

FCC FACT SHEET*
Cellular Service Reform

Second Report and Order, Report and Order, Second Further Notice of Proposed Rulemaking - WT Docket Nos. 12-40, 10-112, and 16-138

Background: The Commission will consider a Second Report and Order, Report and Order, and Second Further Notice of Proposed Rulemaking which would eliminate outdated regulations that hinder Cellular Service licensees' deployment of advanced broadband services to consumers, deter innovation, or are simply unnecessary. These actions would continue the transition of the 800 MHz Cellular Service (Cellular), the original radio spectrum used by cellphones in the United States, to a geographic licensing framework, increasing licensees' flexibility to change their systems as needed to respond more quickly – and at less cost – to evolving market conditions and consumer demand.

These actions would also update outmoded Cellular power and other technical rules, facilitating the widespread deployment of mobile broadband services in the Cellular band while also safeguarding public safety operations. In particular:

- These reforms would allow Cellular licensees to choose the technologies that work best for their wireless service, without being disadvantaged by rules that were adopted when today's newer mobile broadband technologies, including LTE, did not exist.
- Licensees would be better able to use their Cellular spectrum to provide advanced mobile services that are already provided in other wireless spectrum bands, including, for example, faster speeds for data and enhanced video and music streaming options.

These reforms would reduce barriers to innovation and investment and ease administrative burdens, so that licensees and the Commission can use resources more efficiently to serve the public. The rules would also promote regulatory consistency because the Cellular licensing and technical rules would be akin to those in place for other commercial wireless service bands.

What the Rules Would Do:

- **Power Reform:** The Commission would facilitate broadband technologies by permitting Cellular licensees to use about the same amount of power across the spectrum band, whether they are using a legacy (narrow bandwidth) technology or modern(wider bandwidth) technology like LTE.
- **Co-existence.** The Commission would promote co-existence of Cellular and neighboring public safety systems by engaging stakeholders via a public forum and retaining our interference resolution rules and procedures.
- **Consistency.** The Commission would treat Cellular consistent with other commercial wireless services by conforming rules related to power measurement, out of band emissions, field strength, and discontinuance of operations.
- **Unnecessary rules/burdens.** The Commission would eliminate unnecessary rules and burdens related to application filings, domestic and international coordination, and comparative renewal.

What the Further Notice Would Do:

- **Unnecessary rules/burdens.** The Commission would propose to eliminate unnecessary rules and burdens related to records retention and production, operators at control points, and employment reports.
- **Consolidate/simplify.** The Commission would seek comment on whether to simplify and consolidate our rules for Cellular and other commercial wireless services.

* This document is being released as part of a "permit-but-disclose" proceeding. Any presentations or views on the subject expressed to the Commission or staff, including by email, must be filed in both WT Docket No. 12-40 and WT Docket No. 10-112, which may be accessed via the Electronic Comment Filing System (<https://www.fcc.gov/ecfs/>).

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)
)
Amendment of Parts 1 and 22 of the Commission's) WT Docket No. 12-40
Rules with Regard to the Cellular Service,)
Including Changes in Licensing of Unserved Area) RM No. 11510
)
Amendment of the Commission's Rules with)
Regard to Relocation of Part 24 to Part 27)
)
Interim Restrictions and Procedures for Cellular)
Service Applications)
)
Amendment of Parts 0, 1, and 22 of the)
Commission's Rules with Regard to Frequency)
Coordination for the Cellular Service)
)
Amendment of Part 22 of the Commission's Rules)
Regarding Certain Administrative and Filing)
Requirements)
)
Amendment of the Commission's Rules Governing) RM No. 11660
Radiated Power Limits for the Cellular Service)
)
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95,) WT Docket No. 10-112
and 101 to Establish Uniform License Renewal,)
Discontinuance of Operation, and Geographic)
Partitioning and Spectrum Disaggregation Rules)
and Policies for Certain Wireless Radio Services)
)
2016 Biennial Review of Telecommunications) WT Docket No. 16-138
Regulations)

SECOND REPORT AND ORDER, REPORT AND ORDER,
AND SECOND FURTHER NOTICE OF PROPOSED RULEMAKING*

Adopted: []

Released: []

Comment Date: (30 days after date of publication in the Federal Register)
Reply Comment Date: (60 days after date of publication in the Federal Register)

* This document has been circulated for tentative consideration by the Commission at its March open meeting. The issues referenced in this document and the Commission's ultimate resolution of those issues remain under consideration and subject to change. This document does not constitute any official action by the Commission. However, the Chairman has determined that, in the interest of promoting the public's ability to understand the nature and scope of issues under consideration by the Commission, the public interest would be served by making this document publicly available. The FCC's ex parte rules apply and presentations are subject to "permit-but-disclose" ex parte rules. See, e.g., 47 C.F.R. §§ 1.1206, 1.200(a). Participants in this proceeding should familiarize themselves with the Commission's ex parte rules.

By the Commission.

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I. INTRODUCTION

1. Today, we continue the transition of the 800 MHz Cellular Radiotelephone (Cellular) Service framework away from an outdated command-and-control regulatory paradigm to the flexible use model applicable to several of our geographic market-based wireless services. The revisions we adopt today will reduce barriers to innovation and investment in new technologies, reduce unnecessary regulatory burdens on licensees, promote greater spectrum efficiency, and facilitate the deployment of ubiquitous broadband connectivity demanded by consumers in the 800 MHz Cellular spectrum. In particular, the conversion of this band to a more flexible regime by revising certain technical and service rules will facilitate the use of Cellular spectrum to provide advanced mobile broadband services such as long term evolution (LTE), and will eliminate unnecessary rules and burdens for Cellular licensees. With the continued skyrocketing demand for mobile broadband, it is imperative that providers be able to use Cellular spectrum in addition to the Broadband Personal Communications Service (PCS), Advanced Wireless Services (AWS), and 700 MHz spectrum that are already largely used today to provide that service.

II. SECOND REPORT AND ORDER (CELLULAR REFORM)

2. In this Second Report and Order, we provide licensees with greater flexibility and facilitate mobile broadband deployment.¹ Most importantly, we revise the outdated Cellular power rules that were adopted when commercial mobile service was provided using narrowband technologies. We take account of the availability and deployment of advanced mobile broadband technologies, such as LTE, by adopting power rules based on power spectral density (PSD) metrics² that parallel those that apply in other spectrum bands used to provide mobile broadband service. In revising our Cellular technical rules to accommodate PSD, we take steps to address the potential for increased interference to public safety and other adjacent-band systems. Our revisions also include modernizing licensing rules to eliminate filing requirements and provide Cellular licensees with enhanced flexibility to improve their service to consumers.

A. Background

3. The Cellular Service provided the original foundation of the commercial wireless

¹ See *Amendment of Parts 1 and 22 of the Commission's Rules with Regard to the Cellular Service, Including Changes in Licensing of Unserved Area; Amendment of the Commission's Rules with Regard to Relocation of Part 24 to Part 27; Interim Restrictions and Procedures for Cellular Service Applications; Amendment of Parts 0, 1, and 22 of the Commission's Rules with Regard to Frequency Coordination for the Cellular Service; Amendment of the Commission's Rules Governing Radiated Power Limits for the Cellular Service*, WT Docket No. 12-40, RM Nos. 11510 and 11660, Report and Order and Further Notice of Proposed Rulemaking, 29 FCC Rcd 14100 (2014) (*R&O* and *Further Notice*, respectively).

² For a description of PSD metrics, see paragraph 8 below.

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industry. Initial rules governing allocation of spectrum for commercial Cellular service were adopted in 1981,³ establishing two Cellular providers per Cellular Market Area (CMA).⁴ Those providers were given the exclusive right, for a five-year period from the date of grant of the initial construction authorization, for that CMA Block, to build out anywhere within the CMA boundary.⁵ The area built out during that five-year period became the licensee's Cellular Geographic Service Area (CGSA), while any area not built out by the five-year mark was automatically relinquished for re-licensing on a site-by-site basis.⁶ By 2012, when the Commission released the *Notice of Proposed Rulemaking* in this proceeding,⁷ about 80 percent of all CMA Blocks were at least 95 percent built out.⁸

4. The *R&O* released in 2014 modernized Cellular Service licensing in several respects. The centerpiece of the *R&O* was the adoption of a geographically-based regime, with licenses based on CGSA boundaries, and significant new flexibility for licensees to improve their systems within those boundaries.⁹ The *R&O* also added significant opportunities for licensees to expand their service coverage without prior authorization.¹⁰ The Commission's reforms resulted in Cellular Service rules, particularly regarding licensed areas, more akin to the flexible licensing schemes found in other similar mobile services, such as PCS,¹¹ the commercial service in the 700 MHz band (700 MHz Service),¹² the 600 MHz

³ See generally *An Inquiry Into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems*, CC Docket No. 79-318, Report and Order, 86 F.C.C.2d 469 (1981).

⁴ The Commission established two channel blocks (Blocks A and B) in each of 734 CMAs. The 734 CMAs comprise 306 Metropolitan Statistical Areas (MSAs) and 428 Rural Service Areas (RSAs). See 47 CFR § 22.909.

⁵ See 47 CFR § 22.947 (2013) (former "Five year build-out period" rule).

⁶ For all CMA Blocks except one (Chambers, Texas, CMA672-A), initial licenses have been issued and their five-year periods have expired. See *R&O*, 29 FCC Rcd at 14120-22 (discussing the license for the Chambers, TX CMA (Chambers License) and adopting revised 47 CFR § 22.961 pursuant to which the Commission will auction this license).

⁷ *Amendment of Parts 1 and 22 of the Commission's Rules with Regard to the Cellular Service, Including Changes in Licensing of Unserved Area; Amendment of the Commission's Rules with Regard to Relocation of Part 24 to Part 27; Interim Restrictions and Procedures for Cellular Service Applications*, WT Docket No. 12-40, RM No. 11510, Notice of Proposed Rulemaking and Order, 27 FCC Rcd 1745, 1747 n.3, 1750-52, 1758 (2012) (*NPRM*).

⁸ See *NPRM*, 27 FCC Rcd at 1747, 1750-55, 1768-1769.

⁹ See the *R&O* for the full discussion of the new and revised rules adopted (29 FCC Rcd at 14102-26 (Section II) and 14156-63 (Appendix A (Final Rules))).

¹⁰ *R&O*, 29 FCC Rcd at 14114-15; 47 CFR § 22.949. Such opportunities occur in any "Unserved Area," which is defined in Part 22 to mean, with regard to a channel block allocated for assignment in the Cellular Service, "[g]eographic area . . . that is not within any [CGSA] of any Cellular system authorized to transmit on that channel block." 47 CFR § 22.99. To expand its CGSA into Unserved Area that is at least 50 contiguous square miles, the applicant requests authorization to construct at a specific transmitter location (or multiple locations) and may construct only authorized transmitters. Authorizations to expand the CGSA, like new-system authorizations, continue to be subject to a one-year construction deadline. See 47 CFR § 22.946. The rules adopted in the *R&O* allow incumbents to serve indefinitely, on a secondary basis, Unserved Area parcels smaller than 50 contiguous square miles without Commission filings (with certain exceptions). See *R&O*, 29 FCC Rcd at 14115-18; 47 CFR § 22.912.

¹¹ See generally 47 CFR §§ 24.1 *et seq.*

¹² See generally 47 CFR Part 27.

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Service,¹³ and AWS.¹⁴

5. The *Further Notice* sought to take further steps to align the Cellular rules with those other bands being used to provide mobile broadband service, including proposals dealing with radiated power and interference protection, that could further facilitate the ability of Cellular licensees to deploy advanced broadband services.¹⁵ The *Further Notice* also proposed and sought comment on additional licensing reforms that could eliminate unnecessary rules or processes.¹⁶

6. In response, six parties submitted comments and nine parties submitted reply comments; 11 parties subsequently filed *ex parte* letters.¹⁷ No one commented quantitatively on the costs and benefits of the various proposals in the *Further Notice*.¹⁸ In the Sections below, we provide background on the proposals, and we discuss the specific comments on the record together with our conclusions.

B. Providing Flexibility for Deployment of Advanced Services; Interference Protection

7. In the following Sections, we revise the radiated power rules for the Cellular Service, including: adoption of a PSD model and specific PSD limits tailored to the deployment of advanced mobile service as an additional option for Cellular licensees; adoption of safeguards to protect public safety operations from the possibility of increased unacceptable interference, including a one-time advance notification requirement when operating at PSD limits above a certain threshold, and a power flux density (PFD) limit for a transition period of 7 years under certain circumstances; convening a public forum to facilitate efforts led by stakeholders to improve co-existence in the 800 MHz band; and retention of the existing interference resolution rules and procedures in Part 22 of our rules. We also revise certain related Cellular technical rules to accommodate PSD operations, including: revision of Section 22.911 (methodology for calculating the service area boundary (SAB) and CGSA boundary); and an exemption for PSD systems under the height-power limit rule.

8. We here incorporate into our Cellular rules two radiated power metrics already incorporated into the technical rules for spectrum bands commonly used for the provision of mobile broadband service. “PSD” describes the amount of effective radiated power (ERP)¹⁹ that would be allowed per unit of bandwidth from a base station antenna (e.g., 100 watts/MHz), such that wider bandwidth emissions would be permitted more power commensurate with their bandwidth. The *Further*

¹³ See generally *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Report and Order, 29 FCC Rcd 6567 (2014) (*BIA Report and Order*) (subsequent history omitted); 47 CFR § 27.5(l).

¹⁴ See generally 47 CFR Part 27.

¹⁵ *Further Notice*, 29 FCC Rcd at 14146-52. The *Further Notice* included options regarding the application of PSD to measure permissible power output, *id.* at 14135-44 (proposing changes to 47 CFR § 22.913), as well as a possible power flux density limit. *Id.* at 14144-45.

¹⁶ *Id.* at 14126-35.

¹⁷ See Appendix C for a list of parties that submitted comments, reply comments, and *ex parte* letters.

¹⁸ *But see infra* Section II.E.5. (noting certain comments on the record regarding (without quantification) increased costs or cost savings in connection with the Commission’s specific proposal to use frequency coordinators). Commenters asserted benefits (without quantification) of specific proposals, discussed in the Sections below where applicable.

¹⁹ A generic definition of the term “effective radiated power” is in our existing Part 2 rules: “[t]he product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.” 47 CFR § 2.1. Pursuant to 47 CFR § 2.1(a), terms and definitions appearing in Part 2 serve as definitive terms and definitions that prevail throughout the Commission’s rules.

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Notice proposed to add a definition of PSD to the Part 22 definitions in our rules, and today we adopt the definition substantially as proposed.²⁰ For the purposes of this proceeding, “PFD” is the amount of radio frequency energy that would be present over a given unit of area (e.g., 100 microwatts per square meter). Therefore, PFD can be used to describe the strength of signals at ground level in a given location.

1. Reform of Power Rules to Facilitate Broadband Deployment

9. *Background.* The current Cellular base station power limit of 500 watts (W) ERP (1000 W ERP for rural areas)²¹ was adopted in 1988 to facilitate economical coverage in rural areas and to account for technological developments. At that time, industry groups and the Commission were just beginning to explore the possibilities of digital technologies for the Cellular Service.²² In 2007 and 2008, the Commission revised the radiated power rules to implement a PSD model for several wireless services, including PCS and AWS,²³ the 700 MHz Service,²⁴ and 700 MHz public safety broadband operations.²⁵ It declined to revise the Cellular ERP rules,²⁶ primarily because of significant restructuring (800 MHz rebanding) ongoing in the immediately adjacent frequencies used by public safety entities.²⁷ The Commission also noted a lack of industry support at that time and the need for more time to assess the

²⁰ See *Further Notice*, Appendix B (Proposed Rules), § 22.99; Appendix A of this Second Report and Order (Final Rules), § 22.99.

²¹ See 47 CFR § 22.913.

²² See *Further Notice*, 29 FCC Rcd at 14135 (citing *Amendment of Parts 2 and 22 of the Commission’s Rules to Permit Liberalization of Technology and Auxiliary Service Offerings in the Domestic Public Cellular Radio Telecommunications Service*, GEN. Docket No. 87–390, Report and Order, 3 FCC Rcd 7033 (1988)).

²³ See generally *Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27 and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03–264, Third Report and Order, 23 FCC Rcd 5319 (2008) (*Streamlining 3d R&O*).

²⁴ See generally *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 8064 (2007) (other captions and docket numbers omitted) (*April 700 MHz Order*).

²⁵ See generally *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, Second Report and Order, 22 FCC Rcd 15289 (2007) (other captions and docket numbers omitted) (*August 700 MHz Order*).

