction applicant's failure to include the required certification by the applicable filing deadline would render its short-form application unacceptable for filing, and its application would be dismissed with prejudice.

3. Small Business Provisions for Geographic Area Licenses

254. As discussed in the *H Block NPRM,* in authorizing the Commission to use competitive bidding, Congress mandated that the Commission ''ensure that small businesses, rural telephone companies, and businesses owned by members of minority groups and women are given the opportunity to participate in the provision of spectrum-based services.'' In addition, section 309(j)(3)(B) of the Communications Act provides that, in establishing eligibility criteria and bidding methodologies, the Commission shall seek to promote a number of objectives, including ''economic opportunity and competition . . . by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women.'' One of the principal means by which the Commission fulfills this mandate is through the award of bidding credits to small businesses.

255. In the *Competitive Bidding Second Memorandum Opinion and Order,* the Commission stated that it would define eligibility requirements for small businesses on a service-specific basis, taking into account the capital requirements and other characteristics of each particular service in establishing the appropriate threshold. Further, in the *Part 1 Third Report and Order,* the Commission, while standardizing many auction rules, determined that it would continue a service-by-service approach to defining the eligibility requirements for small businesses.

256. The Commission proposed in the *H Block NPRM* to define a small business as an entity with average gross revenues for the preceding three years not exceeding $40 million, and a very small business as an entity with average gross revenues for the preceding three years not exceeding $15 million. Under this proposal, small businesses would be provided with a bidding credit of 15 percent and very small businesses with a bidding credit of 25 percent, consistent with the standardized schedule in part 1 of our rules.

257. This proposal was modeled on the small business size standards and associated bidding credits that the Commission adopted for the AWS–1 band. The Commission believed that the H Block would be employed for purposes similar to those for which the AWS–1 Band is used. The *H Block NPRM* noted that these small business size standards and associated bidding credits were proposed for the AWS–1 band because of the similarities between the AWS–1 service and the broadband PCS service and that the Commission had followed this approach when proposing small business size standards and associated bidding credits in the *AWS–2 NPRM.*

258. The Commission sought comment on these proposals, including the costs or benefits of these standards and associated bidding credits, especially as they relate to the proposed EA-defined geographic area licensing approach. The Commission specifically sought comment on whether the small business provisions we proposed are sufficient to promote participation by businesses owned by minorities and women. Those addressing small business credits generally support the Commission's proposals.

259. RTG supports the Commission's proposed bidding credits, and argues for creation of an additional size standard under which auction applicants with average gross revenues not exceeding $75 million for the preceding three years would receive a 10 percent bidding credit. RTG asserts that this additional bidding credit tier would help ''slightly larger small and rural telephone companies to compete for spectrum with nationwide carriers on a more level playing field.'' Similarly, Broadband Properties seeks adoption of a 35 percent bidding discount for ''smaller operators,'' though it does not state what size firm might be considered to be a ''smaller operator.'' The Commission has previously considered and rejected RTG's efforts to create an additional rural telephone company bidding credit. In so doing, the Commission observed that RTG and

other proponents had been unable ''to demonstrate a historical lack of access to capital that was the basis for according bidding credits to small businesses, minorities and women,'' and that ''[i]n subsequent decisions, large rural telcos have failed to demonstrate any barriers to capital formation similar to those faced by other designated entities.'' Moreover, RTG supplies no additional information from which we might conclude that entities with average annual gross revenues of between $40 and $75 million have faced particular difficulties in attracting capital. While we have not intended to apply the part 1 bidding credit schedule uniformly to all auctions without any opportunity for the consideration of alternative bidding credits, we continue to believe that the schedule of size standards and bidding credits described in part 1 provide small businesses with consistency and predictability. As discussed above, we took the characteristics of this service into consideration when proposing the two size standards and associated bidding credits in the *H Block NPRM.* Accordingly, we decline to adopt an additional size standard and bidding credit for the H block.

260. MetroPCS argues that we should adopt a scale of bidding credits based on an entity's spectrum holdings in a particular geographic area in lieu of credits based on small business size. MetroPCS would also bar an auction applicant from acquiring any license that would cause it to exceed the spectrum screen in effect prior to the allocation of the spectrum to be offered at auction. AT&T and Sprint call on the Commission to reject MetroPCS's alternative bidding credit plan. AT&T argues that ''[t]his proposal is little more than an attempt to achieve . . . restrictions on auction participation based on spectrum holdings'' which it contends would be ''anticompetitive and unlawful.'' We find that MetroPCS's proposal fundamentally involves issues of spectrum aggregation policy, and that those issues would be more properly addressed in the separate *Mobile Spectrum Holdings Policies* proceeding. Thus we decline to replace our small business bidding credit program with MetroPCS's alternative approach.

261. Based on our prior experience with the use of bidding credits in spectrum auctions, we believe that the use of bidding credits is an effective tool in achieving the statutory objective of promoting participation by designated entities in the provision of spectrum-based services. In the absence of small business size standards and bidding credits, designated entities might have less opportunity to obtain spectrum in this band. The Commission believes that continuing to extend such benefits to the H Block would be consistent with our statutory mandate. In light of the similarities with the AWS–1 service, we adopt these size standards and associated bidding credits for small businesses. We have requested SBA approval of these size standards. Moreover, we continue to believe that use of the small business size standards and credits set forth in the part 1 schedule provides consistency and predictability for small businesses. Specifically, we will define a small business as an entity with average gross revenues for the preceding three years not exceeding $40 million, and a very small business as an entity with average gross revenues for the preceding three years not exceeding $15 million. For the H block, small businesses would be provided with a bidding credit of 15 percent and very small businesses with a bidding credit of 25 percent, consistent with the standardized schedule in part 1 of our rules. Given the record before us and the benefits discussed above, we conclude that the potential benefits of our proposals would likely outweigh any potential costs.