²⁶ More recently, the Commission adopted the PSD model for the 600 MHz Service, AWS-3, H Block, and AWS-4. See *BIA Report and Order*, 29 FCC Rcd at 6865; *Amendment of the Commission’s Rules With Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, GN Docket No. 13-185, Report and Order, 29 FCC Rcd 4610, 4642-43 (2014) (*AWS-3 Report and Order*); *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*, WT Docket No. 12-357, Report and Order, 28 FCC Rcd 9483, 9504-05 (2013) (*H Block Order*); *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, WT Docket No. 04-356, ET Docket No. 10-142, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102, 16146 (2012) (*AWS-4 Report and Order*).

²⁷ *Streamlining 3d R&O*, 23 FCC Rcd at 5321, 5341. See also *Improving Public Safety Communications in the 800 MHz Band*, WT Docket No. 02-55 (other captions and docket numbers omitted), Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Rcd 14969 (2004) (*800 MHz Rebanding Order*), modified by *Improving Public Safety Communications in the 800 MHz Band*, WT Docket No. 02-55 (other captions and docket numbers omitted), Supplemental Order and Order on Reconsideration, 19 FCC Rcd 25120 (2004) (*800 MHz Rebanding Supplemental Order*), clarified by *Improving Public Safety Communications in the 800 MHz Band*, WT Docket No. 02-55 (other captions and docket numbers omitted), Memorandum Opinion and Order, 22 FCC Rcd 9818 (2007).

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potential impact of using the PSD model for the Cellular Service.²⁸

10. At that time, the Commission was in the midst of implementing the *800 MHz Rebanding Order*, which it had adopted in 2004 to address the root cause of interference to public safety communications by moving public safety entities spectrally further from the Cellular and commercial Enhanced Specialized Mobile Radio (ESMR) frequencies.²⁹ The Commission's 2004 rules also outlined the circumstances in which public safety devices are entitled to interference resolution procedures, established technical standards that define unacceptable interference in the 800 MHz band, as well as procedures detailing parties' responsibility for, and steps to take in, abating interference. Those rules also established information exchange procedures so public safety licensees could be notified of new or modified ESMR and Cellular base station activities.³⁰

11. In 2012, AT&T Services, Inc. on behalf of AT&T, Inc. and its subsidiaries (AT&T) filed a Petition for Rulemaking seeking to modify Section 22.913 of the Commission's rules for Cellular base station power so as to permit ERP measurement³¹ in terms of PSD.³² With near completion of the 800 MHz rebanding and operations by most public safety licensees on their post-rebanding channels, the Commission issued the *Further Notice* in 2014 proposing to adopt a PSD model for the Cellular Service.³³

12. Several commenters strongly support the Commission's proposal, and no commenter opposes it, although some express concerns about increased interference to licensees operating in adjacent bands if a PSD model is adopted. Commenters who expressly support the use of PSD differ in their recommendations concerning the technical details of a Cellular PSD model, including the appropriate PSD limits and how they should be applied, whether a PFD limit is necessary, and various other power measurement issues. In the Sections below, we discuss the specific power-related proposals and issues outlined in the *Further Notice*.

a. Further Notice

13. Because efficient deployment of more advanced wideband technologies such as LTE may not be possible under the current Cellular Service rules, the *Further Notice* proposed to revise Section 22.913 to permit a PSD model for measurement of base transmitter and Cellular repeater power.³⁴ It noted that the current Cellular power limits favor use of narrowband systems over wideband technologies, because those limits currently apply to each emission without regard to bandwidth.³⁵ Under the current limits, a Cellular licensee using 5 megahertz could theoretically deploy four CDMA channels (each having 1.25 megahertz of bandwidth) with an aggregate power of 2000 W ERP (4 x 500 W), or 12 GSM

²⁸ *Streamlining 3d R&O*, 23 FCC Rcd at 5338-40.

²⁹ See *800 MHz Rebanding Order*, 19 FCC Rcd at 14983-89, 15045-78.

³⁰ See 47 CFR §§ 22.970-22.973.

³¹ In this Second Report and Order, the terms "measure" and "measurement" are used to refer to both (1) a means of specifying a limit parameter (e.g., transmitter output power in watts ERP), and (2) a process of experimentally obtaining quantity values that can reasonably be attributed to a parameter that is subject to a limit.

³² AT&T Services, Inc., Petition for Expedited Rulemaking and Request for Waiver of Section 22.913 of the Commission's Rules (filed Feb. 29, 2012) (re-posted in RM No. 11660 on May 20, 2013) (Petition).

³³ *Further Notice*, 29 FCC Rcd at 14137, 14142.

³⁴ See *id.* at 14142-44.

³⁵ *Id.* at 14135, 14142. Examples of narrowband systems include those using Time Division Multiple Access (TDMA) and the Global System for Mobile Communication (GSM). Examples of wideband systems include those using Code Division Multiple Access (CDMA), Wideband-CDMA (W-CDMA), and Orthogonal Frequency-Division Multiplexing (OFDM).

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channels (each having 200 kilohertz of bandwidth) with an aggregate power of 6000 W ERP (12 x 500 W). A Cellular carrier using the same 5 megahertz for a wideband deployment such as LTE, however, is limited to only 500 W ERP for the entire emission—in other words, only 1/4 or 1/12 of the power permitted for narrowband technologies. The *Further Notice* tentatively concluded that an optional PSD model would better accommodate wideband technologies by establishing ERP limits per 1 MHz of an emission's bandwidth rather than limiting the ERP per each emission bandwidth.³⁶

14. The *Further Notice* did not propose a specific PSD limit, but discussed and sought comment on the following three PSD proposals that were on the record:

- AT&T's proposal of 250 W/MHz ERP in non-rural areas, 500 W/MHz ERP in rural areas;³⁷
- Verizon's proposal of 1000 W/MHz ERP in non-rural areas, 2000 W/MHz in rural areas, coupled with a PFD limit of 3000 microwatts per square meter ($\mu\text{W}/\text{m}^2$), which Verizon argued would minimize the interference potential on the ground within one kilometer (km) of a base station;³⁸ and
- Union Wireless's proposal of 500 W/MHz ERP in non-rural areas, 1000 W/MHz in rural areas, and its accompanying proposal to specify power in terms of equivalent isotropically radiated power (EIRP), yielding PSD limits of 820 W/MHz EIRP for non-rural areas, and 1640 W/MHz EIRP for rural areas.³⁹

The *Further Notice* sought comment on all aspects of the three proposals, including their potential to cause interference to public safety operations or any other licensees in adjacent markets or service bands. In discussing the proposals of Union Wireless and Verizon, it also noted that they each included a bandwidth dividing line, under which licensees would be able to use PSD-based limits only when using emissions greater than a certain bandwidth.⁴⁰ However, the *Further Notice* proposed not to establish a bandwidth dividing line and sought comment on the potential effect of such a dividing line on certain licensees.⁴¹

15. The *Further Notice* proposed and sought comment on allowing the doubling of the PSD limit in rural counties, as in other commercial mobile radio service (CMRS) bands.⁴² It also sought comment on whether the PSD limit should be applied per emission, per transmitter, per sector, or for all Cellular channels transmitted by the entire base station, and how this application would be affected by Multiple Input Multiple Output (MIMO) antenna configurations.⁴³ Using MIMO antennas, a Cellular base station would deploy multiple antennas, each intended to transmit and receive the same signals,

³⁶ *Id.* at 14142.

³⁷ *Id.* at 14143.

³⁸ *Id.* Verizon's filings prior to release of the *Further Notice* did not indicate whether its proposed PFD limit should be measured over any particular bandwidth, such as 1 MHz. See paragraph 27 below regarding Verizon's subsequent clarification.

³⁹ *See id.* at 14144 (citing Joint Comments of the GSM Licensees at 9 (June 1, 2012) (GSM Licensees Comments)).

⁴⁰ Under the Union Wireless proposal, the PSD limits would apply only to carriers operating with at least 1 MHz of bandwidth, *see id.* at 14139; under Verizon's proposal, the PSD limits would apply only to carriers operating with *more than* 1 MHz bandwidth, *see id.* at 14142.

⁴¹ *Id.* at 14143.

⁴² *Id.* at 14144.

⁴³ *Id.* at 14149.

(continued...)

allowing increased throughput and reliability by having multiple signals to add together or to compensate for multipath fading.⁴⁴

16. To minimize adverse effects on Cellular licensees operating with narrowband technologies such as GSM, the *Further Notice* proposed to permit licensees to continue to operate as currently deployed within the existing limits of 500 W ERP per emission in non-rural areas and 1000 W ERP per emission in rural areas.⁴⁵ It also sought comment on whether there is a need to increase Cellular power levels consistent with other services (e.g., the 700 MHz Service rules impose a limit of 1000 W ERP for emissions less than 1 MHz in non-rural areas, and 2000 W ERP for emissions less than 1 MHz in rural areas), or whether the current limits are sufficient.⁴⁶

17. The *Further Notice* sought comment on several other issues raised by Verizon's proposal in the event a PFD limit is adopted.⁴⁷ The Commission's queries included whether a PFD limit should have a reference or measurement bandwidth, e.g., 1 MHz, to ensure uniform measurement regardless of channel width, and whether we should require licensees to perform predictive modeling of PFD before deployment, or whether PFD should be a measured value.⁴⁸

18. The *Further Notice* sought comment on all aspects of the proposals and others on the record surrounding PSD and PFD, and also invited commenters to submit alternative proposals and ideas that would advance the Commission's goals of providing power flexibility, harmonizing rules where practicable among competing or complementary services, and safeguarding spectral compatibility with licensees in adjacent markets and adjacent bands.⁴⁹ It also encouraged public safety entities in particular, at the local, regional, and national levels, to submit their comments on revising the rules to permit all Cellular licensees nationwide to use, at their option, a PSD model.⁵⁰ As described below, we received a robust record on the *Further Notice* during the formal pleading cycle. In addition, thereafter, representatives of Cellular licensees and public safety entities filed various *ex parte* letters, some of which reflect their discussions among themselves and with Commission staff.⁵¹ These filings are also described

⁴⁴ See AT&T Comments at 14 n.18 (Jan. 21, 2015) (explaining that "MIMO uses multiple antennas or multiple antenna elements at both the transmitter and receiver to create multiple distinct spatial channels between the transmitter and the receiver using the same radio channel," and that AT&T plans to use 2x2 MIMO in its Cellular LTE deployments, explaining further that "2x2 MIMO uses two transmitters operating on the same carrier channel but carrying two different information streams to create two separate spatial channels. Because two spatial channels are created using a single radio carrier, spectral efficiency is increased."). See also Petition at 12 n.28; *Further Notice*, 29 FCC Rcd at 14144 (citing FCC Laboratory Knowledge Database Publication No. 662911, "Emissions Testing of Transmitters with Multiple Outputs in the Same Band" (available at www.fcc.gov/labhelp), and noting that this equipment authorization document includes guidance for determining equivalent antenna gain for MIMO, smart antenna, etc., equipment with transmitter power specified in terms of ERP or EIRP).

⁴⁵ *Further Notice*, 29 FCC Rcd at 14142.

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ In addition, the *Further Notice* asked whether the PFD value should be an average or a peak value not to be exceeded at any point within the specified area. See *id.* at 14145. The Commission also queried whether, in the event it were to require that the PFD be a modeled parameter, it would be better to establish some allowance for exceeding the PFD over a small portion of the subject area, as an allowance may be needed in areas where rolling terrain could increase the PFD over a small portion of the applicable area. See *id.*

⁴⁹ *Id.* at 14138, 14144, 14145 (also seeking comment, see *id.* at 14138, on the economic costs and benefits of the various possible approaches and on the proposed rules in Appendix B of the *Further Notice*, including definitions.)

⁵⁰ *Id.* at 14138.

⁵¹ See Appendix C for a list of parties that submitted *ex parte* letters.

(continued...)

below, where pertinent.

b. The Record

19. PSD Comments. In response to the *Further Notice*, AT&T reiterates the proposal set forth in its Petition—a PSD limit of 250 W/MHz in non-rural areas, 500 W/MHz in rural areas⁵²—but asserts that the Commission should establish “an aggressive timeline” for transitioning to higher PSD limits, “expecting public safety agencies over time to upgrade to devices less susceptible to interference.”⁵³ AT&T “clarifie[s] that its proposed PSD limit would be applied per sector, not per transmitter.”⁵⁴ AT&T explains that it is planning to deploy LTE in the Cellular Service and intends to use MIMO techniques, but that without PSD, this results in a requirement for a “higher concentration of cell sites than other licensees” in other commercial wireless services where the Commission already permits use of a PSD model, putting Cellular licensees at a competitive disadvantage.⁵⁵

20. Verizon reiterates its earlier proposal of 1000 W/MHz in non-rural areas and 2000 W/MHz in rural areas.⁵⁶ According to Verizon, these same limits that apply to the 700 MHz Service are appropriate for the Cellular Service because the frequencies share similar propagation characteristics and, it asserts, the limits have been used successfully by 700 MHz Service licensees without problems.⁵⁷ In addition, it argues that PSD limits should be applied per transmitter, rather than per sector,⁵⁸ and continues to advocate a bandwidth dividing line.⁵⁹ Otherwise, it asserts, if a licensee deploying a narrowband technology such as GSM is permitted to use a PSD model with a limit of 1000 W/MHz, it could increase its total power to 5000 W, and this would increase the risk of interference to licensees in adjacent markets.⁶⁰

21. The Rural Wireless Association, Inc. (RWA) supports having a PSD option at the limits proposed by Union Wireless, 500 W/MHz non-rural, 1000 W/MHz rural.⁶¹ It contends that AT&T’s proposed lower limits would result in reduced coverage areas for 2G GSM/EDGE networks, “which would dramatically increase roaming costs for customers and in some instances will result in the roaming customers’ loss of signal altogether,” but that Verizon’s higher proposed PSD limits would “increase the

⁵² AT&T Comments at 4. *See also id.* at 16.

⁵³ *Id.* at 17; AT&T Reply Comments at 4 (Feb. 20, 2015).

⁵⁴ Letter from Linda Vandeloop, Director-Federal Regulatory, AT&T Services, Inc. (Vandeloop) to Marlene H. Dortch, Secretary, FCC (FCC Secretary Dortch) at 1 (filed May 8, 2015).

⁵⁵ AT&T Comments at 15.

⁵⁶ Verizon Comments at 2-6 (Jan. 21, 2015). *See also* Verizon Reply Comments at 2-3.

⁵⁷ Verizon Comments at 2-3.

⁵⁸ *Id.* at 3 (adding that this would reflect licensees’ use of multiple transmitters at a given base station location; otherwise, it argues, to ensure that the sum of the power of multiple transmitters at a base station stayed within the PSD limit, licensees would be required to reduce power, essentially nullifying the benefits of deploying MIMO configurations).

⁵⁹ *Id.* at 5 (stating specifically that PSD limits should only be an option for licensees deploying technologies with bandwidths greater than 1 MHz).

⁶⁰ *Id.* at 6. Verizon agrees with the Commission’s concern that “coverage areas could shrink if licensees deploying technologies with emission bandwidths greater than 1 MHz were required to use a PSD model,” but argues that “the concern only exists if the Commission adopts a PSD limit that is too low.” *Id.* at 5.

⁶¹ Rural Wireless Association, Inc. Comments at 7 (Jan. 21, 2015) (RWA Comments).

(continued...)

likelihood of harmful interference” to adjacent and co-channel Cellular and public safety licensees.⁶² In response, Verizon asserts that the field strength limit adopted by the *R&O* “fully protects co-channel licensees from harmful interference.”⁶³ CTIA also supports the proposal to permit use of a PSD model,⁶⁴ but does not take a position on any particular PSD limit or on proposed other changes to related technical rules. Broadpoint, LLC (Broadpoint), whose Cellular operations use narrowband (GSM/EDGE) technology serving customers in the Gulf of Mexico, supports adoption of a PSD model as an option for wider bandwidth technologies if public safety operations are reasonably protected, but does not advocate any particular PSD level.⁶⁵ For Cellular licensees using narrowband technologies, Broadpoint supports either retention of the existing power limits or an increase “in order to maintain current operations and avoid power reductions.”⁶⁶

22. Gogo Inc. (Gogo), which operates commercial air-to-ground (ATG) base stations nationwide in the 800 MHz band adjacent to the Cellular band, contends that the use of PSD limits by Cellular carriers would risk “significantly increased interference” to ATG service.⁶⁷ Gogo does not oppose adoption of a Cellular PSD model, but argues that the Commission should adopt certain requirements pertaining to the out of band emission (OOBE) limit to protect ATG service.⁶⁸

23. Several public safety entities submitted *ex parte* letters articulating concerns about interference from both Cellular and ESMR carriers in the 800 MHz band without specifically addressing PSD limits for the Cellular Service. The Port Authority of New York and New Jersey (Port Authority) reports interference to its public safety users (including the Port Authority Police Department) of 800 MHz National Public Safety Planning Advisory Committee (NPSPAC) channels, rendering portable receivers “inoperable within the vicinity of an 800 MHz radio frequency transmitted by wireless carriers in the area.”⁶⁹ It has also reported interference incidences through the 800 MHz Interference Notification

⁶² *Id.* at 8. RWA does not address PFD or the other technical issues raised in the *Further Notice*.