IV. Procedural Matters

Final Regulatory Flexibility Analysis

262. The Regulatory Flexibility Act (RFA) requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that ''the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.'' Accordingly, we have prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of the rule changes contained in the *Report and Order* on small entities. As required by the Regulatory Flexibility Act of 1980, as amended (RFA), the Commission incorporated an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in the *Notice of Proposed Rulemaking (NPRM).* No comments were filed addressing the IRFA. Because we amend the rules in this *Report and Order,* we have included this Final Regulatory Flexibility Analysis (FRFA) which conforms to the RFA.

A. Need for, and Objectives of, the Report and Order

263. Demand for wireless broadband services and the network capacity associated with those services is surging, resulting in a growing demand for spectrum to support these services. Adoption of smartphones increased at a 50 percent annual growth rate in 2011, from 27 percent of U.S. mobile subscribers in December 2010 to nearly 42 percent in December 2011. Further, consumers have rapidly adopted the use of tablets, which were first introduced in January of 2010. By the end of 2012, it was estimated that one in five Americans—almost 70 million people—would use a tablet. Between 2011 and 2017, mobile data traffic generated by tablets is expected to grow at a compound annual growth rate of 100 percent. New mobile applications and services, such as high resolution video communications, are also using more bandwidth. For example, a single smartphone can generate as much traffic as thirty-five basic-feature mobile phones, while tablets connected to 3G and 4G networks use three times more data than smartphones over the cellular network. All of these trends, in combination, are creating an urgent need for more network capacity and, in turn, for suitable spectrum.

264. The 2010 *National Broadband Plan* recommended the Commission undertake to make 500 megahertz of spectrum available for broadband use within ten years, including 300 megahertz within five years. The Commission has taken numerous steps to achieve these goals, including recently adopting a notice of proposed rulemaking on conducting the world's first incentive auction to repurpose broadcast spectrum for wireless broadband use, updating the Commission's rules for the 2.3 GHz Wireless Communications Service (WCS) band to permit the use of the most advanced wireless technologies in that band, and establishing service rules to allow terrestrial mobile broadband in the 2 GHz MSS bands.

265. In February 2012, Congress enacted Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (the ''Spectrum Act''). The Spectrum Act includes several provisions to make more spectrum available for commercial use, including through auctions, and to improve public safety communications. Among other things, the Spectrum Act requires the Commission, by February 23, 2015, to allocate the 1915–1920 MHz band and the 1995–2000 MHz band (collectively, the H Block) for commercial use, and to auction and grant new initial licenses for the use of each spectrum band, subject to flexible-use service rules. Congress provided, however, that if the Commission determined that either of the bands

could not be used without causing harmful interference to commercial licensees in 1930–1995 MHz (PCS downlink), then the Commission was prohibited from allocating that specific band for commercial use or licensing it. Additionally, Sections 6401(f) and 6413 of the Spectrum Act specify that the proceeds from an auction of licenses in the 1995–2000 MHz band and in the 1915–1920 MHz band shall be deposited in the Public Safety Trust Fund and used to fund the Nationwide Public Safety Broadband Network (''FirstNet''). The H Block spectrum could be the first spectrum specified by the Spectrum Act to be licensed by auction, and thus could represent the first inflow of auction revenues toward this statutory goal.

266. In this *Report and Order,* we increase the Nation's supply of spectrum for mobile broadband by adopting rules for fixed and mobile services, including advanced wireless services in the H Block, 1915–1920 MHz paired with 1995–2000 MHz. These service rules will make available 10 megahertz of spectrum for flexible use in accordance with the Spectrum Act, without causing harmful interference to Personal Communications Service (PCS) licensees. In so doing, we also carry out a recommendation in the *National Broadband Plan* that the Commission make available the provision of Advanced Wireless Services in the 1915–1920 MHz and 1995–2000 MHz spectrum bands, thus increasing the value of this spectrum to the public. Specifically, we adopt service, technical, and licensing rules that will encourage innovation and investment in mobile broadband and provide certainty and a stable regulatory regime in which broadband deployment can rapidly occur. For example, we find the spectrum is properly allocated for commercial use as the Spectrum Act requires, and authorize mobile and lower power fixed operations in the 1915–1920 MHz band and base and fixed operations in the 1995–2000 MHz band. We also adopt service, technical, assignment, and licensing rules for this spectrum that generally follow the Commission's part 27 rules that govern flexible use terrestrial wireless service—except that in order to protect PCS licenses, our rules are more stringent in certain respects. The market-oriented licensing framework for these bands will ensure efficient spectrum utilization and will foster the development of new and innovative technologies and services, as well as encourage the growth and development of broadband services, ultimately leading to greater benefits to consumers.

B. Legal Basis

267. The action is authorized pursuant to sections 1, 2, 4(i), 201, 301, 302, 303, 307, 308, 309, 310, 316, 319, 324, 332, 333, 1404, and 1451 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 152, 154(i), 201, 301, 302, 303, 307, 308, 309, 310, 316, 319, 324, 332, 333, 1404, and 1451.

C. Description and Estimate of the Number of Small Entities to Which the Rules Will Apply

268. The RFA directs agencies to provide a description of, and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules and policies, if adopted. The RFA generally defines the term ''small entity'' as having the same meaning as the terms ''small business,'' ''small organization,'' and ''small governmental jurisdiction.'' In addition, the term ''small business'' has the same meaning as the term ''small business concern'' under the Small Business Act. A ''small business concern'' is one which: (1) Is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.

269. *Small Businesses, Small Organizations, and Small Governmental Jurisdictions.* Our action may, over time, affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three comprehensive, statutory small entity size standards that encompass entities that could be directly affected by the proposals under consideration. As of 2010, there were 27.9 million small businesses in the United States, according to the SBA. Additionally, a ''small organization'' is generally ''any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.'' Nationwide, as of 2007, there were approximately 1,621,315 small organizations. Finally, the term ''small governmental jurisdiction'' is defined generally as ''governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.'' Census Bureau data for 2007 indicate that there were 89,527 governmental jurisdictions in the United States. We estimate that, of this total, as many as 88,761 entities may qualify as ''small governmental jurisdictions.'' Thus, we estimate that most governmental jurisdictions are small.

270. *Wireless Telecommunications Carriers (except satellite).* This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular phone services, paging services, wireless Internet access, and wireless video services. The appropriate size standard under SBA rules is for the category Wireless Telecommunications Carriers. The size standard for that category is that a business is small if it has 1,500 or fewer employees. For this category, census data for 2007 show that there were 11,163 establishments that operated for the entire year. Of this total, 10,791 establishments had employment of 999 or fewer employees and 372 had employment of 1000 employees or more. Thus, under this category and the associated small business size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities that may be affected by our proposed action. Similarly, according to Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including cellular service, PCS, and Specialized Mobile Radio (SMR) Telephony services. Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees. Consequently, the Commission estimates that approximately half or more of these firms can be considered small. Thus, using available data, we estimate that the majority of wireless firms can be considered small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

271. The projected reporting, recordkeeping, and other compliance requirements resulting from the *Report and Order* will apply to all entities in the same manner. The Commission believes that applying the same rules equally to all entities in this context promotes fairness. The Commission does not believe that the costs and/or administrative burdens associated with the rules will unduly burden small entities. The revisions the Commission adopts should benefit small entities by giving them more information, more flexibility, and more options for gaining access to valuable wireless spectrum.

272. Any applicants for licenses of H Block will be required to file license applications using the Commission's automated Universal Licensing System

(ULS). ULS is an online electronic filing system that also serves as a powerful information tool, one that enables potential licensees to research applications, licenses, and antennae structures. It also keeps the public informed with weekly public notices, FCC rulemakings, processing utilities, and a telecommunications glossary. Licensees of H Block that must submit long-form license applications must do so through ULS using Form 601, FCC Ownership Disclosure Information for the Wireless Telecommunications Services using FCC Form 602, and other appropriate forms.

E. Steps Taken To Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

273. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its approach, which may include the following four alternatives (among others): (1) The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.

274. As set forth in this *Report and Order,* we will license the H Block bands under Economic Areas (EA) geographic size licenses. Utilizing EAs in the H Block will provide regulatory parity with other AWS bands that are licensed on an EA basis, such as AWS–1 B and C block licenses. Additionally, assigning H Block in EA geographic service areas will allow H Block licensees to make adjustments to suit their individual needs. Although some commenters advocated for smaller or larger sized licensed areas, such as Cellular Market Areas or Metropolitan Statistical Areas, we believe that EA license areas are small enough to provide spectrum access opportunities for smaller carriers. EA license areas also nest within and may be aggregated up to larger license areas that have been used by the Commission for other services, such as Major Economic Areas (MEAs) and Regional Economic Area Groupings (REAGs) for those seeking to create larger service areas. Licensees may also adjust their geographic coverage through secondary markets. These rules should enable licensees of H Block spectrum, or any entities, whether large or small, providing service in other AWS bands to more easily adjust their spectrum holdings to build their networks pursuant to individual business plans. As a result, we believe the ability of licensees to adjust spectrum holdings will provide an economic benefit by making it easier for small entities to acquire spectrum or access spectrum in these bands.

275. This *Report and Order* adopts rules to protect licensees operating in nearby spectrum bands from harmful interference, which may include small entities. The technical rules adopted in the *Report and Order* are based on the rules for AWS–1 spectrum, with specific additions or modifications designed, among other things, to protect broadband PCS services operating in the 1930–1995 MHz band from harmful interference, as well as future services operating in the 2000–2020 MHz band. We adopt specific Out-of-Band-Emissions (OOBE) limits for the 1915–1920 MHz band and the 1995–2000 MHz band. We base our decision on the record, the probabilistic nature of mobile-to-mobile interference, and the statutory requirements of the Spectrum Act. The record in this proceeding contains three interference studies that supported a specific OOBE limit of $96 + 10 \log_{10}(P)$ dB and a power limit of 300 milliwatts EIRP for the 1915–1920 MHz band. We adopt the power limit, but conclude an OOBE limit of $70 + 10 \log_{10}(P)$ dB is appropriate for the 1915–1920 MHz band, which ensures full flexible use of the band while also protecting the 1930–1995 MHz PCS band from harmful interference. Although one party commented that OOBE limits for the 1995–2000 MHz band should be stricter than what the Commission proposed or adopted in this *Report and Order,* we concluded those suggested limits were overly burdensome. The technical rules in the *Report and Order* will therefore allow licensees of the H Block spectrum to operate while also protecting licensees in nearby spectrum from harmful interference, some of whom may be small entities, and meet the statutory requirements of the Spectrum Act.