⁶³ Verizon Reply Comments at 3 (citing 47 CFR § 22.983, as adopted in the *R&O*, and asserting that adopting a revised field strength measure in terms of PFD (discussed *infra* Section II.C.2.) would add another layer of protection).

⁶⁴ CTIA Reply Comments at 6 (Feb. 20, 2015). Although CTIA submitted the Reply Comments under its former name, CTIA – The Wireless Association, we reference it herein under its current name.

⁶⁵ Broadpoint, LLC d/b/a Cellular One Reply Comments at 1-2, 4 (Feb. 20, 2015) (Broadpoint Reply Comments).

⁶⁶ *Id.* (supporting an increase “consistent with [power levels] for other services, such as the 700 MHz Service rules,” which it asserts “would improve downlink within rural coverage of UMTS and LTE,” but arguing that a corresponding increase in the mobile station ERP would also be necessary). See *infra* Section II.E.4. (discussing mobile unit power levels). Broadpoint suggests that the Commission define 1.25 MHz as “the maximum bandwidth for a ‘narrowband’ technology” for the purpose of the Cellular radiated power rules. Broadpoint Reply Comments at 4-5.

⁶⁷ See generally Letter from Michele Farquhar, Tom Peters, and David M. Crawford, Hogan Lovells US LLP, Counsel to Gogo Inc., to FCC Secretary Dortch (filed Dec. 24, 2015) (Gogo Dec. 2015 *Ex Parte* Letter).

⁶⁸ *Id.* at 1. Because Gogo’s filings in this proceeding pertain to the OOBE limit, we discuss them in more detail below, in the OOBE section of this Second Report and Order. See *infra* Section II.C.3.

⁶⁹ Letter from Timothy G. Stickelman, Assistant General Counsel, The Port Authority of New York and New Jersey, to FCC Secretary Dortch at 1-2 (filed May 3, 2016) (Port Authority *Ex Parte* Letter). The Port Authority is the licensee of WNNM887, on whose channels the unacceptable interference has been experienced. See *id.* at 1-2 (including a list of the airports, marine and bus terminals, rail transit system, tunnels, bridges, and other properties that it manages, covering an area of about 1,500 square miles). Its Letter includes seven “spectrum analyzer data” charts for interference experienced at various times in 2015 at locations in New York, NY and Union City, NJ. *Id.* at 2 and Exhs. A-D.

(continued...)

Site,⁷⁰ and while it has found the wireless carriers generally responsive and cooperative, it cautions that “this remediation does not preclude similar harmful [radio frequency (RF) interference] on other occasions,” which cannot be predicted in terms of location, duration, or timing.⁷¹

24. The State of Connecticut Department of Emergency Services and Public Protection (State of Connecticut), which operates a trunked radio system in support of the state government and for “interoperability among public safety providers,” reports problems with radio coverage “in the areas of several known commercial wireless transmitters.”⁷² The State of Connecticut explains that, based on its investigation and tests, mobile, portable, and control station subscriber units “continue to pass frequencies up to and including 874/875 MHz” notwithstanding rebanding,⁷³ and that the problem of interference is not confined to any particular manufacturer’s equipment, nor to any single wireless carrier.⁷⁴ Morton Leifer PE of Clarkstown, NY (Leifer) expresses concern about the potential for increased interference to public safety (specifically the Clarkstown police) in connection with “Cellular Carriers” requesting permits to build or expand using LTE technology.⁷⁵ Leifer observes that public safety units “continue to have front ends that tune well beyond the 800 MHz public safety band” and that “voluntary cooperation

⁷⁰ The “800 MHz Interference Notification Site” is a website (www.publicsafety800mhzinterference.com) established collectively by Cellular and ESMR carriers in the 800 MHz band to record interference complaints. The website serves as a vehicle for licensees who operate non-cellular architecture systems in the 800 MHz band to report interference to the commercial carriers. It was created because the Commission directed licensees operating cellular-architecture systems in or adjacent to the 800 MHz band to establish an electronic means of receiving interference complaints from licensees who operate non-cellular systems in the band. *See 800 MHz Rebanding Order*, 19 FCC Rcd at 15042.

⁷¹ Port Authority *Ex Parte* Letter at 2. We also acknowledge *ex parte* letters filed by New Jersey Transit Corporation (NJ Transit), which holds Part 90 licenses for its digital land mobile radio (LMR) network occupying frequencies between 854 and 860 MHz. The comments report significant interference problems “emanating from the adjacent 862-869 MHz [ESMR] band” *See* Letter from Andrew E. Schwartz, NJ Transit (Schwartz), to FCC Secretary Dortch at 2 (filed Mar. 31, 2016). *See also, generally*, Letter from Schwartz to FCC Secretary Dortch (filed Apr. 25, 2016). As noted above, the instant proceeding is limited to rules applicable to the Cellular Service and, accordingly, we do not address the substance of NJ Transit’s Letters herein.

⁷² Letter from Scott Wright, Telecommunications Engineer I, State of Connecticut Dept. of Emergency Services and Public Protection, to FCC Secretary Dortch at 1 (filed July 22, 2016) (State of Connecticut *Ex Parte* Letter). The State reports, as a “real-world” example, that the radios of Troopers responding to an accident on a Hartford highway went “out of range” in an area adjacent to “a known commercial wireless site” and could not establish effective communications. *Id.* at 2. It explains that it has reported a number of such problems via the 800 MHz Interference Notification Site and that, while the carriers have been responsive, “the issues remain.” *Id.* at 3. For illustrative purposes, it also provides graphics showing “typical locations” in Hartford where such problems have been experienced. *See id.* at 3-7. The State of Connecticut further states that the majority of its current radio units have been in service for 17 years and, “[g]iven the typical refresh times for public safety [LMR] systems, it will be at least that length of time until this equipment is replaced.” *Id.* at 2.

⁷³ *Id.* at 2 (adding that a filter placed in line with the antenna to obtain relief from the problem resulted in significant attenuation of frequencies above the current LMR portion of the band). The frequencies 874/875 MHz are within Block A of the Cellular Service. For the short term, it argues that filtering devices might provide some relief, but questions “who is to provide and install this . . . [even] if found to be an acceptable short term solution.” *Id.* at 3. *See also infra* para. 37.

⁷⁴ State of Connecticut *Ex Parte* Letter at 1-2 (reporting that in the problem areas, “the commercial carrier was usually observed with signal levels greater than or equal to -35 dbm”).

⁷⁵ Letter from Morton Leifer PE, Electronic Communications Specialist, Town of Clarkstown, NY (Leifer), to FCC Secretary Dortch at 1 (filed Dec. 7, 2015); Letter from Leifer to FCC Secretary Dortch at 1 (filed Mar. 10, 2016) (Leifer 2016 *Ex Parte* Letter).

(continued....)

between the Carriers and Municipalities would be mutually beneficial.”⁷⁶

25. In letters filed after the formal pleading cycle, AT&T and Verizon address possible interference to public safety systems, outlining measures they plan to take as a result of their discussions with representatives of APCO—measures “intended to provide a process to test for increased potential for interference prior to full deployment [of PSD operations].”⁷⁷ They voluntarily commit to providing notice to public safety agencies before transitioning any Cellular market to PSD operations.⁷⁸ They also agree to take the following additional voluntary measures following release of this Second Report and Order:⁷⁹

- Working with public safety, AT&T and Verizon each will identify “six additional markets” in which to conduct testing jointly with local public safety agencies of a variety of equipment operating in the 806-815/851-860 MHz band “at the new PSD limits set out in the Commission’s Order,” based on the test plan that had been developed by AT&T and certain public safety entities in connection with the Florida Waiver;
 - AT&T and Verizon will submit the test results into the record of this rulemaking proceeding,⁸⁰
- After completing their testing as described above, AT&T and Verizon will each select 10 additional market areas and roll out PSD operations in two phases in those market areas:
 - in the first phase, each of the two carriers will, after providing advance notice to local public safety agencies, operate a cluster of the Cellular base stations in each of the identified markets for 60 days at the PSD limits established by the Commission, thus allowing local public safety agencies to assess results before the entire market is transitioned to PSD;
 - in the second phase, if no unacceptable interference has arisen during the first phase,

⁷⁶ See generally Leifer 2016 *Ex Parte* Letter. The Letter refers to comments by “ESMR” carriers, but references the instant Cellular Reform proceeding’s docket (i.e., WT Docket No. 12-40) and carriers’ requests to switch to a PSD model. ESMR licensees, which do not operate in the Cellular Service band, have not individually submitted comments in this proceeding.

⁷⁷ See generally Letter from Vandeloop, AVP External Affairs/Regulatory, Federal Regulatory, AT&T, and Tamara Preiss, Vice President, Federal Regulatory & Legal Affairs, Verizon, to FCC Secretary Dortch (filed May 10, 2016) (AT&T/Verizon May 10, 2016 *Ex Parte* Letter) (adding, at 1, that they will continue to work closely with public safety to address interference concerns through the established process under 47 CFR §§ 22.970-22.973 and 90.672-90.675); Letter from Vandeloop to FCC Secretary Dortch (filed May 27, 2016) (AT&T/Verizon May 27, 2016 *Ex Parte* Letter) (documenting the positions of both AT&T and Verizon following up on a meeting in which representatives of both companies participated).

⁷⁸ AT&T/Verizon May 10, 2016 *Ex Parte* Letter at 1.

⁷⁹ In describing their planned measures, they reference testing that AT&T had conducted jointly with public safety entities in connection with AT&T’s request for interim waiver of Section 22.913 to permit PSD operations at certain of its Cellular stations in Florida, which the Bureau granted subject to the outcome of this proceeding (“Florida Waiver”). See *Further Notice*, 29 FCC Rcd at 14136, 14141-42 (describing the Bureau’s grant of the Florida Waiver and a similar interim waiver for AT&T’s Cellular stations in Vermont). AT&T’s test results were documented in *ex parte* letters submitted by AT&T and Miami-Dade County in WT Docket No. 13-202, as also discussed in the *Further Notice*. See *id.*

⁸⁰ See AT&T/Verizon May 10, 2016 *Ex Parte* Letter at 2 (citing pertinent filings in the Florida Waiver docket, WT-Docket No. 13-202, by AT&T and Miami-Dade County; stating also that the testing will include markets operating under a wide range of conditions, will take into account the frequency range of public safety radios, which can extend to 824/869 MHz, and will include a representative sample of markets with both Cellular Block A and 800 MHz ESMR operations).

(continued....)

or if instances of unacceptable interference arising during that 60-day period are “effectively mitigated in cooperation with the local public safety agencies,” then AT&T and Verizon will deploy PSD operations at the other base stations in that respective market.⁸¹

They confirm that the testing and phased roll-out “will be completed prior to moving into other markets” and clarify their plan to give 30-day notice to public safety licensees when deploying PSD in additional markets after the testing and phased roll-out described above.⁸²

26. AT&T and Verizon assert that the results of the above-described testing and phased PSD deployment, together with AT&T’s experience deploying PSD pursuant to the interim waivers granted by the Bureau,⁸³ will provide sufficient real-world evidence “to assure public safety agencies across the country that the relief requested in this [proceeding] will not increase the potential for interference to their devices or networks.”⁸⁴ They argue, in addition, that the Commission’s Order in this proceeding should “permit higher PSD limits immediately in those Cellular markets where public safety licensees do not reasonably plan to operate in the 800 MHz band and within no more than 5 years in all other markets following successful completion of the joint market testing.”⁸⁵

27. PFD Comments. Verizon urges adoption of a PFD limit for Cellular licensees, and clarifies that its proposed PFD limit would be across a given bandwidth, i.e., 3000 $\mu\text{W}/\text{m}^2/\text{MHz}$.⁸⁶ Verizon further argues that the PFD limit should be measured on a per-transmitter basis, “whereby the measurement bandwidth would be equal to the channel bandwidth.”⁸⁷ It asserts once again that a PFD limit will permit higher PSD limits while protecting adjacent public safety and other licensees from harmful interference.⁸⁸ Verizon also clarifies that a PFD limit of 3000 $\mu\text{W}/\text{m}^2/\text{MHz}$ is currently being met by its Cellular CDMA transmitters, stating that for each configuration it modeled, the PFD produced “did not exceed 3000 $\mu\text{W}/\text{m}^2/\text{MHz}$ over more than approximately one percent of the ground area near the base station.”⁸⁹

⁸¹ *Id.*

⁸² AT&T/Verizon May 27, 2016 *Ex Parte* Letter at 1.

⁸³ In addition to the two interim waivers granted by the Bureau prior to release of the *Further Notice*, the Bureau has since granted two additional interim PSD waivers requested by AT&T for certain stations in Kansas and Missouri, both of which include conditions similar to those in the Florida and Vermont Waivers. See *Interim Waiver of 47 C.F.R. § 22.913 to Permit the Use of a Power Spectral Density Model for Certain Cellular Service Operations in Four Missouri Markets*, WT Docket No. 15-86, Letter Order, 30 FCC Rcd 10765 (WTB MD 2015) (“Missouri Waiver”); *Interim Waiver of 47 C.F.R. § 22.913 to Permit the Use of a Power Spectral Density Model for Certain Cellular Service Operations in Seven Kansas Markets*, WT Docket No. 15-130, Letter Order, 30 FCC Rcd 14495 (WTB MD 2015).

⁸⁴ AT&T/Verizon May 10, 2016 *Ex Parte* Letter at 2.

⁸⁵ *Id.* at 3.

⁸⁶ Letter from Andre J. Lachance, Assistant General Counsel, Verizon (Lachance), to FCC Secretary Dortch at 1 (filed Oct. 9, 2015) (attaching Revised Technical Statement of Scott Townley) (Verizon Oct. 2015 *Ex Parte* Letter, Revised Townley Statement) (stating that Verizon modeled PFD levels “measured per MHz of bandwidth – herein referred to as power flux spectral density or ‘PFSD’ – for typical urban configurations of CDMA transmitters currently operating in the Cellular bands”).

⁸⁷ Verizon Comments at 7.

⁸⁸ *Id.* at 6.

⁸⁹ Letter from Lachance to FCC Secretary Dortch at 2 (filed Aug. 23, 2016) (Verizon Aug. 2016 *Ex Parte* Letter) (including a chart (Table 1) depicting the results of its modeling study, stating that it modeled two “representative

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28. Pericle Communications Company, a consulting engineering firm (Pericle), and the law firm Shulman, Rogers, Gandal, Pordy & Ecker, P.A. (Shulman, and collectively with Pericle, Pericle-Shulman) filed extensive comments arguing that PSD rule changes must be accompanied by a PFD limit.⁹⁰ Pericle-Shulman contends that increased power levels for the Cellular Service absent ground-level PFD limitations would likely have a “significant detrimental effect on public safety radio performance in the immediate vicinity of 800 MHz cell sites, especially . . . co-located Sprint [ESMR] and [Cellular Block A] sites,” which it describes as the worst-case situation, generally.⁹¹ It cautions, however, that an isolated Cellular Block A site can be equally problematic under certain circumstances,⁹² and that “there is still a need for public safety radios in many areas of the country to pass ‘old NPSPAC’ (i.e., 866-869 MHz) frequencies,” as rebanding is still ongoing.⁹³

29. Pericle-Shulman recommends an interim PFD of 625 $\mu\text{W}/\text{m}^2$ with a goal of transitioning to a PFD limit of 3000 $\mu\text{W}/\text{m}^2$ “over some period that would enable a significant number of radios to be replaced with better-performing models.”⁹⁴ In a subsequent filing, it proposes specific rule language implementing this proposal with the transition period ending effective January 1, 2021.⁹⁵ It argues that allowing even 5 percent of the area within 1 km of the site to exceed the PFD limit is “unacceptable” and that the Commission should only allow non-compliance “at locations well above ground level and these

antenna configurations with different heights and downtilts,” and noting that the analysis and graph here are the same as in the Verizon Oct. 2015 *Ex Parte* Letter, Revised Townley Statement, except that the PFD units “here are changed from dBW/m²/MHz to $\mu\text{W}/\text{m}^2/\text{MHz}$ ”.