276. The *Report and Order* provides licensees of H Block with the flexibility to provide any fixed or mobile service that is consistent with the allocations for this spectrum, which is consistent with other spectrum allocated or designated for licensed fixed and mobile services, *e.g.,* AWS–1. The *Report and Order* further provides for licensing of this spectrum under the Commission's market-oriented part 27 rules. This includes applying the Commission's secondary market policies and rules to all transactions involving the use of H Block bands, which will provide greater predictability and regulatory parity with bands licensed for mobile broadband service. These rules should make it easier for H Block providers to enter secondary market arrangements involving use of their spectrum. The secondary market rules apply equally to all entities, whether small or large. As a result, we believe that this will provide an economic benefit to small entities by making it easier for entities, whether large or small, to enter into secondary market arrangements for H Block spectrum.

277. The *Report and Order* adopts rules pertaining to how the H Block licenses will be assigned, including rules to assist small entities in competitive bidding. Specifically, small entities will benefit from the proposal to provide small businesses with a bidding credit of 15 percent and very small businesses with a bidding credit of 25 percent. Providing small businesses and very small businesses with bidding credits will provide an economic benefit to small entities by making it easier for small entities to acquire spectrum or access to spectrum in these bands.

F. Federal Rules That May Duplicate, Overlap, or Conflict With the Rules

278. None.

279. *Paperwork Reduction Act Analysis:* This document contains new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104–13. It will be submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. Prior to submission to OMB, the Commission will publish a notice in the **Federal Register** seeking public comment on the new or modified information collection requirement for OMB 3060–1184. In addition, we note that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, *see* 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

280. In this present document, we have assessed the effects of the policies adopted in this *Report and Order* with regard to information collection burdens on small business concerns, and find that these policies will benefit many companies with fewer than 25 employees because the revisions we adopt should provide small entities with more information, more flexibility, and more options for gaining access to valuable wireless spectrum. In addition, we have described impacts that might affect small businesses, which includes

most businesses with fewer than 25 employees, in the FRFA in Appendix B of the *Report and Order, infra.*

V. Ordering Clauses

281. Accordingly, it is ordered, pursuant to sections 1, 2, 4(i), 201, 301, 302, 303, 307, 308, 309, 310, 316, 319, 324, 332, and 333 of the Communications Act of 1934, as amended, and sections 6003, 6004, and 6401 of the Middle Class Tax Relief Act of 2012, Public Law 112–96, 126 Stat. 156, 47 U.S.C. 151, 152, 154(i), 201, 301, 302(a), 303, 307, 308, 309, 310, 316, 319, 324, 332, 333, 1403, 1404, and 1451, that this Report and Order is hereby ordered.

282. Effective September 16, 2013 except for 47 CFR 1.2105(a)(2)(xii), 27.12, and 27.17, which contain information collection requirements that have not been approved by the Office of Management and Budget (OMB), Control Number 3060–1184. The Commission will publish a document in the **Federal Register** announcing the effective date of those sections.

283. It is further ordered that the amendments, adopted above and specified in §§ 1.2105, 27.12, 27.14, and 27.17 of the Commission's rules, 47 CFR 1.2105, 27.12, 27.14, and 27.17, which contain new or modified information collection requirements that require approval by the Office of Management and Budget under the Paperwork Reduction Act, will become effective after the Commission publishes a notice in the **Federal Register** announcing such approval and the relevant effective date.

284. It is further ordered that the Final Regulatory Flexibility Analysis hereto is adopted.

285. It is further ordered that, pursuant to section 801(a)(1)(A) of the Congressional Review Act, 5 U.S.C. 801(a)(1)(A), the Commission shall send a copy of this *Report and Order* to Congress and to the Government Accountability Office.

286. It is further ordered that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, shall send a copy of this *Report and Order,* including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

List of Subjects

47 CFR Part 1

Radio, Reporting and recordkeeping requirements.

47 CFR Part 27

Communications common carriers, Radio.

Federal Communications Commission.

Marlene H. Dortch,

Secretary.

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 1 and 27 as follows:

PART 1—PRACTICE AND PROCEDURE

■ 1. The authority citation for part 1 is revised to read as follows:

Authority: 15 U.S.C. 79 *et seq.;* 47 U.S.C. 151, 154(i), 154(j), 155, 157, 225, 227, 303(r), 309, 1403, 1404, and 1451.

■ 2. Section 1.2105 is amended by adding paragraph (a)(2)(xii) to read as follows:

§ 1.2105 Bidding application and certification procedures; prohibition of certain communications.

(a) * * *

(2) * * *

(xii) For auctions required to be conducted under Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. 112–96), certification under penalty of perjury that the applicant and all of the person(s) disclosed under paragraph (a)(2)(ii) of this section are not person(s) who have been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant. For the purposes of this certification, the term ''person'' means an individual, partnership, association, joint-stock company, trust, or corporation, and the term ''reasons of national security'' means matters relating to the national defense and foreign relations of the United States.

* * * * *

PART 27—MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

■ 3. The authority citation for part 27 is revised to read as follows:

Authority: 47 U.S.C. 154, 301, 302(a), 303, 307, 309, 332, 336, 337, 1403, 1404, and 1451 unless otherwise noted.

■ 4. Section 27.1 is amended by adding paragraph (b)(7) to read as follows:

§ 27.1 Basis and purpose.

* * * * *

(b) * * *

(7) 1915–1920 MHz and 1995–2000 MHz.

* * * * *

■ 5. Section 27.4 is amended by revising the definition of ''*Advanced Wireless Service (AWS)''* to read as follows:

§ 27.4 Terms and definitions.

Advanced Wireless Service (AWS). A radiocommunication service licensed pursuant to this part for the frequency bands specified in § 27.5(h), 27.5(j), or 27.5(k).

* * * * *

■ 6. Section 27.5 is amended by adding paragraph (k) to read as follows:

§ 27.5 Frequencies.

* * * * *

(k) *1915–1920 MHz and 1995–2000 MHz bands.* The paired 1915–1920 MHz and 1995–2000 MHz bands are available for assignment on an Economic Area (EA) basis.

■ 7. Section 27.6 is amended by adding paragraph (j) to read as follows:

§ 27.6 Service areas.

* * * * *

(j) *1915–1920 MHz and 1995–2000 MHz bands.* AWS service areas for the 1915–1920 MHz and 1995–2000 MHz bands are based on Economic Areas (EAs) as defined in paragraph (a) of this section.

■ 8. Section 27.12 is revised to read as follows:

§ 27.12 Eligibility.

(a) Except as provided in paragraph (b) and in §§ 27.604, 27.1201, and 27.1202, any entity other than those precluded by section 310 of the Communications Act of 1934, as amended, 47 U.S.C. 310, is eligible to hold a license under this part.

(b) A person described in 47 U.S.C. 1404(c) is ineligible to hold a license that is required by 47 U.S.C. Chapter 13 (Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. 112–96, 125 Stat. 156 (2012)) to be assigned by a system of competitive bidding under § 309(j) of the Communications Act, 47 U.S.C. 309(j).

■ 9. Section 27.13 is amended by adding paragraph (j) to read as follows:

§ 27.13 License period.

* * * * *

(j) *1915–1920 MHz and 1995–2000 MHz bands.* Authorizations for 1915–1920 MHz and 1995–2000 MHz bands will have a term not to exceed ten years from the date of issuance or renewal.

■ 10. Section 27. 14 is amended by revising the first sentence of paragraphs (a), (f), and (k), and adding paragraph (r) to read as follows:

§ 27.14 Construction requirements; Criteria for renewal.

(a) AWS and WCS licensees, with the exception of WCS licensees holding authorizations for Block A in the 698–

704 MHz and 728–734 MHz bands, Block B in the 704–710 MHz and 734–740 MHz bands, Block E in the 722–728 MHz band, Block C, C1, or C2 in the 746–757 MHz and 776–787 MHz bands, Block D in the 758–763 MHz and 788–793 MHz bands, Block A in the 2305–2310 MHz and 2350–2355 MHz bands, Block B in the 2310–2315 MHz and 2355–2360 MHz bands, Block C in the 2315–2320 MHz band, and Block D in the 2345–2350 MHz band, and with the exception of licensees holding AWS authorizations in the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands, must, as a performance requirement, make a showing of ''substantial service'' in their license area within the prescribed license term set forth in § 27.13. * * *

* * * * *

(f) Comparative renewal proceedings do not apply to WCS licensees holding authorizations for the 698–746 MHz, 747–762 MHz, and 777–792 MHz bands or licensees holding AWS authorizations for the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands. * * *

* * * * *

(k) Licensees holding WCS or AWS authorizations in the spectrum blocks enumerated in paragraphs (g), (h), (i), (q), or (r) of this section, including any licensee that obtained its license pursuant to the procedures set forth in paragraph (j) of this section, shall demonstrate compliance with performance requirements by filing a construction notification with the Commission, within 15 days of the expiration of the applicable benchmark, in accordance with the provisions set forth in § 1.946(d) of this chapter. * * *

* * * * *

(r) The following provisions apply to any licensee holding an AWS authorization in the 1915–1920 MHz and 1995–2000 MHz bands:

(1) A licensee shall provide signal coverage and offer service within four (4) years from the date of the initial license to at least forty (40) percent of the total population in each of its licensed areas (''Interim Buildout Requirement'').

(2) A licensee shall provide signal coverage and offer service within ten (10) years from the date of the initial license to at least seventy-five (75) percent of the population in each of its licensed areas (''Final Buildout Requirement'').

(3) If a licensee fails to establish that it meets the Interim Buildout Requirement for a particular licensed area, then the Final Buildout Requirement (in this paragraph (r)) and the license term (as set forth in § 27.13(j)) for each license area in which it fails to meet the Interim Buildout Requirement shall be accelerated by two years (from ten to eight years).

(4) If a licensee fails to establish that it meets the Final Buildout Requirement for a particular licensed areas, its authorization for each license area in which it fails to meet the Final Buildout Requirement shall terminate automatically without Commission action and the licensee will be ineligible to regain it if the Commission makes the license available at a later date.