⁹⁰ Pericle Communications Company and Shulman, Rogers, Gandal, Pordy & Ecker, P.A. Comments at 5 (Jan. 21, 2015) (Pericle-Shulman Comments). Pericle “consults for the public safety, personal wireless, transportation and broadcast industries,” and its clients have included, among others, the city and county of Denver, CO, and the city of Oakland, CA. *Id.* at 1. Shulman represents, among others, “hundreds of public safety licensees (state, counties and cities) in securing spectrum for their operations and negotiations involving the 800 MHz Rebanding Program.” *Id.* at 2.

⁹¹ *Id.* at 5, 9, 19. Because of frequency separation between bands, Pericle-Shulman asserts, a Cellular Block A site by itself “normally causes blocking or 5th order [intermodulation]” which is weaker than 3d order intermodulation, but that performance nonetheless varies by radio. Pericle-Shulman Reply Comments at 7-8 (Feb. 20, 2015). Sprint does not hold Cellular Service licenses and has not submitted comments in this Cellular Reform proceeding.

⁹² *See, e.g.*, Pericle-Shulman Reply Comments at 10-11.

⁹³ *Id.* at 7. Pericle-Shulman discusses blocking and intermodulation (IM) (including strong signal IM (SSIM)) interference at length (along with receiver design and performance), and asserts that this interference is a result of continued vulnerability of public safety receivers to interference—a problem it argues will increase as operators build new sites with low antenna heights. *See* Pericle-Shulman Comments at 4, 7. *See also*

⁹⁴ “*Ex Parte* Comments of Pericle Communications Company and Shulman, Rogers, Gandal, Pordy & Ecker, P.A.” at 3 (filed Dec. 4, 2015) (Pericle-Shulman Dec. 2015 *Ex Parte*). Pericle-Shulman states that its filing of these “*Ex Parte* Comments, as well as Notice of an *Ex Parte* communication,” is pursuant to 47 CFR § 1.1206, and it references a discussion on Nov. 19, 2015, involving Alan Tilles, Esq., of Shulman, Jay M. Jacobsmeier, P.E., President of Pericle, and Brian Marenco, PSHSB. *See id.* at 1. The submission was late-filed under the requirements of 47 CFR § 1.1206. We remind Pericle-Shulman of the importance of complying with our *ex parte* rules and caution that future violations will be referred to the Office of General Counsel for further action, but accept and consider the submission herein in the interest of having a complete record and because no party has been prejudiced by its lateness.

⁹⁵ Pericle-Shulman Dec. 2015 *Ex Parte* at 3-4 (stating, at 3, that this PFD limit of 625 $\mu\text{W}/\text{m}^2$ would apply “per 800 MHz RF carrier per antenna sector, measured at ground level anywhere in the vicinity of the cell site,” with the limit increasing to 3000 $\mu\text{W}/\text{m}^2$ effective January 1, 2021).

(continued....)

should be limited to a small percentage of the study area, say 1%.⁹⁶ It also proposes provisions specifying how compliance is to be verified and how PFD is to be measured.⁹⁷ Furthermore, Pericle-Shulman argues, even sites with ERPs below 500 W can exceed a PFD of 3000 $\mu\text{W}/\text{m}^2$ on the ground.⁹⁸ It proposes a rule provision that partially “grandfathers” existing cell sites that operate below 500 W ERP, such that they would not be required to comply with any PFD limit, except that their cell sites “shall be corrected following notification of harmful interference by the Part 90 non-cellular 800 MHz licensee and verification of non-compliance through field measurement.”⁹⁹

30. Pericle-Shulman argues that the Cellular PFD limit should not be measured over any particular bandwidth.¹⁰⁰ According to Pericle-Shulman, the PFD limit it proposes—which does not specify any reference bandwidth—“should satisfy the vast majority of interference scenarios” and minimize complaints of unacceptable interference while being easy to implement and enforce.¹⁰¹ It also argues that we should specify the instruments to be used to measure PFD.¹⁰²

31. According to Pericle-Shulman, while the interference is largely a receiver performance issue, “large-scale replacement of public safety equipment on a nationwide basis today is not a feasible alternative.”¹⁰³ It reports that better radios are coming on the market, but that improvements in new models are uneven and “sufficient market pressures do not yet exist to bring all manufacturers up to an acceptable standard.”¹⁰⁴ Pericle-Shulman claims that SSIM rejection is “rarely published by the radio manufacturer,” and it encourages public safety agencies to specify SSIM rejection in requests for proposal for new radio systems.¹⁰⁵

32. The National Public Safety Telecommunications Council (NPSTC) does not offer a recommended PFD value but urges adoption of a limit “sufficient to minimize the risk of interference to

⁹⁶ Pericle-Shulman Comments at 22.

⁹⁷ See Pericle-Shulman Dec. 2015 *Ex Parte* at 4-5.

⁹⁸ Pericle-Shulman Comments at 21.

⁹⁹ Pericle-Shulman Dec. 2015 *Ex Parte* at 4 (proposed new rule Section 22.970(c)(1), which would also require cell sites to be brought into compliance with the PFD limit—“verified by engineering calculation”—regardless of interference complaints, “whenever base station radio equipment or antennas are replaced or the ERP is raised above 500 Watts.”). According to Pericle-Shulman, “a PFD limit based directly on [PSD] should not be used.” *Id.* at 9.

¹⁰⁰ Pericle-Shulman Dec. 2015 *Ex Parte* at 2 (emphasis omitted) (asserting that, while PSD is “by its very nature specified in units of bandwidth (e.g., Watts per Hertz), PFD is different,” and a PFD limit is intended to protect public safety receivers from unacceptable interference which, in the 800 MHz bands, “is created in the front end of the receiver where there is typically . . . very little selectivity over the [Cellular Service] band (869-894 MHz).”).

¹⁰¹ *Id.* at 3.

¹⁰² Pericle-Shulman Comments at 18-19, 23.

¹⁰³ *Id.* at 19.

¹⁰⁴ “*Ex Parte* Comments of Pericle Communications Company and Shulman, Rogers, Gandal, Pordy & Ecker, P.A.” at 10 (filed June 25, 2015) (Pericle-Shulman June 2015 *Ex Parte*) (adding, at n.3, that all 10 radio models for which it tested third order SSIM rejection are “public safety grade” and “therefore entitled to protection from broadband interference under the Commission’s Rules”). Further, it reports based on its tests that “two *new* model radios perform very poorly in the presence of [a] PFD limit of 3,000 $\mu\text{W}/\text{m}^2$ (-13.2dBm at the antenna terminal).” *Id.* at 10 (emphasis in original) (adding, at 12, that the minimum signal level needed to overcome a given interference level “is simply the interferer power level in dBm minus the SSIM rejection in dB.”).

¹⁰⁵ Pericle-Shulman Reply Comments at 6 (emphasis added); Pericle-Shulman June 2015 *Ex Parte* at 6.

(continued....)

public safety mobiles and portables in the vicinity of Cellular base stations.”¹⁰⁶ APCO supports the NPSTC response and also emphasizes the importance of certain recommendations made by Pericle-Shulman.¹⁰⁷ APCO agrees that some PFD limit should be adopted to help control the ground-level signal in the vicinity of Cellular transmitter sites, and also agrees with Pericle-Shulman’s recommendations that (1) the Commission not allow the PFD to be exceeded at any ground level location within a 1 km radius of the site, (2) the PFD limit be complied with at all ERP and/or PSD levels, and (3) the Commission should only allow non-compliance “at locations well above ground level, and that these non-complaint locations should be limited to a small percentage of the 1 km area.”¹⁰⁸

33. Verizon argues that only licensees electing to operate using the PSD model should be required to meet PFD limits.¹⁰⁹ Verizon also opposes a requirement that all Cellular licensees comply with the PFD limit at existing facilities.¹¹⁰ Verizon argues that so long as public safety operators use older equipment that does not filter Cellular signals completely, the risk of unacceptable interference from Cellular operations cannot be entirely eliminated.¹¹¹ It also opposes specifying any type of instrument or particular measurement technique for PFD levels, arguing that various techniques might be suitable and that, moreover, other techniques yielding more accurate results might be developed in the future.¹¹²

34. In a July 2015 *ex parte* filing, in connection with re-asserting its proposal for PSD limits of 250 W/MHz (non-rural) and 500 W/MHz (rural), AT&T argues that a PFD limit for Cellular PSD operations is unnecessary.¹¹³ In a more recent *ex parte* letter, however, in the context of responding to staff inquiries about the calculated PSD of AT&T’s current operations and PFD comments on the record, AT&T expresses support for Verizon’s proposed PFD limit of 3000 $\mu\text{W}/\text{m}^2/\text{MHz}$ “at up to 98% of a 1 km area of a Cellular base station,” stating that its base stations currently operate within this PFD limit.¹¹⁴ AT&T argues that, nonetheless, no PFD limit should apply to Cellular licensees using the PSD model in markets “where public safety licensees do not reasonably plan to operate in the 800 MHz band,” even when operating at “higher PSD levels.”¹¹⁵

35. Like Verizon, AT&T opposes Pericle-Shulman’s proposal to apply a PFD limit to all base stations operating above 500 W ERP and to other base stations after receipt of an interference complaint or when replacing radio equipment or antennas—i.e., to base stations “operating under current power rules and presenting little to no risk of unacceptable interference” to public safety.¹¹⁶ AT&T

¹⁰⁶ NPSTC Reply Comments at 4 (Feb. 20, 2015). NPSTC does not discuss PSD limits.

¹⁰⁷ See APCO Reply Comments at 2 (Feb. 20, 2015).

¹⁰⁸ *Id.* at 3.

¹⁰⁹ Verizon Reply Comments at 5-6.

¹¹⁰ *Id.* at 6 (claiming it would “force [them] to verify compliance at multiple locations surrounding tens of thousands of base station transmitters and make coverage, capacity and throughput-reducing adjustments at cell sites, even if the transmissions have no effect on any public safety operation.”)

¹¹¹ *Id.* at 4.

¹¹² *Id.* at 6-7.

¹¹³ See Letter from Vandeloop to FCC Secretary Dortch at 1-2 (filed July 10, 2015) (AT&T July 2015 *Ex Parte* Letter) (including, at 3-6, charts purporting to show that PFD is a non-factor, stating also, at 2, that it opposes the use of PFD to replace the field strength limit and SAB provisions that the Commission adopted in the *R&O*).

¹¹⁴ Letter from Vandeloop to FCC Secretary Dortch at 2 (filed Aug. 18, 2016) (AT&T Aug. 2016 *Ex Parte* Letter).

¹¹⁵ *Id.* (without specifying what it means by “higher” PSD levels).

¹¹⁶ See Letter from Vandeloop to FCC Secretary Dortch at 1 (filed Jan. 15, 2016) (AT&T Jan. 2016 *Ex Parte* Letter (noting (at 2) that in the *800 MHz Rebanding Order*, 19 FCC Rcd at 15040, the Commission considered but declined

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describes Pericle-Shulman's proposed PFD limit of $625 \mu\text{W}/\text{m}^2$ as "extreme, far below what is reasonable and far below current operations," and argues that it would restrict Cellular base station power to "far below currently permissible levels."¹¹⁷ It further contends that setting such a PFD limit would eliminate "the urgency to improve public safety devices and enhance public safety networks," unjustly placing the burden for reducing the risk of interference solely on Cellular licensees "nearly a dozen years after the rebanding docket removed all doubt about the need for improvements in public safety receivers and networks."¹¹⁸

36. Improvements in Receiver Standards. Although we did not seek comment on public safety receiver standards, some commenters raised the issue in this proceeding. Pericle-Shulman encourages the Commission to adopt receiver standards ("or more accurately, harm claim thresholds") in ET Docket No. 13-101, and believes it is the "best way to encourage radio manufacturers to adopt more robust designs."¹¹⁹ NPSTC echoes Pericle-Shulman's recommendation, supporting improvements in receiver interference rejection to help mitigate interference over the long run if improvements can be accomplished "at reasonable costs, without negatively impacting other critical performance factors or the size and weight of portable radios."¹²⁰ APCO shares these concerns.¹²¹ Further, APCO asserts, implementing improved receiver standards "would necessarily be a very long term process," given that public safety equipment replacement cycles often run 10-20 years and many public safety 800 MHz radios were, APCO states, replaced as a result of rebanding.¹²²

37. The State of Connecticut similarly advocates mandating improved receiver specifications and filtering requirements as a long term solution to the problem of interference from the Cellular Service to public safety licensees in the adjacent band.¹²³ It cautions, however, that absent a viable funding mechanism, public safety agencies would "most likely not be able to replace equipment for a number of years" even if improved land mobile equipment were available today.¹²⁴

c. Discussion

38. Based on this record, we adopt PSD limits for the Cellular Service, an advance notification requirement at specified higher PSD levels, and a PFD limit that will apply for a seven-year transition period if the Cellular licensee operates at PSD limits that exceed a certain threshold. In reaching these decisions, we recognize that PSD and PFD limits are not a complete answer to eliminating unacceptable Cellular interference to public safety systems, at least for the immediate term. While the rebanding process began soon after adoption of the *800 MHz Rebanding Order* in 2004 and is nearly done, it has not yet been completed in portions of states bordering Mexico where complex international coordination is required. Therefore, in these areas, some public safety licensees continue to operate on

to adopt "across-the-board limits on such cell parameters as maximum [PFD] . . .," recognizing that "the restrictions would require modifications of cells that had little, if any, potential for generating unacceptable interference.").

¹¹⁷ *Id.* at 3 (describing examples applying Pericle-Shulman's proposed PFD limit to various antenna installations).

¹¹⁸ *Id.*

¹¹⁹ Pericle-Shulman Comments at 23.

¹²⁰ NPSTC Reply Comments at 5.

¹²¹ APCO Reply Comments at 4.

¹²² *Id.*

¹²³ State of Connecticut *Ex Parte* Letter at 2-3.

¹²⁴ *Id.* at 3.

(continued....)

frequencies adjacent to the lower edge of the Cellular band at 869 MHz.¹²⁵ Even after rebanding is fully complete, some public safety licensees may still be susceptible to Cellular base station (and ESMR band) interference because the filtering in their legacy radios does not reflect the post-rebanding channel plan.

39. As discussed below, we direct the Bureau, in conjunction with the Commission's Public Safety and Homeland Security Bureau (PSHSB) and the Office of Engineering and Technology (OET) (collectively, Bureaus), to convene a public forum to facilitate multi-stakeholder co-existence efforts. In addition, we will continue to rely on Sections 22.970-22.973 of the Commission's rules which, by placing strict responsibility for remedying unacceptable interference on the licensee(s) causing that interference to public safety communications, serve as a "backstop" to help ensure that first responders' critical communications are not impeded.¹²⁶

40. *PSD Limits.* To meet the ever-increasing demand for ubiquitous, mobile data services, Cellular licensees need to utilize their spectrum as efficiently as possible. LTE is more spectrally efficient than other commercial wireless broadband technologies being used by Cellular carriers today;¹²⁷ it can bring faster speeds, reduced latency, and better mobile service for consumers. Carriers have already deployed LTE on their 700 MHz, AWS, and PCS spectrum, and our rules governing those services provide for use of a PSD model. However, the existing Cellular non-PSD limits restrict power for deployment of wider bandwidth technologies such as LTE. If carriers were to deploy LTE on Cellular frequencies using the existing non-PSD limits, the result would be reduced coverage. To compensate, carriers could add sites, but the resulting higher concentration of sites could potentially worsen the existing interference environment, especially near Cellular base stations where the risk to public safety communications is greatest. Additionally, while using techniques such as MIMO can achieve spectral efficiency, Cellular broadband licensees using 2X2 MIMO transmitters under the existing ERP limits will double their power, and here too, the result is potentially increased interference to public safety operations.

41. Providing technological flexibility and, to the extent practicable, regulatory parity for Cellular licensees via a PSD model to facilitate efficient use of more advanced wideband technologies without increasing the potential for unacceptable interference to 800 MHz public safety operations has been the primary two-pronged objective in this proceeding concerning power reform. We find that revising our rules to permit a PSD option serves the public interest by allowing for efficient use of wideband technologies in the Cellular Service.¹²⁸ As proposed, we also find that it serves the public interest to apply to PSD operations the doubling of power in rural counties (as permitted under the existing rule for non-PSD operations)—defined as counties with population densities of 100 persons or fewer per square mile, based on the most recently available population statistics from the Bureau of the

¹²⁵ Many licensees operating in the NPSAC regions bordering Mexico have yet to complete their frequency retunes. See *Public Safety and Homeland Security Bureau Extends 800 MHz Application Freeze Along Border with Mexico*, WT Docket No. 02-55, Public Notice, 31 FCC Rcd 9585 (PSHSB 2016). See also *Improving Public Safety Communications in the 800 MHz Band*, WT Docket 02-55, Fifth Report and Order, 28 FCC Rcd 4085 (PSHSB 2013).

¹²⁶ See 47 CFR §§ 22.970-22.973.

¹²⁷ See Rysavy Research, *Mobile Broadband Explosion: 3GPP Broadband Evolution to IMT-Advanced at 18* (2011), available at http://www.rysavy.com/articles/2011_09_08_mobile_broadband_explosion.pdf.

¹²⁸ To accommodate filings by licensees and applicants, several of the new and revised rules that we are adopting today will require changes to FCC Form 601 and/or the Commission's Universal Licensing System (ULS). The Bureau will issue public notices, as appropriate, announcing completion of these changes and, where required, Office of Management and Budget approval thereof, along with the effective date(s) of the new rules pursuant to the Ordering Clauses of this Second Report and Order.

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Census.¹²⁹ No commenter on the record opposed this proposal. Our decision is consistent with the radiated power rules adopted for other commercial wireless services, which also include doubled PSD limits to facilitate economical coverage in rural areas.¹³⁰

42. Based on the record, we conclude that the appropriate PSD limits for the Cellular Service are as follows: (1) 400 W/MHz ERP in non-rural areas, and 800 W/MHz in rural areas, without a PFD requirement; and (2) higher limits—up to 1000 W/MHz ERP in non-rural areas, and up to 2000 W/MHz ERP in rural areas (Higher PSD Limits)—with a PFD limit for seven years¹³¹ and an advance notification requirement. As Verizon states, its Cellular transmitters using CDMA technology in non-rural areas operate at a calculated PSD of “400 W/MHz for each cell sector,” equivalent to (and in compliance with) the current maximum ERP of 500 W per emission (non-rural) under existing Section 22.913, which does not have a PFD limit.¹³² AT&T explains that its network operated at PSD levels averaging higher than 400 W/MHz in non-rural areas with high population density, “[p]rior to and during AT&T’s early transition from narrowband GSM to wide-band UMTS,” but that it operated at “less power per MHz” as its network evolution to UMTS advanced.¹³³

43. PSD limits of 400 W/MHz ERP in non-rural areas and 800 W/MHz ERP in rural areas—without any PFD restriction—represent an equivalent amount of power across the Cellular band when compared to existing Cellular CDMA deployments. This achieves our two-pronged goal of providing enhanced technological flexibility for Cellular carriers while protecting public safety communications from increased interference. Consistent with the Commission’s decisions for the 700 MHz Service,¹³⁴ we also find that it serves the public interest to permit Cellular Service operations at the Higher PSD Limits—up to 1000 W/MHz ERP (non-rural)/up to 2000 W/MHz ERP (rural)—with a PFD limit. This will afford Cellular carriers additional system design flexibility where, for example, increased power is needed for sites at higher elevation to achieve sufficient coverage in sparsely populated areas.¹³⁵ As explained below, this higher-PSD-plus-PFD approach will enable better broadband service in such areas without increasing the potential for unacceptable interference to public safety communications, as the PFD on the ground will be maintained at a level equivalent to that of a low site operating at lower

¹²⁹ See 47 CFR § 22.913(a) (existing rule), and Appendix A (Final Rules), § 22.913(a)(2) (revised rule). As in the case of the existing rule for non-PSD limits, we limit this rural area power increase to base stations more than 72 km (45 miles) from the Mexican and Canadian borders, consistent with our current agreements with those countries.

¹³⁰ See, e.g., 47 CFR §§ 24.232(b) (PCS), 27.50(d) (AWS).

¹³¹ The PFD limit and the seven-year transition period are discussed further below. See *infra* paras. 52-64.

¹³² See Verizon Aug. 2016 *Ex Parte* Letter at 1 (i.e., the maximum allowable ERP of 500 W divided by 1.25 MHz—the channel bandwidth used in its CDMA operations) (citing Technical Statement of Scott Townley (attached to Letter from Lachance to FCC Secretary Dortch (filed Aug. 11, 2015)), and Verizon Oct. 2015 *Ex Parte* Letter, Revised Townley Statement).

¹³³ See AT&T Aug. 2016 *Ex Parte* Letter at 1 (noting, as an example, deployment in New York City of 5 channels—4 GSM and 1 UMTS—at 500 W each, over 5.8 MHz for a total of 2500 W in a sector, averaging to 431 W/MHz).

¹³⁴ See 47 CFR §§ 27.50(b)(6), 27.55(c)

¹³⁵ Today we adopt a revised definition of “Cellular system” substantially as proposed (see *Further Notice*, Appendix B (Proposed Rules) § 22.99), but in light of our adoption of a rule that permits operations at the Higher PSD Limits, we are also deleting the existing definition’s reference to “low transmitting power.” See Appendix A (Final Rules), § 22.99.

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power.¹³⁶

44. We further conclude that the PSD limits should be applied per sector, rather than per transmitter. We are not persuaded by Verizon's argument that a PSD limit per sector may nullify the effect of MIMO techniques used in sectors.¹³⁷ First, as noted above, Verizon states on the record that its current CDMA operations are at the equivalent of a calculated PSD of "400 W/MHz for each cell sector."¹³⁸ If we were to establish the PSD limit per transmitter, then using MIMO techniques of 2X2 or 4X4 could potentially double or quadruple the total energy radiating from a cell site and would likely worsen the interference environment, which undermines one of our primary goals in this proceeding and is contrary to the public interest.

45. We disagree with Verizon and Broadpoint that a bandwidth dividing line—whether it be 1 MHz or 1.25 MHz (or some other dividing line)—is necessary for PSD operations, and we decline to adopt one. As explained below, we are providing the flexibility for Cellular licensees to operate subject to either the existing non-PSD ERP limits under Section 22.913 or the PSD option, described above, whichever is best suited to the bandwidth of the technology being deployed. Moreover, a dividing line might disadvantage certain carriers.

46. *Advance Notification Requirement at the Higher PSD Limits.* As established in the record, public safety receivers remain vulnerable to interference from Cellular licensees in the 800 MHz band, and the Higher PSD Limits could increase the potential for interference. Therefore, we are adding two important safeguards: a PFD limit and an advance notification requirement.¹³⁹ We will require every Cellular licensee preparing to activate a cell site at the Higher PSD Limits to provide a minimum of 30 days (but not more than 90 days) written advance notice to any public safety licensee then authorized in the frequency range 806-816 MHz/851-861 MHz with a base station located within a radius of 113 km of the Cellular base station to be deployed.¹⁴⁰ The written notice shall include the location, ERP PSD level, height of the transmitting antenna's center of radiation above ground level, and the timeframe for activation of the cell site, as well as the Cellular licensee's contact information, with additional parameters to be provided upon request by a public safety licensee within the 113 km radius.¹⁴¹ This notification will be for informational purposes only; the notified public safety licensee(s) will not have the right to oppose the planned Cellular operations, but could analyze the cell site's potential for interference and suggest changes before the cell is activated. The Cellular licensee will have discretion to make changes, but will remain obligated to address complaints of interference in compliance with the applicable resolution procedures in Sections 22.970-22.973 of our rules.

¹³⁶ We find that these PSD power limits also respond to concerns raised by RWA that AT&T's proposed limits of 250 W/MHz would result in reduced coverage in rural areas, as does our decision to retain the option of providers complying with current power limits for narrowband 2G GSM/EDGE services. See paras. 21 *supra* and 50 *infra*.

¹³⁷ Verizon Comments at 3.

¹³⁸ See Verizon Aug. 2016 *Ex Parte* Letter at 1 (emphasis added) (cited Verizon Technical Statements omitted).

¹³⁹ These safeguards are in addition to, and not a replacement for, the interference resolution procedures set forth in Sections 22.970-22.973 which, as explained below in Section II.B.3., we are retaining without change.

¹⁴⁰ We note that, in granting AT&T the four interim PSD waivers described above for certain of its stations in Florida, Vermont, Kansas, and Missouri, the Bureau required similar advance notice as one of the conditions. See, e.g., Missouri Waiver, 30 FCC Rcd at 10771.

¹⁴¹ This mandatory notice requirement under Section 22.913 is in addition to, and not in lieu of, any notice that a Cellular licensee may choose to provide voluntarily (see paragraphs 25-26 regarding the voluntary commitments of AT&T and Verizon), nor is it a replacement for any other information exchanges that Cellular and public safety licensees may undertake in the interest of interference avoidance.

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47. The advance notification would be required only one time. Thus, for example, if the Cellular licensee prepares to operate a cell site at a PSD level of 425 W/MHz, it will be required to provide the requisite written notice at least 30 days (but not more than 90 days) in advance of that cell site's deployment, including the data specified above. Thereafter, if the same Cellular licensee increases the ERP PSD level at that same cell site (e.g., from 425 W/MHz to 550 W/MHz), it will not be required to provide additional notice under Section 22.913. To require more than a one-time notification would impose an unnecessary burden on Cellular licensees; once notified that a particular cell site will operate above 400 W/MHz (or 800 W/MHz in rural areas), a local public safety licensee will already be in a position to identify that particular cell site as a possible source of any new interference that is encountered. We conclude that the requisite one-time notification will be yet another valuable tool to help public safety licensees assess a cell site's potential for interference and will enhance the interaction between Cellular and public safety communications operators that is so vital to co-existence in the 800 MHz band. This component of our approach thus advances our goals on which the Commission sought comment in this proceeding—to provide system design flexibility to Cellular carriers, achieve parity among competing or complementary services, and safeguard spectral compatibility with licensees in adjacent markets and adjacent bands.¹⁴² Accordingly, the revised Section 22.913 that we are adopting today includes an advance notice requirement.¹⁴³

48. We believe that multi-stakeholder efforts are crucial to harmonious co-existence between commercial broadband and public safety communications in neighboring bands. We therefore applaud the discussions that have already taken place among AT&T, Verizon, and APCO. We also applaud the resulting voluntary commitments made by AT&T and Verizon, as summarized above, particularly their commitments that will entail testing, extensive collaboration with local public safety entities, and phased PSD roll-out in select markets. We expect AT&T and Verizon to fulfill these commitments. The measures AT&T and Verizon have outlined, coupled with AT&T's experience to date in deploying PSD pursuant to the interim waivers granted by the Bureau, will be extremely important to near-term co-existence of more advanced Cellular broadband services, such as LTE, and public safety communications. We agree with AT&T and Verizon that the result will be “real-world evidence” that public safety entities can use to assess the impact of Cellular systems operating at the PSD limits we establish today.¹⁴⁴

49. We also acknowledge the additional voluntary commitment of AT&T and Verizon to give 30-day advance notice to public safety licensees when transitioning to PSD in additional markets after their planned testing and phased roll-out, as described above. This could include advance notice even for PSD operations at 400 W/MHz or less (or, in rural areas, at 800 W/MHz or less). We encourage any and all cooperation aimed at avoiding interference to public safety communications.

50. We conclude that it serves the public interest to retain non-PSD ERP limits, as proposed, for Cellular licensees that either cannot or choose not to deploy systems using a PSD model. We decline, however, to increase the existing limits. Broadpoint suggests that an increase could be beneficial, but has

¹⁴² See *Further Notice*, 29 FCC Rcd at 14144 (inviting all commenters to submit alternative proposals and ideas that would advance these goals, and also encouraging, *see id.* at 14138, public safety entities to submit comments on revising the rules to permit all Cellular licensees nationwide to use, at their option, a PSD model).

¹⁴³ See Appendix A (Final Rules), § 22.913(c).

¹⁴⁴ AT&T's most recent request for interim waiver of Section 22.913 to use a PSD model at stations in Kentucky and Tennessee (Kentucky/Tennessee Waiver Request) remains pending. See *Wireless Telecommunications Bureau Seeks Comment on AT&T Request for Waiver to Permit Power Spectral Density Model for 800 MHz Cellular Operations in Eight Markets in Kentucky and Tennessee*, WT Docket No. 15-300, Public Notice, 30 FCC Rcd 14046 (WTB MD 2015). In light of our actions today, including adoption of revised Section 22.913 to permit Cellular PSD operations in all markets nationwide, we direct the Bureau to dispose of the request as moot if AT&T fails to withdraw it.

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not demonstrated that the existing power limits are inadequate, and no other commenter has suggested that an increase is warranted. We reiterate that our goal is to provide flexibility for Cellular licensees to choose the technology that best suits their needs, while at the same time not increasing the potential for unacceptable interference, particularly to public safety communications. Increasing the non-PSD limits would likely increase unacceptable interference to public safety entities. We find that the existing Cellular power limits of 500 W ERP (non-rural) and 1000 W ERP (rural) continue to be sufficient and appropriate for the Cellular Service.¹⁴⁵ In addition, we make explicit in the rule that these non-PSD ERP limits apply per emission so as not to create ambiguity, given that we are specifying PSD limits per sector in the revised rule. Our decision to retain the existing non-PSD limits as an option will ensure that carriers using narrowband technologies such as GSM are not disadvantaged, as a requirement to use PSD could result in a power reduction in certain instances, which in turn would result in reduced coverage—a result that would be detrimental to consumers and licensees alike. Accordingly, the revised Section 22.913 that we adopt today includes the existing ERP limits of 500 W ERP/1000 W ERP and clarifies that these limits are to be applied per emission.¹⁴⁶

51. Cellular licensees will continue to be subject to the field strength limit rule adopted in the *R&O*, and thus, regardless of the location, power level, or height of the Cellular base stations, the signal level at the neighboring licensee's CGSA boundary may not exceed 40 dB μ V/m, with certain exceptions.¹⁴⁷ As we discuss below in Section II.D.2., Cellular licensees not deploying PSD operations will also continue to be subject to the coordination requirements set forth in Section 22.907 of our rules.¹⁴⁸

52. *PFD Limit at Higher PSD Limits.* As reflected in this Report and Order, we are here making decisions that further align the rules for the Cellular band with other bands used to provide competing commercial wireless services. We must, however, consider the Cellular band's unique circumstances that warrant special requirements to prevent interference. Today, we provide Cellular licensees the flexibility to operate at PSD limits above 400 W/MHz (non-rural)/800 W/MHz (rural), up to 1000 W/MHz (non-rural)/2000 W/MHz (rural), consistent with the 700 MHz Service PSD limits. At the same time, the record shows that public safety equipment remains vulnerable to interference from Cellular Service operations even in areas where rebanding has been completed. Therefore, as an additional safeguard, we are adopting a PFD limit for Cellular base transmitters and repeaters operating at the Higher PSD Limits, to remain in effect for seven years from the effective date of revised Section 22.913.

53. Specifically, we adopt a modeled PFD limit of 3000 μ W/m²/MHz at 1.6 meters above ground level, which represents the average height above ground of a public safety receiver being used by a person,¹⁴⁹ and we require that the limit be observed over at least 98 percent of the area within 1 km of each base station antenna. As explained in further detail below, to determine compliance, this limit is to be modeled using good engineering practices accounting for terrain and local conditions—at the time of

¹⁴⁵ The doubled power limits for Cellular licensees that do not deploy technologies using PSD will continue to apply only to base stations that are more than 72 km (45 miles) from the Mexican and Canadian borders, consistent with our current agreements with those countries.

¹⁴⁶ Appendix A (Final Rules), Section 22.913(a)(1)-(2).

¹⁴⁷ See 47 CFR § 22.983 (including a special provision for the Gulf of Mexico service area and also permitting licensees to negotiate a different limit that is mutually acceptable).

¹⁴⁸ 47 CFR § 22.907 (which is being revised by today's Second Report and Order).

¹⁴⁹ In describing our PFD decision and reasoning in this Second Report and Order, we use “on the ground” and “at ground level” interchangeably to mean this 1.6-meter height above ground of a public safety receiver being used by a person.

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initial deployment at the Higher PSD Limits and for any site modifications thereafter that may increase the PFD levels around the site. Factors other than ERP that contribute to the strength of PFD are antenna height, antenna down tilt, and ground elevation. Because of these factors, most sites have small “hot spots” where PFD will reach a high level in an extremely small area, making adoption of an absolute PFD limit impractical. Technical data provided by Cellular carriers depicting real-world deployment scenarios—using the existing radiated power limits—indicate that current Cellular operations produce a PFD of 3000 $\mu\text{W}/\text{m}^2/\text{MHz}$, and that this limit is not exceeded in at least 98 percent of the area within 1 km of the base station.¹⁵⁰ We therefore conclude that it is appropriate to adopt a modeled PFD limit of 3000 $\mu\text{W}/\text{m}^2/\text{MHz}$ not to be exceeded over 98 percent of the area within 1 km of the base station at 1.6 meters above ground.