(5) To demonstrate compliance with these performance requirements, licensees shall use the most recently available U.S. Census Data at the time of measurement and shall base their measurements of population served on areas no larger than the Census Tract level. The population within a specific Census Tract (or other acceptable identifier) will only be deemed served by the licensee if it provides signal coverage to and offers service within the specific Census Tract (or other acceptable identifier). To the extent the Census Tract (or other acceptable identifier) extends beyond the boundaries of a license area, a licensee with authorizations for such areas may only include the population within the Census Tract (or other acceptable identifier) towards meeting the performance requirement of a single, individual license.

(6) An applicant for renewal of a license covered by this paragraph (r) must make a renewal showing, independent of its performance requirements, as a condition of renewal. The showing must include a detailed description of the applicant's provision of service during the entire license period and address:

(i) The level and quality of service provided by the applicant (*e.g.,* the population served, the area served, the number of subscribers, the services offered);

(ii) The date service commenced, whether service was ever interrupted, and the duration of any interruption or outage;

(iii) The extent to which service is provided to rural areas;

(iv) The extent to which service is provided to qualifying tribal land as defined in § 1.2110(f)(3)(i) of this chapter; and

(v) Any other factors associated with the level of service to the public.

■ 11. Section 27.15 is amended by revising paragraphs (d)(1)(i), (d)(1)(iii), (d)(2)(i), and (d)(2)(iii) to read as follows:

§ 27.15 Geographic partitioning and spectrum disaggregation.

* * * * *

(d) * * *

(1) * * *

(i) Except for WCS licensees holding authorizations for Block A in the 698–704 MHz and 728–734 MHz bands, Block B in the 704–710 MHz and 734–740 MHz bands, Block E in the 722–728 MHz band, Blocks C, C1, or C2 in the 746–757 MHz and 776–787 MHz bands, or Block D in the 758–763 MHz and 788–793 MHz bands; and for licensees holding AWS authorizations in the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands; the following rules apply to WCS and AWS licensees holding authorizations for purposes of implementing the construction requirements set forth in § 27.14. Parties to partitioning agreements have two options for satisfying the construction requirements set forth in § 27.14. Under the first option, the partitioner and partitionee each certifies that it will independently satisfy the substantial service requirement for its respective partitioned area. If a licensee subsequently fails to meet its substantial service requirement, its license will be subject to automatic cancellation without further Commission action. Under the second option, the partitioner certifies that it has met or will meet the substantial service requirement for the entire, pre-partitioned geographic service area. If the partitioner subsequently fails to meet its substantial service requirement, only its license will be subject to automatic cancellation without further Commission action.

* * * * *

(iii) For licensees holding AWS authorizations in the 1915–1920 MHz and 1995–2000 MHz bands, or the 2000–2020 MHz and 2180–2200 MHz bands, the following rules apply for purposes of implementing the construction requirements set forth in § 27.14. Each party to a geographic partitioning must individually meet any service-specific performance requirements (i.e., construction and operation requirements). If a partitioner or partitionee fails to meet any service-specific performance requirements on or before the required date, then the consequences for this failure shall be those enumerated in § 27.14(q) for 2000–2020 MHz and 2180–2200 MHz licenses and those enumerated in § 27.14(r) for 1915–1920 MHz and 1995–2000 MHz licensees.

(2) * * *

(i) Except for WCS licensees holding authorizations for Block A in the 698–704 MHz and 728–734 MHz bands, Block B in the 704–710 MHz and 734–740 MHz bands, Block E in the 722–728 MHz band, Blocks C, C1, or C2 in the 746–757 MHz and 776–787 MHz bands, or Block D in the 758–763 MHz and 788–793 MHz bands; and for licensees holding AWS authorizations in the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands; the following rules apply to WCS and AWS licensees holding authorizations for purposes of implementing the construction requirements set forth in § 27.14. Parties to disaggregation agreements have two options for satisfying the construction requirements set forth in § 27.14. Under the first option, the disaggregator and disaggregatee each certifies that it will share responsibility for meeting the substantial service requirement for the geographic service area. If the parties choose this option and either party subsequently fails to satisfy its substantial service responsibility, both parties' licenses will be subject to forfeiture without further Commission action. Under the second option, both parties certify either that the disaggregator or the disaggregatee will meet the substantial service requirement for the geographic service area. If the parties choose this option, and the party responsible subsequently fails to meet the substantial service requirement, only that party's license will be subject to forfeiture without further Commission action.

* * * * *

(iii) For licensees holding AWS authorizations in the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands, the following rules apply for purposes of implementing the construction requirements set forth in § 27.14. Each party to a spectrum disaggregation must individually meet any service-specific performance requirements (i.e., construction and operation requirements). If a disaggregator or a disaggregatee fails to meet any service-specific performance requirements on or before the required date, then the consequences for this failure shall be those enumerated in § 27.14(q) for 2000–2020 MHz and 2180–2200 MHz licenses and those enumerated in § 27.14(r) for 1915–1920 MHz and 1995–2000 MHz licensees.

■ 12. Section 27.17 is revised to read as follows:

§ 27.17 Discontinuance of service in the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands.

(a) *Termination of authorization.* A licensee's AWS authorization in the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands will automatically terminate, without specific Commission action, if it permanently discontinues service after meeting the respective Interim Buildout Requirement as specified in § 27.14(r) or AWS–4 Final Buildout Requirement as specified in § 27.14(q).

(b) For licensees with common carrier or non-common carrier regulatory status that hold AWS authorizations in the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands, permanent discontinuance of service is defined as 180 consecutive days during which a licensee does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to the licensee. For licensees with private, internal regulatory status that hold AWS authorizations in the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands, permanent discontinuance of service is defined as 180 consecutive days during which a licensee does not operate.

(c) *Filing Requirements.* A licensee of the 1915–1920 MHz and 1995–2000 MHz bands or the 2000–2020 MHz and 2180–2200 MHz bands that permanently discontinues service as defined in this section must notify the Commission of the discontinuance within 10 days by filing FCC Form 601 or 605 requesting license cancellation. An authorization will automatically terminate, without specific Commission action, if service is permanently discontinued as defined in this section, even if a licensee fails to file the required form requesting license cancellation.

■ 13. Section 27.50 is amended by revising paragraph (d) introductory text, paragraphs (d)(1) introductory text and (d)(2) introductory text, and adding paragraphs (d)(9) and (10), to read as follows:

§ 27.50 Power limits and duty cycle.

* * * * *

(d) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz, 2110–2155 MHz, 2000–2020 MHz, 2180–2200 MHz, 1915–1920 MHz, and 1995–2000 MHz bands:

(1) The power of each fixed or base station transmitting in the 1995–2000 MHz, 2110–2155 MHz, or 2180–2200 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to:

* * *

(2) The power of each fixed or base station transmitting in the 1995–2000 MHz, the 2110–2155 MHz, or 2180–2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

* * * * *

(9) Fixed, mobile and portable (hand-held) stations operating in the 1915–1920 MHz band are limited to 300 milliwatts EIRP.

(10) A licensee operating a base or fixed station in the 1995–2000 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with all PCS G Block licensees authorized to operate on adjacent frequency blocks in the 1990–1995 MHz band within 120 kilometers of the base or fixed station operating in this band.

* * * * *

■ 14. Section 27.53 is amended by revising paragraph (h)(1) and adding paragraphs (h)(2)(iii) and (iv) to read as follows:

§ 27.53 Emission limits.

* * * * *

(h) * * *

(1) *General protection levels.* Except as otherwise specified below, for operations in the 1710–1755 MHz, 2110–2155 MHz, 2000–2020 MHz, 2180–2200 MHz, 1915–1920 MHz, and 1995–2000 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

(2) * * *

(iii) For operations in the 1915–1920 MHz band, the power of any emission between 1930–1995 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log_{10}(P)$ dB.

(iv) For operations in the 1995–2000 MHz band, the power of any emission between 2005–2020 MHz shall be attenuated below the transmitter power (P) in watts by at least $70 + 10 \log_{10}(P)$ dB.

* * * * *

■ 15. Section 27.55 is amended by revising paragraph (a)(1) to read as follows:

§ 27.55 Power strength limits.

(a)* * *

(1) 1995–2000, 2110–2155, 2180–2200 MHz, 2305–2320, and 2345–2360 MHz bands: 47 dBμV/m.

* * * * *

■ 16. Section 27.57 is amended by revising paragraph (c) to read as follows:

§ 27.57 International coordination.

(c) Operation in the 1710–1755 MHz, 2110–2155 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, and 2180–2200 MHz bands is subject to international agreements with Mexico and Canada.

■ 17. Add subpart K to part 27 to read as follows:

Subpart K—1915–1920 MHz and 1995–2000 MHz

Sec.

Subpart K—1915–1920 MHz and 1995–2000 MHz

Licensing and Competitive Bidding Provisions

§ 27.1001 1915–1920 MHz and 1995–2000 MHz bands subject to competitive bidding.

Mutually exclusive initial applications for 1915–1920 MHz and 1995–2000 MHz band licenses are subject to competitive bidding. The general competitive bidding procedures set forth in 47 CFR part 1, subpart Q will apply unless otherwise provided in this subpart.

§ 27.1002 Designated entities in the 1915–1920 MHz and 1995–2000 MHz bands.

Eligibility for small business provisions:

(a)(1) A small business is an entity that, together with its affiliates, its controlling interests, the affiliates of its controlling interests, and the entities with which it has an attributable material relationship, has average gross revenues not exceeding $40 million for the preceding three years.

(2) A very small business is an entity that, together with its affiliates, its controlling interests, the affiliates of its controlling interests, and the entities with which it has an attributable material relationship, has average gross revenues not exceeding $15 million for the preceding three years.

(b) *Bidding credits.* A winning bidder that qualifies as a small business as defined in this section or a consortium of small businesses may use the bidding credit specified in § 1.2110(f)(2)(iii) of this chapter. A winning bidder that qualifies as a very small business as defined in this section or a consortium of very small businesses may use the bidding credit specified in § 1.2110(f)(2)(ii) of this chapter.

Reimbursement Obligation of Licensees at 1915–1920 MHz and 1995–2000 MHz

§ 27.1021 Reimbursement obligation of licensees at 1915–1920 MHz.

A licensee in the 1915–1920 MHz band (Lower H Block) shall, within 30 days of grant of its long-form application, reimburse 25 percent of the total relocation costs incurred by UTAM, Inc. for relocating and clearing incumbent Fixed Microwave Service (FS) licensees from the 1910–1930 MHz band on a *pro rata* shared basis with other Lower H Block licensees as set forth in paragraphs (a) through (e) of this section.