54. This PFD limit will require Cellular licensees to consider very carefully the impact near the ground for each deployment at the Higher PSD Limits to ensure that the potential for interference around a Cellular base station is not increased, while affording them flexibility to deploy more advanced broadband services where the PSD limits of 400 W/MHz (or 800 W/MHz in rural areas) would not permit sufficient coverage and could result in a loss of service to consumers. Moreover, this PFD limit is consistent with the limit applicable to competing wireless systems in the 700 MHz Service.¹⁵¹

55. We disagree with Pericle-Shulman that a PFD limit should apply to non-PSD Cellular systems operating above 500 W ERP, and to non-PSD Cellular systems operating at or below 500 W ERP after receipt of an interference complaint or when replacing radio equipment or antennas.¹⁵² Imposing such a heavy new burden on Cellular licensees for their extensively deployed facilities is unwarranted. First, we are not adopting any increase to the existing non-PSD power limits, as explained above, and thus the potential for interference from systems operating at or below those limits will not increase. Second, a PFD limit is intended to limit the amount of energy from antenna sites that are closer to ground level with large down tilts, and under the current ERP limits, sites operating above 500 W ERP are located in rural areas where antennas are generally located well above ground level with very small down tilts. Third, as discussed further below, the existing interference resolution provisions in Sections 22.970-22.973 have provided a workable mechanism to address interference problems as they arise. A PFD limit as proposed by Pericle-Shulman could potentially require modification of existing Cellular systems, which might adversely affect the wireless coverage (including 911 calling) of narrowband licensees who elect to use the existing non-PSD power rules. Such a result is contrary to the public interest. In the 800 MHz rebanding proceeding, the Commission considered but declined to adopt across-the-board PFD limits for Cellular licensees under the non-PSD power limits of 500 W (non-rural)/1000 W (rural), recognizing that “the restrictions would require modifications of cells that had little, if any, potential for generating unacceptable interference.”¹⁵³ We reach the same conclusion today. For all these reasons, we decline to add a PFD component to the existing non-PSD power limits.

56. We reject Pericle-Shulman’s recommendation that we adopt a PFD limit of 625 $\mu\text{W}/\text{m}^2$ with the goal of transitioning to a PFD limit of 3000 $\mu\text{W}/\text{m}^2$ after five years¹⁵⁴ and its proposals to: (1) not allow licensees to exceed the PFD limit at *any* ground level locations within 1 km of the base

¹⁵⁰ See AT&T Aug. 2016 *Ex Parte* Letter at 2; Verizon Aug. 2016 *Ex Parte* Letter at 2. See also Verizon Oct. 2015 *Ex Parte* Letter, Revised Townley Statement at 1-2.

¹⁵¹ See §§ 27.55(b) and 27.55(c).

¹⁵² Pericle-Shulman Comments at 21; Pericle-Shulman Dec. 2015 *Ex Parte* at 4 (proposing that such cell sites “shall be corrected following notification of harmful interference by the Part 90 non-cellular 800 MHz licensee and verification of non-compliance through field measurement.”).

¹⁵³ *800 MHz Rebanding Order*, 19 FCC Rcd at 15040.

¹⁵⁴ See Pericle-Shulman June 2015 *Ex Parte* at 3.

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station; and (2) only allow non-compliance at 1 percent of locations well above ground level within 1 km of the base station.¹⁵⁵ The record indicates that the Pericle-Schulman limits are not realistic or achievable by Cellular systems even as currently deployed (non-PSD),¹⁵⁶ nor are they workable for Cellular systems that will be deployed at the PSD limits we adopt today. Cellular carriers will deploy wideband technologies such as LTE that use bandwidths of 5 MHz or more. A PFD of 625 $\mu\text{W}/\text{m}^2$ measured across 5 MHz would be equivalent to 125 $\mu\text{W}/\text{m}^2/\text{MHz}$. As stated above, technical data filed by the parties in this proceeding show that this very low PFD is already exceeded in large portions of the areas around their sites today and thus does not reflect the existing interference environment. Even at the PSD limits of 400 W/MHz (or 800 W/MHz in rural areas), which are equivalent to the existing non-PSD ERP limits, it would be difficult if not impossible to operate Cellular systems that comply with such low PFD limits, especially if they were applied as an absolute limit at any ground level location as Pericle-Shulman advocates.¹⁵⁷ Moreover, meeting the PFD limits recommended by Pericle-Shulman would require power reductions and increase the need for a higher concentration of sites, potentially increasing interference and reducing the flexibility and efficiency a PSD model is designed to afford.¹⁵⁸ Instead, we are adopting a PFD limit today that is achievable to minimize impact at ground level and avoid potentially worsening the existing interference environment.

57. We are also not persuaded by Pericle-Shulman's argument that PFD is different from PSD and cannot be specified per unit of bandwidth.¹⁵⁹ Any power or energy of a system can be stated per unit of bandwidth. We agree with Pericle-Shulman that PSD by its nature is specified with a reference bandwidth of 1 MHz, but in the interest of consistency and accuracy, we adopt the same reference bandwidth for PFD.

58. We find that requiring a measured PFD limit would be overly burdensome and also unnecessary, given that Cellular licensees are still required to resolve unacceptable interference should it occur from their operations.¹⁶⁰ A modeled PFD limit nonetheless will require the licensee to consider the amount of signal energy it is putting on the ground around its base stations to minimize the potential for large areas of interference. Cellular licensees must perform predictive modeling of the PFD values around each site prior to operating their systems at the Higher PSD Limits or, thereafter, prior to changing the parameters of these sites such that it could increase the PFD levels. The propagation model must confirm that each applicable base station meets the PFD limit over 98 percent of the area within a 1 km radius of the base station antennas, at 1.6 meters above ground.¹⁶¹ The purpose of the modeling

¹⁵⁵ Pericle-Shulman Comments at 22.

¹⁵⁶ See AT&T July 2015 *Ex Parte* Letter at App. 1 (showing the PFD value at one of its sites exceeding 25,000 $\mu\text{W}/\text{m}^2$).

¹⁵⁷ See Verizon Oct. 9, 2015 *Ex Parte* Letter, Revised Townley Statement at 2 (providing a graph showing that for the real-world representative site with the height of 50' and 9° down tilt, the PFD of 125 $\mu\text{W}/\text{m}^2$ would be exceeded in a large portion of the coverage area within 1 km of this site). See also Verizon Aug. 2016 *Ex Parte* Letter at 2 (including a chart (Table 1) depicting the results of its modeling study, which show that the PFD exceeds 3000 $\mu\text{W}/\text{m}^2/\text{MHz}$ over 1% to 2% of the ground area near some existing base stations).

¹⁵⁸ AT&T indicates that using Pericle-Shulman's recommended PFD of 625 $\mu\text{W}/\text{m}^2$ would limit the ERP for one of AT&T's Cellular base stations to only 27.5 W (see AT&T Jan. 2016 *Ex Parte* Letter at 3), which is equivalent to a PSD of 5.5 W/MHz ERP in a 5 MHz LTE system.

¹⁵⁹ See Pericle-Shulman Dec. 2015 *Ex Parte* at 2.

¹⁶⁰ See *infra* Section II.B.3.

¹⁶¹ If the predictive model does not confirm compliance with these requirements, the licensee will need to adjust base-station parameters, such as the height of the antenna, beam tilt, power, or other parameters, until confirmation of the requirements is achieved before deployment, thereby reducing the amount of signal energy on the ground

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requirement is to ensure that the Cellular licensee will consider the impact on the ground of “hot spots” when deploying at the Higher PSD Limits and will use engineering techniques to minimize those “hot spots.” Licensees must use modeling tools (software) that take into account terrain and local conditions. The model need not consider areas indoors or in buildings because this could vary widely depending on building materials. We reiterate that the PFD limit is, for the seven-year transition period, an addition to, and not a replacement for, the interference resolution process already in place under Sections 22.970-22.973 to protect public safety operations.

59. We also disagree with AT&T’s argument that, no matter the PSD limit at which a Cellular licensee is operating, no PFD limit should apply in markets “where public safety licensees do not reasonably plan to operate in the 800 MHz band.”¹⁶² AT&T has not demonstrated why such relief is necessary, and there is no evidence that an immediate exemption from the Cellular PFD limit at the Higher PSD Limits would provide benefits to consumers.¹⁶³ Our provision for operations at higher PSD limits combined with a PFD limit will accommodate cases where AT&T needs additional power—for example, systems with antennas well above street level or on mountain tops. Moreover, AT&T’s premise is speculative: the plans of public safety agencies are not known to the Commission and, even if they were known today, they would likely change with time.¹⁶⁴ Permitting Cellular licensees to deploy at the higher PSD levels without a PFD limit during our seven-year transition period could hamper launch of expanded or new 800 MHz systems by public safety entities and increase their deployment costs. For all these reasons, we find that AT&T’s proposal does not serve the public interest and, accordingly, we decline to adopt it.

60. *PFD Sunset.* We further conclude that it is appropriate to eliminate the Cellular PFD limit seven years after the effective date of the revised Section 22.913 that we are adopting today. We base our “PFD Sunset” decision on several factors. Providing technologically-neutral rules for the Cellular Service in terms of allowing radiated power that fosters efficient deployment of more advanced broadband services has been delayed for nine years since we adopted PSD models for competing CMRS licensees (PCS, AWS, and the 700 MHz Service), to allow more time for the rebanding process to evolve.¹⁶⁵ Notably, PCS and AWS licensees are not subject to any PFD limit, and 700 MHz Service licensees are not subject to a PFD limit at or below their PSD limits of 1000 W/MHz (non-rural)/2000 W/MHz (rural).¹⁶⁶ The PFD limit that we are establishing for the Cellular Service, while consistent with the Commission’s decision regarding the 700 MHz Service, is a unique requirement reflecting unique characteristics of the 800 MHz band and is designed to protect public safety licensees for a transition period that will allow for improved spectrum sharing in that band.

61. We are convinced that the formula for such co-existence must include good faith efforts on the part of Cellular (and other commercial) system operators and public safety communications operators, *as well as* device manufacturers. The seven-year period will provide a reasonable amount of

around the site.

¹⁶² See AT&T Aug. 2016 *Ex Parte* Letter at 2.

¹⁶³ AT&T has not, for example, provided evidence of the number, location, and types of sites that would require such relief.

¹⁶⁴ As explained above, we are establishing an advance notification requirement that, *inter alia*, specifies a radius of 113 km of the Cellular base station to be deployed at the Higher PSD Limits. For the purpose of AT&T’s request for additional relief here, even if we assume that 113 km is sufficient separation for purposes of examining whether public safety is currently using 800 MHz spectrum in an area, there are very few areas in the country, and virtually none that are populated, that would meet such a test based on our analysis.

¹⁶⁵ See *Streamlining 3d R&O*, 23 FCC Rcd at 5321, 5338, 5341.

¹⁶⁶ See §§ 27.50(c)(6), 27.55(b).

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time for this crucial three-way conversation, which we intend to facilitate by holding a public forum (as described further below),¹⁶⁷ with the goal of implementing important changes in equipment and practices of Cellular and public safety communications licensees alike. Given the advances in technology for commercial and public safety communications, combined with the changing interference environment as a result of the restructuring of the band launched in 2004, the Commission expects evolving capabilities from participants in all three groups of stakeholders—Cellular licensees, public safety operators, and device manufacturers.

62. Comments on the record indicate that the specialized equipment used by public safety licensees is costly given budget constraints and used for longer durations as compared to commercial wireless devices. According to APCO, many public safety 800 MHz radios were replaced as a result of the *800 MHz Rebanding Order*, which established receiver performance standards entitling public safety licensees to full interference abatement measures.¹⁶⁸ As noted above, APCO states that public safety equipment replacement cycles often run 10-20 years.¹⁶⁹ A seven-year PFD Sunset date will be approximately 20 years after release of the Commission's *800 MHz Rebanding Order*.

63. AT&T and Verizon have committed to careful deployment of their PSD operations, including PSD testing in collaboration with public safety entities, and phased roll-out. We reiterate our expectation that they will fulfill those commitments. To the extent that they elect to operate at the Higher PSD Limits in the next several years, they will be subject to the PFD limit to minimize "hot spots." With these various obligations in mind, Cellular licensees can be expected to design their PSD operations with great care, and we expect their deployment of more advanced wideband technologies to be substantially completed within the next seven years. Moreover, at the Higher PSD Limits, they will be subject to the one-time advance notification requirement (with no sunset of that rule).

64. The PSD limits we adopt today for the Cellular Service that are equivalent to the existing non-PSD power limits, with Higher PSD Limits that include an advance notification requirement, plus a transitional PFD limit (applicable at the Higher PSD Limits), and continuing obligations under Sections 22.970-22.973, all in conjunction with voluntary commitments of AT&T and Verizon for testing and phased roll-out of their PSD operations, comprise a comprehensive balanced approach to Cellular power reform that affords the Cellular licensees long-overdue technical flexibility while protecting public safety communications. The forthcoming public forum described in the next section will provide the opportunity for development of additional multi-stakeholder co-existence measures. Based on all of these considerations and comments on the record, we conclude that a seven-year PFD Sunset date is appropriate and serves the public interest.

2. Public Forum to Facilitate Multi-Stakeholder Co-existence

65. We reiterate the great weight we attach to multi-stakeholder co-existence efforts—good

¹⁶⁷ See *infra* Section II.B.2.

¹⁶⁸ See 47 CFR §§ 22.970-22.973 (also explaining the adjustments to full protection if a public safety licensee uses different equipment).

¹⁶⁹ Twenty years is notably longer than the standard measures of useful life for commercial devices, and notably longer than the depreciation timetable allowed for commercial wireless communications equipment under U.S. tax law. The Consumer Electronics Association estimates the life expectancy of the average cell phone to be 4.7 years. Consumer Electronics Association, *The Life Expectancy of Electronics*, <https://www.cta.tech/News/Blog/Articles/2014/September/The-Life-Expectancy-of-Electronics.aspx> (last visited September 20, 2016). For tax purposes, the U.S. Internal Revenue Service allows depreciation of wireless assets such as computer-based switching equipment, base station controllers, radio network controllers, and related assets over a period of either five years (general depreciation system specified under I.R.C. § 168(a)) or nine and a half years (alternative depreciation system specified under I.R.C. § 168(g)). See Rev. Proc. 2011-22, 2011-18 I.R.B. 737.

faith efforts to work through these important issues by Cellular licenses, public safety entities, and public safety equipment manufacturers alike. While we are encouraged by the discussions that the two major Cellular carriers, AT&T and Verizon, have already held with APCO, and we commend the voluntary commitments made by AT&T and Verizon, it is clear from the record discussed above that additional dialogue is crucial to resolving the lingering problems of unacceptable interference to public safety receivers—without hindering spectral efficiency and technological advances in the Cellular Service. Consistent with our multipronged approach in this proceeding, to foster the three-way conversation among Cellular carriers, public safety entities, and manufacturers of public safety equipment, the Commission hereby directs the Bureaus to work together to organize and conduct a public forum that brings together representatives of all three stakeholder groups.

66. This forum shall be convened by the Bureaus no later than one year following release of today's Second Report and Order. We direct the Bureaus to invite a broad array of stakeholders, including carriers with significant nationwide Cellular operations, as well as Cellular rural carrier representatives, public safety representatives, including the key public safety associations, and the leading public safety equipment manufacturers. We defer, however, to the Bureaus concerning development of the full list of invitees, format, and specific date of the forum. A forum attended by licensees, engineers, manufacturers, Cellular carriers, and any others (as determined by the Bureaus) who have first-hand experience with interference cases will focus attention on what has been achieved, what remains to be done, and how it can be accomplished.

67. Equipment manufacturers are not currently subject to Commission rules that mandate particular standards for public safety equipment. Nonetheless, we are disappointed that such equipment has not improved to the extent necessary to filter out the undesired 800 MHz Cellular (or ESMR) signals over the past 12 years since we adopted the *800 MHz Rebanding Order* and identified the problem of deficient receivers.¹⁷⁰ We expect these radio manufacturers to be part of the conversation now—and particularly encourage them to participate in the public forum to explain why receivers with better interference rejection features are not available to public safety users at affordable prices, and to present practical options and potential steps for improving interference rejection in public safety devices. We also expect public safety equipment purchasers to specify interference rejection (SSIM in particular)¹⁷¹ in their requests for proposal for new radio systems,¹⁷² putting manufacturers in a position to respond to these specifications and requirements. The public forum is one way to educate public safety users so they can become savvier purchasers of communications equipment. Cellular licensees likewise need to be open to developing and executing best practices for site selection and coordination with public safety entities when they deploy PSD operations.

68. The Commission's Technological Advisory Council (TAC) recently recommended specific principles to be applied when developing policy and technical service rules where there are conflicting adjacent band interests and the risk of interference.¹⁷³ The TAC has also recommended to the

¹⁷⁰ The susceptibility of radios to strong signal interference is not a function of filter selectivity alone. It also is affected, *inter alia*, by the transfer characteristics of the first RF amplifier stage in the radio—its IP3 (third order intercept) rating. Cripps, S., *RF Power Amplifiers for Wireless Communications*, 2 ed., pp 237-238.