(a)(1) If Lower H Block licenses granted as a result of the first auction for this spectrum cover, collectively, at least forty (40) percent of the nation's population, the amount owed to UTAM, Inc. by each individual Lower H Block licensee (reimbursement amount owed or RN) will be determined by dividing the gross winning bid (GWB) for each individual Lower H Block license (*i.e.,* an Economic Area (EA)) by the sum of the gross winning bids for all Lower H Block licenses for which there is a winning bid in the first auction, and then multiplying by $12,629,857.

RN = (EA GWB ÷ Sum of GWBs) × $12,629,857.00

(2) Except as provided in paragraphs (b) and (c) of this section, a licensee that obtains a license for a market in which no license is granted as a result of the first Lower H Block auction will not have a reimbursement obligation to UTAM, Inc.

(b) If Lower H Block licenses granted as a result of the first auction for this spectrum cover, collectively, less than forty (40) percent of the nation's population, then the pro rata amount that the licensee of an individual Lower H Block license must reimburse UTAM, Inc. shall be calculated by dividing the population of the individual EA by the total U.S. population, and then multiplying by $12,629,857. In this event, the same population data, e.g., 2010, used to calculate the RNs for Lower H Block licenses granted as a result of the first auction will apply to subsequent auctions of Lower H Block licenses that were not granted as a result of an earlier auction of Lower H Block licenses.

RN = (EA POP ÷ U.S. POP) × $12,629,857.00

(c) A winning bidder of a Lower H Block license that is not granted a license for any reason will be deemed to have triggered a reimbursement obligation to UTAM, Inc. This obligation will be owed to UTAM, Inc. by the licensee acquiring the Lower H Block license through a subsequent auction. The amount owed by the licensee acquiring the Lower H Block license at such auction will be the RN calculated for the EA license based on the first auction (calculated under paragraphs (a) or (b), as applicable, of this section).

(d) For purposes of compliance with this section, licensees should determine population based on 2010 U.S. Census Data or such other data or measurements that the Wireless Telecommunications Bureau proposes and adopts under the notice and comment process for the auction procedures.

(e) A payment obligation owed by a Lower H Block licensees under this section shall be made within thirty (30) days of the grant of the license (*i.e.,* grant of the long form application).

§ 27.1031 Reimbursement obligation of licensees at 1995–2000 MHz.

A licensee in the 1995–2000 MHz band (Upper H Block) shall, within 30 days of grant of its long-form application, reimburse one-seventh of the eligible expenses incurred by Sprint Nextel, Inc. (Sprint) for relocating and clearing Broadcast Auxiliary Service (BAS), Cable Television Relay Service (CARS), and Local Television Transmission Service (LTTS) incumbents from the 1990–2025 MHz band, on a *pro rata* shared basis with other Upper H Block licensees as set forth in paragraphs (a) through (e) of this section.

(a)(1) If Upper H Block licenses granted as a result of the first auction for this spectrum cover, collectively, at least forty (40) percent of the nation's population, the amount owed to Sprint by the winning bidder of each individual Upper H Block license granted as a result of the first auction will be determined by dividing the gross winning bid (GWB) for each individual Upper H Block license (*i.e.,* an Economic Area (EA)) by the sum of the gross winning bids for all Upper H

Block licenses for which there is a winning bid in the first auction, and then multiplying by $94,875,516.

RN = (EA GWB ÷ Sum of GWBs) × $94,875,516

(2) Except as provided in paragraphs (b) and (c) of this section, a licensee that obtains a license for a market in which no license was granted as a result of the first Upper H Block auction will not have a reimbursement obligation to Sprint.

(b) If Upper H Block licenses granted as a result of the first auction for this spectrum cover, collectively, less than forty (40) percent of the nation's population, then the amount that the licensee of an individual Upper H Block license must reimburse Sprint shall be calculated by dividing the population of the individual EA by the total U.S. population, and then multiplying by $94,875,516. In this event, the same population data, e.g., 2010, used to calculate the RNs for Upper H Block licenses granted as a result of the first auction will apply to subsequent auctions of Upper H Block licenses that were not granted as a result of an earlier auction of Upper H Block licenses.

RN = (EA POP ÷ U.S. POP) × $94,875,516

(c) A winning bidder of an Upper H Block license that is not granted a license for any reason will be deemed to have triggered a reimbursement obligation to Sprint. This obligation will be owed to Sprint by the licensee acquiring the Upper H Block license through a subsequent auction. The amount owed by the licensee acquiring the EA license at such auction will be based on the RN calculated for the EA license based on the first auction (calculated under paragraphs (a) or (b), as applicable, of this section).

(d) For purposes of compliance with this section, licensees should determine population based on 2010 U.S. Census Data or such other data or measurements that the Wireless Telecommunications Bureau proposes and adopts under the notice and comment process for the auction procedures.

(e) A payment obligation owed by a Upper H Block licensees under this section shall be made within thirty (30) days of the grant of the license (i.e., grant of the long form application).

§ 27.1041 Termination of cost-sharing obligations.

(a) The cost-sharing obligation adopted in this subpart for the Lower H Block and for the Upper H Block will sunset ten years after the first license is issued in the respective band.

(b) A Lower H Block licensee and an Upper H Block licensee must satisfy in full its payment obligations under this subpart K within thirty days of the grant of its long-form application. The failure to timely satisfy a payment obligation in full prior to the applicable sunset date will not terminate the debt owed or a party's right to collect the debt.

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