¹⁷¹ See *supra* para. 28.

¹⁷² See, e.g., Pericle-Shulman June 2015 *Ex Parte* at 6.

¹⁷³ See Spectrum and Receiver Performance Working Group of the FCC Technological Advisory Council, *Basic Principles for Assessing Compatibility of New Spectrum Allocations – A White Paper* (2015), <https://transition.fcc.gov/bureaus/oet/tac/tacdocs/meeting121015/Principles-White-Paper-Release-1.1.pdf>.

(continued...)

Commission the use of more quantitative interference risk assessment.¹⁷⁴ The TAC proposed these principles following its recommendations of interference limits, on which the Commission sought public comment in ET Docket No. 13-101—a proceeding referenced by parties in this Cellular Reform proceeding. While the Commission has not sought comment on public safety receiver standards in the instant proceeding, we encourage the stakeholders in the public forum to address the adequacy of industry standards to ensure reliable receiver performance in strong signal conditions, to assess quantitatively the interference risks of degraded receiver performance, and to consider the applicability of the TAC’s key recommendations.

69. Following the public forum, all three stakeholder groups will have ample time remaining before the PFD Sunset date to implement necessary changes to enable better co-existence thereafter in the band. AT&T and Verizon have committed to report on progress in their planned PSD testing and phased roll-out. We direct the Bureaus to seek an update on progress from all three stakeholder groups no later than four years from the release of today’s Second Report and Order, and we encourage all stakeholders to share their experiences on spectrum sharing in the band throughout the seven-year transition period.¹⁷⁵ We believe that the rules and expectations established in this Second Report and Order, including the PFD Sunset schedule, will serve the public interest by balancing the needs of all parties and the important services they provide to their customers and to the public.

3. Retention of Part 22 Interference Resolution Rules and Procedures

70. *Background.* In the *Further Notice*, the Commission sought comment on whether PSD limits can be adopted for the Cellular Service (consistent with our actions regarding other CMRS) with the assurance that any unacceptable interference to public safety or other entities will be appropriately addressed pursuant to the interference resolution provisions adopted for the Cellular Service in the *800 MHz Rebanding Order*, i.e., Sections 22.970-22.973.¹⁷⁶ The Commission did not propose any changes to those provisions. Pericle-Shulman argues that we should add a new provision to Section 22.973 to require a Cellular “Broadband Licensee” that causes interference to an 800 MHz public safety radio system to reimburse public safety licensees for “reasonable costs expended to locate and mitigate the interference.”¹⁷⁷ Otherwise, Pericle-Shulman alleges, “the carrier has every incentive to engage in a lengthy, drawn out process, creating a war of attrition and potential public relations battle with the municipality,” as the public safety agency bears the burden of gathering the evidence and coordinating the mitigation effort, requiring outside engineering and legal assistance.¹⁷⁸

¹⁷⁴ See Spectrum and Receiver Performance Working Group of the FCC Technological Advisory Council, A Quick Introduction to Risk-Informed Interference Assessment (2015), <https://transition.fcc.gov/bureaus/oet/tac/tacdocs/meeting4115/Intro-to-RIA-v100.pdf>.

¹⁷⁵ We direct the Bureau to select the most appropriate mechanism by which stakeholders may file such comments and progress reports (e.g., a new docket opened specifically for that purpose) and to issue a Public Notice announcing the mechanism.

¹⁷⁶ *Further Notice*, 29 FCC Rcd at 14143-44 (citing 47 CFR §§ 22.970-22.973).

¹⁷⁷ Pericle-Shulman Dec. 2015 *Ex Parte* at 5 (including in the proposed new rule the following sentence: “Disputes between the parties regarding such costs shall be determined by the Chief, Public Safety and Homeland Security Bureau.”) Pericle-Shulman uses, but does not propose a definition of, the term “Broadband Licensee” for the purposes of its proposed revised rule. The term is not otherwise defined in the Cellular Service rules nor in 47 CFR § 22.99 (Part 22 Definitions). Pericle-Shulman proposes similarly amending the Part 90 interference mitigation rules, which essentially mirror the provisions of 47 CFR §§ 22.970-22.973, at 47 CFR §§ 90.672-90.675. See Pericle-Shulman Comments at 17. The Part 90 rules are not at issue in this proceeding.

¹⁷⁸ Pericle-Shulman Comments at 17 (citing as an example the abatement work which, it alleges, has thus far cost the City of Oakland “several hundred thousand dollars (not including Harris costs)”). Pericle-Shulman stresses that

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71. APCO similarly supports amending Sections 22.970-22.973 to require that Cellular licensees bear “the direct and indirect expenses incurred by public safety licensees in attempting [to] address interference” caused by Cellular licensees.¹⁷⁹ It argues that rebanding was and in some areas continues to be “a major drain on scarce public safety agency resources and personnel . . . often forced to divert attention away from critical communications projects,” and that “all forms of interference to public safety systems have the potential to endanger the safety of first responders and the public they serve.”¹⁸⁰ NPSTC also advocates that we make those changes, contending that, even when steps are taken to address incidents of interference, “public safety can incur significant unfunded costs in the process of working with a Cellular licensee to investigate and resolve the situation,” and if higher power levels are adopted, “it is likely that interference situations . . . will increase, making recovery of legitimate costs incurred even more critical.”¹⁸¹

72. Both AT&T and Verizon object to any requirement that Cellular licensees compensate public safety entities for their costs of dealing with interference complaints.¹⁸² They contend that identifying and mitigating sources of interference to public safety entities is a shared responsibility between Part 22 and Part 90 licensees and that Cellular licensees already incur costs to address such complaints.¹⁸³ AT&T further argues that it would be unjust to make Cellular licensees bear not only their own costs but also the costs to public safety entities of reacting to interference that is, “at least in part, often a consequence of public safety’s decision to not upgrade to newer devices with more robust designs.”¹⁸⁴

73. *Discussion.* We decline to adopt Pericle-Shulman’s proposed addition to Section 22.970, as endorsed by APCO and NPSTC, whereby a Cellular licensee that is found to have caused interference to an 800 MHz public safety radio system would be required to reimburse public safety licensees for “reasonable costs expended to locate and mitigate the interference.”¹⁸⁵ The number of interference complaints lodged by public safety entities against Cellular and ESMR carriers via the 800 MHz Interference Notification Site has been steadily declining.¹⁸⁶ While Pericle-Shulman broadly questions Cellular licensee incentives to cooperate,¹⁸⁷ other public safety commenters state that Cellular carriers have been cooperative in addressing interference complaints.¹⁸⁸

74. We recognize that identifying sources of interference is burdensome to public safety

the problem is not confined to Oakland and notes its awareness of interference complaints in other jurisdictions, including Arvada, CO, El Paso County, CO, Ann Arbor, MI, Orange County, CA, Seattle, WA, and Charleston, SC.

¹⁷⁹ APCO Reply Comments at 3.

¹⁸⁰ *Id.* at 2.

¹⁸¹ NPSTC Reply Comments at 5.

¹⁸² AT&T Jan. 2016 *Ex Parte* Letter at 3; Verizon Reply Comments at 5.

¹⁸³ *See* AT&T Jan. 2016 *Ex Parte* Letter at 3; Verizon Reply Comments at 5.

¹⁸⁴ AT&T Jan. 2016 *Ex Parte* Letter at 4.

¹⁸⁵ Pericle-Shulman Dec. 2015 *Ex Parte* at 5.

¹⁸⁶ Complaints filed via the 800 MHz Interference Notification Site have steadily decreased from a high of over 400 interference incidents reported in the year 2010 to just 20 in the year 2015. There has been a slight increase to 40 interference incidents reported in 2016 as of November 16th. The slight increase could be the result of more stringent interference-protection standards going into effect as additional NPSPAC regions complete rebanding. *See 800 MHz Rebanding Supplemental Order*, 19 FCC Rcd at 25137-38.

¹⁸⁷ *See* Pericle-Shulman Comments at 17.

¹⁸⁸ *See* Port Authority *Ex Parte* Letter at 2; State of Connecticut *Ex Parte* Letter at 3.

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entities. We also recognize that certain areas of the country such as Oakland are unusually troublesome in terms of unacceptable interference to public safety operations. At the same time, we recognize that Cellular licensees themselves incur costs to investigate and address complaints, including those that are determined to arise from non-Cellular operations.¹⁸⁹ We also know that Sections 22.970-22.973 were carefully crafted based on the extensive record compiled in the 800 MHz rebanding proceeding, and those provisions establish shared responsibility between Part 22 and Part 90 licensees. In the instant proceeding, we have exercised care to ensure that the burdens and responsibilities remain shared and balanced.

75. We conclude that any future unacceptable interference to public safety or other entities that occurs as a result of Cellular operations, including PSD operations, will be appropriately addressed pursuant to the Part 22 interference resolution provisions adopted in the *800 MHz Rebanding Order*. Accordingly, we retain the existing Sections 22.970-22.973 without change. We emphasize that the obligations set forth in those provisions will continue to apply notwithstanding the new requirements that we establish under revised Section 22.913 including, when applicable, advance notification and the PFD limit.

4. Revision of Section 22.911 to Accommodate PSD Systems

76. *Background.* In the context of considering the adoption of a PSD model for the Cellular Service, the Commission sought comment in the *Further Notice* on how to ensure a technologically-neutral application of the formula for calculating the SAB and CGSA boundary, set forth in Section 22.911 of our rules.¹⁹⁰ As explained there, changing the value of “P” in the formula could have a significant impact on the CGSA-expansion process because, with a PSD model, P could be increased dramatically, depending on the occupied bandwidth and the specific PSD value. The Commission expressed concern that revising Section 22.913 to include a PSD model without some form of normalization reflected in Section 22.911 could unfairly penalize licensees using narrowband technologies and thus would not serve the public interest.¹⁹¹ It tentatively concluded that, if it were to adopt a PSD model for the Cellular Service in this proceeding, it should establish some method to allow P in the formula to vary so as to equalize the effects of PSD when applying for Unserved Area to expand a CGSA, or when extending an SAB into Unserved Area and providing service on a secondary basis.¹⁹²

77. The *Further Notice* did not propose a specific normalization method, but presented various options, including the possibility of adding a separate formula to Section 22.911 for use by those licensees that opt to use the PSD model in measuring their ERP.¹⁹³ The Commission sought comment on the issues raised and invited suggestions on how to address the contour calculations under Section 22.911 so that applicants seeking to establish new Cellular systems or expand existing systems into Unserved Area are treated on par with one another, regardless of the technology they choose and regardless of whether they use the PSD model or operate using the non-PSD ERP limits.¹⁹⁴

¹⁸⁹ See AT&T Jan. 2016 *Ex Parte* Letter at 3; Verizon Reply Comments at 5.

¹⁹⁰ *Further Notice*, 29 FCC Rcd at 14151; 47 CFR § 22.911. The existing Section 22.911 sets forth the formula for calculating the SAB of an individual cell site in terms of distance from the cell’s transmitting antenna, using height above average terrain (H) and ERP (P) values of a proposed new or modified Cellular base station along eight cardinal radials. It is designed to establish a uniform license boundary determination method.

¹⁹¹ *Further Notice*, 29 FCC Rcd at 14151.

¹⁹² *Id.*

¹⁹³ *Id.*

¹⁹⁴ *Id.*

(continued...)

78. Verizon argues that changing the definition of P in the SAB and CGSA contour formula is unnecessary if the Commission adopts the technologically neutral “dBW/m²/MHz PFD field strength measurement” that Verizon advocates.¹⁹⁵ Absent adoption of its proposed change to the field strength limit measurement, Verizon argues, changing the definition of P to W/MHz “would be an equivalent and necessary means of achieving the same goal,” albeit not the better approach in its view.¹⁹⁶ Verizon further argues that the FCC should “re-interpret the formula” used to determine the SAB and CGSA in conjunction with adopting PSD limits by “substituting transmitter PSD for ERP, and interpreting the result in terms of [power flux spectral density] measured across bandwidth instead of dBμV/m (field strength).”¹⁹⁷ AT&T proposes that, instead of using the current formula in Section 22.911(a) for calculating the SAB and CGSA for base stations that use PSD, the calculation should be based on a 32 dBμV/m contour (equivalent to -104 dBm,) and should be depicted “using an industry standard calibrated predictive propagation model.”¹⁹⁸

79. *Discussion.* Cellular licensees have continued to expand their CGSAs to provide additional coverage, but the Cellular Service is a mature service with little Unserved Area remaining, and most of it is in rural areas in the western United States and Alaska.¹⁹⁹ Moreover, since our adoption of the revised Cellular licensing rules in the *R&O*, particularly Section 22.949 which establishes a minimum coverage requirement of 50 contiguous square miles for a CGSA expansion application,²⁰⁰ the volume of CGSA-expansion applications has dropped significantly.²⁰¹ The current formula in Section 22.911(a) has been the basis for determining the SAB of cell sites and the protected licensed area (CGSA) since the inception of the Cellular Service and remains an effective tool for predicting reliable signal coverage for narrowband technologies. Under these circumstances, for Cellular licensees that do *not* elect to use the PSD model, we conclude that it serves the public interest to retain the existing formula in Section 22.911(a) without change, rather than requiring such licensees to change their long-standing methodology for determining their SABs and CGSA boundaries.

80. However, for Cellular licensees that elect to use PSD to deploy LTE and other more advanced mobile broadband technologies, we agree that the formula in Section 22.911(a) is not practical, as the result would be much larger SABs and CGSAs that would not accurately reflect service coverage. Section 22.911(b) currently sets forth an alternative CGSA determination methodology to depict Cellular service coverage that departs from the licensed geographic area (by a significant amount—specifically, by “±20% in the service area of any cell”) where reliable Cellular service is actually provided.²⁰² We find that adapting the Section 22.911(b) methodology essentially as AT&T proposes—to require a predictive propagation model that takes into account terrain and other local conditions, based on the 32 dBμV/m contour—is appropriate for the purposes of calculating SABs and determining CGSA expansion areas for base stations that operate using PSD. For such base stations, we will require that the SAB be defined in

¹⁹⁵ Verizon Comments at 12. In Section II.C.2., below, we discuss Verizon’s argument regarding the field strength limit rule (Section 22.983) and explain why we decline to make changes to that rule at this time.

¹⁹⁶ Verizon Comments at 12.

¹⁹⁷ Verizon Oct. 2015 *Ex Parte* Letter, Revised Townley Statement at 3. This alternative approach entails a linear conversion of units using the following formula: dBμV/m/MHz - 146 = dBW/m²/MHz.

¹⁹⁸ AT&T Oct. 2015 *Ex Parte* Letter at 3.

¹⁹⁹ See *R&O*, 29 FCC Rcd at 14117; *NPRM*, 27 FCC Rcd at 1749.

²⁰⁰ *R&O*, 29 FCC Rcd at 14115; 47 CFR § 22.949.

²⁰¹ See also *infra* Section II.E.5. (reporting, in the context of the Commission’s frequency coordination decision, recent application volume data).

²⁰² 47 CFR § 22.911(b).

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terms of distances from the cell site(s) to the 32 dB μ V/m contour along the eight cardinal radials, consistent with SAB calculations under the existing rule.²⁰³ The distances used for the cardinal radials must be representative of the coverage within the 45° sectors. We conclude that this approach will result in accurate coverage calculations when operating a cell site using PSD, and thus serves the public interest.

81. If this methodology yields an SAB extension comprising at least 50 contiguous square miles, *regardless* of whether the CGSA departs ± 20 percent in the service area of any cell site, the Cellular licensee will be required to file an application for major modification of the CGSA using FCC Form 601. The applicant will be required to submit its CGSA determination pursuant to the new provisions of Section 22.911(c), depicting the CGSA using a predictive model as described above. If the predictive model results in calculations that depict an SAB extension comprising less than 50 contiguous square miles, the licensee may not claim the area as part of its CGSA; it may provide service in the extension area on a secondary basis only. No application should be filed (and we will not process any such application that is filed) in that scenario.

82. Accordingly, we adopt a revised Section 22.911 establishing the above-described predictive model to be used solely to determine the SABs and CGSA boundaries of cell sites operated using PSD.²⁰⁴ We also make certain conforming changes and updates to Section 22.911, including clarification that existing Sections 22.911(a) and 22.911(b) apply solely to Cellular non-PSD operations.²⁰⁵

5. Height-Power Limit—Exemption for PSD Systems

83. *Background.* Section 22.913(b) currently limits the height of a base station antenna: the ERP may not exceed an amount that would result in the average distance to the SAB being 79.1 km for licensees authorized to serve the Gulf, 40.2 km for all other licensees.²⁰⁶ Section 22.913(c) currently provides an exemption from the height-power limit if the licensee coordinates with, and obtains concurrence from, all co-channel licensees within 121 km.²⁰⁷ In the context of the proposal to permit the use of PSD in the Cellular Service, the Commission sought comment in the *Further Notice* on whether and how to amend the Cellular height-power limit and exemption provisions of Sections 22.913(b) and (c).²⁰⁸

84. AT&T states that in its experience, the height-power limit “is a non-factor in the vast majority of deployments” and could be deleted or, alternatively, retained unchanged.²⁰⁹ It suggests that in situations where the limit might be exceeded, such that coordination would be required under the existing

²⁰³ AT&T and Verizon both propose that the SAB/CGSA determinations for Cellular PSD systems be based on a contour, but they differ in that AT&T specifies the parameter in terms of field strength (measured in μ V/m), and Verizon proposes that the contour be based on power spectral flux density (measured in dBW/m²/MHz). While both arguments have merit, we are adopting AT&T’s approach in the interest of consistency with SAB calculations under the existing rule.

²⁰⁴ See Appendix A (Final Rules), § 22.911(c).

²⁰⁵ See *id.*, § 22.911. The updates include deletion in paragraph (d) of the reference to “capture of subscriber traffic,” and deletion of paragraph (e) as unnecessary, as “Unserved Area” is a defined term in Section 22.99.

²⁰⁶ 47 CFR § 22.913(b) (existing rule). As discussed above, Section 22.911 sets forth the formula for calculating the SAB, using height above average terrain (H) and ERP (P) values of a Cellular base station along eight cardinal radials. An installation with large numbers for H and P could therefore produce a large SAB contour. See 47 CFR §§ 22.911(a).

²⁰⁷ 47 CFR § 22.913(c) (existing rule).

²⁰⁸ *Further Notice*, 29 FCC Rcd at 14147.

²⁰⁹ AT&T Comments at 18.

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provision in Section 22.913(c), “coordination is already required by [Section 22.907].”²¹⁰ CTIA also argues that the height-power limit is no longer necessary.²¹¹ Verizon supports deletion of the height-power limit provisions on grounds that the field strength limit adopted in the *R&O* adequately limits SABs, making height-power limits unnecessary. No other commenter addressed this issue.

85. *Discussion.* The Cellular height-power rule was developed to ensure that the average distance to the SAB does not exceed certain limits, and thus prevents excessively large SABs that could otherwise result from the SAB calculation using the formula in Section 22.911(a). Although we acknowledge, consistent with AT&T’s experience, that the distance to the SABs of many Cellular base stations would not exceed the limits specified in the height-power rule, the existing provision recognizes that the limits might well be exceeded in some instances, especially in the case of narrowband technologies. As explained above, we are retaining the Section 22.911(a) formula to be used by Cellular licensees deploying narrowband systems (i.e., licensees not electing to use the PSD model) or operating in the Gulf service area.²¹² We therefore conclude that the height-power rule continues to serve the public interest as applied to such licensees. Likewise, we find that the exemption in existing Section 22.913(c) continues to afford such licensees flexibility when they coordinate with, and obtain the concurrence of, all co-channel licensees within 121 km.²¹³ We disagree with Verizon that the Cellular field strength rule obviates the need for the existing provisions in Sections 22.913(b) and (c). Section 22.983 (the Cellular field strength limit rule) is uniquely tailored to reflect the fact that Cellular licensees may continue to expand their CGSAs, and CGSA boundaries do not typically coincide with defined market boundaries. A Cellular licensee is required to observe the field strength limit at every point along its neighbor’s CGSA, and not necessarily at its own CGSA boundary.²¹⁴ With adoption of that rule, the Commission concluded there was no longer a need to regulate SAB extensions into neighboring CGSAs.²¹⁵ Nonetheless, in the absence of the height-power limit, SABs calculated under Section 22.911(a) could still potentially be excessively large. As noted above, the height-power rule was developed to prevent such large SABs, and it will continue to serve this important purpose for licensees deploying narrowband systems (i.e., not electing to use the PSD model) or operating in the Gulf service area.

86. However, we have determined that the Cellular height-power rule is not appropriate for systems that are operated using PSD. With our adoption of a predictive model requirement for SAB and CGSA calculations under Section 22.911(c), as explained above, Cellular licensees that operate their cell sites pursuant to the PSD limits will not be calculating their service area using the existing formula in Section 22.911(a).

87. Accordingly, we retain the height-power limit and coordination exemption provisions for licensees deploying narrowband systems, but we now exempt licensees operating their systems using PSD. We also change the title of existing Section 22.913(c) to “Exemptions from height-power limit,”

²¹⁰ *Id.* (citing 47 CFR § 22.907).

²¹¹ CTIA Reply Comments at 8.

²¹² *See infra* Section II.B.4. In competing wireless services such as PCS, AWS, and the 700 MHz Service, there is no SAB calculation.

²¹³ We disagree with AT&T that the domestic coordination provision in Section 22.907 obviates the need for the exemption provided in existing Section 22.913(c), which, unlike Section 22.907, includes the concurrence requirement.

²¹⁴ 47 CFR § 22.983.

²¹⁵ *See* 47 CFR § 22.912. Moreover, in adopting Section 22.983 and revised Section 22.912 in the *R&O*, the Commission preserved the existing regime in the Gulf of Mexico Cellular service area, such that the field strength limit does not apply in that area and SAB extension agreements continue to be required under certain circumstances. *See id.* §§ 22.912(c), 22.983(b).

(continued....)

and we renumber paragraphs (b) and (c) to accommodate the provisions concerning PSD and PFD limits and related measurement provisions, described above.²¹⁶

C. Promoting the Consistency of Cellular Technical and Operational Rules with Those of Other CMRS Services

88. In addition to changes to the Cellular power-related rules discussed above, we find it in the public interest to revise additional technical and licensing rules that will further assist licensees in their efforts to deploy advanced services in the Cellular spectrum. Reforming these rules will result in obligations for Cellular licensees that are comparable to those applicable to licensees of flexible use spectrum, thereby helping Cellular licensees to be more competitive in the deployment of new technologies.

1. Power Measurement: Peak vs. Average/Peak-to-Average Ratio

89. *Background.* Section 22.913 does not specify how power is to be measured in the Cellular Service, i.e., peak or average power. Digital modulation techniques often produce instantaneous short-duration spikes such that the overall power of the emission is lower under average power measurement compared to peak measurement. In revising the radiated power rules for PCS and AWS, the Commission concluded that, for non-constant envelope technologies such as CDMA, W-CDMA, and OFDM, limiting PCS and AWS power on an average basis would more accurately predict the interference potential for such technologies.²¹⁷ The Commission further found that measurement of average power for PCS and AWS operations must be made during a period of continuous transmission based on a 1 MHz resolution bandwidth.²¹⁸ Because the average power approach allows for emissions higher than those under peak power limits, the Commission also concluded that it would serve the public interest to adopt a peak-to-average ratio (PAR) limit to mitigate the potential for undesirable interference that could result otherwise.²¹⁹ The current rules for PCS and AWS reflect these various measurement decisions.²²⁰

90. The *Further Notice* sought comment on how to craft the Cellular power measurement rules to accommodate the various technologies used in the band and others that may be used in the future.²²¹ The Commission tentatively concluded that, to account for the characteristics of digital modulation techniques, Cellular radiated power limits—both the current non-PSD limits proposed to be maintained as an option for narrowband technologies, and the PSD limits proposed as an option for wideband technologies—should be measured in terms of maximum average power as measured with a root mean square (rms) power averaging detector.²²² It explained that averaging under the proposal would be permitted only over the various power levels associated with different symbol states while the device is

²¹⁶ See Appendix A (Final Rules), § 22.913(e)-(f).

²¹⁷ *Streamlining 3d R&O*, 23 FCC Rcd at 5337. The record there demonstrated that using peak power measurements for non-constant envelope technologies inaccurately suggested a much higher overall operational power, compared to average power levels, due to short duration power spikes. See *id.* at 5335.

²¹⁸ *Id.* at 5337 (explaining also that parties are to consult with FCC Laboratory staff for guidance on the appropriate method of measuring average power for particular technologies). Recommended measurement procedures are available at the FCC Laboratory's Knowledge Database website (www.fcc.gov/labhelp).

²¹⁹ *Streamlining 3d R&O*, 23 FCC Rcd at 5337. See also *April 700 MHz Order*, 22 FCC Rcd at 8103-04; *August 700 MHz Order*, 22 FCC Rcd at 15417-18.

²²⁰ See 47 CFR §§ 24.232(d) (PCS), 27.50(d) (AWS) (specifying power in terms of average power with a PAR limit).

²²¹ *Further Notice*, 29 FCC Rcd at 14148-49.

²²² *Id.* at Appendix B (Proposed Rules), § 22.913(b).

(continued...)

transmitting at maximum power levels (i.e., averaging during any transmitter quiescent periods or reduced power transmissions would not be permitted). The *Further Notice* also proposed to specify that power should be measured with a resolution bandwidth, and sought comment on what that resolution bandwidth should be.²²³

91. In addition, the Commission asked in the *Further Notice* whether, with an average power requirement for Cellular licensees, it should be accompanied by a PAR limit, consistent with the Commission's rules adopted for PCS and AWS.²²⁴ It proposed that, in the event of adoption of a PAR limit to be applied over an emission's bandwidth, the limit would apply to the highest peak power density relative to the highest average power density measured over the entire occupied bandwidth.²²⁵

92. Finally, the *Further Notice* proposed that, in the event of adoption of a PAR limit for the Cellular Service, the ratio should be specified on a statistical basis to reflect the fact that the peak power of a "noise-like" signal is a statistical parameter (e.g., the PAR must comply with the limit 99 percent of the time), noting that for PCS, the PAR limit is set at 13 dB.²²⁶ The Commission sought comment on all aspects of applying a PAR to the Cellular band, including whether 13 dB or some other value is the most appropriate limit for Cellular licensees. It urged all interested parties, including not only Cellular licensees but also licensees in the immediately adjacent bands, equipment manufacturers, and entities that test Cellular equipment, to provide comments on these questions.²²⁷

93. AT&T agrees with the proposal to measure base station transmitter power using average power "as measured with [an rms] power averaging detector," arguing that this is "relatively straightforward and avoids the need to consider peak signals."²²⁸ Verizon asserts that it would be "neither necessary nor useful to specify a resolution bandwidth beyond simply specifying 'channel power.'"²²⁹ NPSTC argues that the Commission should adopt power limits using peak, not average, power limits.²³⁰ Noting that measurement standards (e.g., TIA-603-D) were normally developed under the assumption that interfering signals would have a PAR of one, NPSTC states that, "[i]n practice, newer generation . . . signals such as LTE have high [PARs]," and that semiconductors in receivers "likely react to peak power, not average power, when [IM] products are created."²³¹ APCO similarly argues that the PAR of interference signals should be considered because newer technologies such as LTE, which it asserts have high PARs, are "more likely to create [IM] products that cause interference to nearby receivers."²³² No commenter suggested a specific PAR for the Cellular Service in response to the *Further Notice*.

94. *Discussion.* Because the peak power associated with a noise-like signal is a random

²²³ *Id.* at 14148.

²²⁴ *Id.* at 14149.

²²⁵ *Id.*

²²⁶ *Id.* (citing 47 CFR § 24.232(d) (PCS)).

²²⁷ *Id.* at 14150.

²²⁸ AT&T Reply Comments at 4.

²²⁹ Verizon Comments at 11. *See also* AT&T Reply Comments at 4 (stating that specifying a resolution bandwidth "would add unnecessary complications to the power calculations and offset the benefits from measuring base station power based on average power").

²³⁰ NPSTC Reply Comments at 5-6 (stating, at 5, that the "[PAR] of interfering signals should be considered when specifying both the environment and the method to test for compliance").

²³¹ NPSTC Reply Comments at 5.

²³² APCO Reply Comments at 4.

(continued...)

variable, it can place unachievable requirements on the measuring instrumentation (e.g., a resolution/measurement bandwidth that exceeds the signal bandwidth).²³³ The same non-constant envelope technologies used for PCS and AWS—such as CDMA, W-CDMA, and LTE—have been or will be used in the Cellular Service as well. Consistent with Commission decisions to permit licensees to meet radiated power limits on an average basis for PCS and AWS,²³⁴ as well as for other flexible wireless services, including the 700 MHz services (both commercial and public safety broadband),²³⁵ we conclude that Cellular power limits should be measured on the basis of average power as proposed in the *Further Notice*.

95. In connection with adopting the average power measurement provision for PCS and AWS, the Commission also adopted a PAR limit of 13 dB.²³⁶ We find that adopting a PAR limit of 13 dB for the Cellular Service would better enable the use of technologies such as LTE, and that it strikes the right balance between enabling licensees to use modulation schemes with high PARs and protecting other licensees from high PAR transmissions.²³⁷ Coupled with the average power measurement we are adopting, as described above, a 13 dB PAR limit furthers our goal of facilitating the deployment of advanced technologies such as LTE in the Cellular Service band, while limiting the potential for unacceptable interference that might result from high PAR transmissions. We disagree with NPSTC that we should adopt power limits using peak power because this approach would hinder Cellular broadband deployments. Spikes are inevitable, but the PAR limit in conjunction with the PFD limit we adopt today takes this into account and addresses NPSTC's concern.

96. Accordingly, the revised Section 22.913 specifies that Cellular power shall be measured on an average basis and establishes a PAR limit of 13 dB.²³⁸ Additionally, as in the rule governing PCS measurements,²³⁹ the revised Section 22.913 specifies that measurement of average power for Cellular operations must be made during a period of continuous transmission based on Commission-approved average power techniques. Licensees should consult the FCC Laboratory's Knowledge Database (KDB) website regularly for the latest recommended procedures concerning Commission-approved average power measurement techniques.²⁴⁰ Our approach will ensure that the correct procedures are used for various technologies that are deployed or will be deployed in the future in the Cellular Service, such as GSM, CDMA, UMTS and LTE, and achieves our important goal of harmonizing, where possible, various commercial wireless service rules.

2. Field Strength Measurement

97. *Background.* In the *R&O*, the Commission adopted a new rule—Section 22.983—establishing a field strength limit of 40 dB μ V/m, and explained that the limit must be observed at every point along the neighboring licensee's CGSA, taking into account that some licensees' CGSAs are

²³³ See *Further Notice*, 29 FCC Rcd at 14148 n.285 and accompanying text.

²³⁴ *Streamlining 3d R&O*, 23 FCC Rcd at 5337.

²³⁵ *April 700 MHz Order*, 22 FCC Rcd at 8103-04; *August 700 MHz Order*, 22 FCC Rcd at 15417-18.

²³⁶ See 47 CFR §§ 24.232(d) (PCS), and 27.50(d) (AWS).

²³⁷ LTE employs a number of solutions, both theoretical and practical, that can be used to substantially mitigate the effects of the PAR such as interleaved sub-carrier schemes that are currently being implemented in LTE networks.

²³⁸ See Appendix A (Final Rules), § 22.913(d).

²³⁹ See 47 CFR §§ 24.232(d)-(e).

²⁴⁰ Recommended measurement procedures are available at the FCC Laboratory's KDB website (www.fcc.gov/labhelp).

(continued...)

adjacent to Unserved Area.²⁴¹ It sought comment in the *Further Notice* on whether the field strength limit can be applied in a technologically neutral fashion, or whether it should adopt a specific bandwidth for field strength measurements or some other limit or metric at the license boundary.²⁴² The Commission did not propose a specific measurement bandwidth, but noted that, with the introduction of power flexibility in the Cellular band, licensees could be deploying different technologies with emission bandwidths ranging from 200 kHz to 10 MHz.²⁴³

98. Verizon argues that the Commission should “change the field strength rules (for *all* bands)” to the methodology used in international border agreements between the United States and Canada and Mexico, “which specify border field strength levels in terms of power flux density measured as dBW/m²/MHz”—a methodology Verizon claims is “both technologically neutral and familiar to licensees operating near international borders.”²⁴⁴ Verizon does not propose a specific value that would be appropriate for the Cellular Service. AT&T opposes any change to the field strength limit rule adopted in the *R&O*.²⁴⁵ No other commenter addressed this issue.

99. *Discussion.* We reiterate that a goal of this reform proceeding has been to develop rules for the Cellular Service that are consistent, to the extent practicable, with the rules governing other commercial wireless services. Verizon had initially proposed the 40 dB μ V/m field strength limit for the Cellular Service,²⁴⁶ which the Commission then determined is comparable to the limit that has worked well for PCS.²⁴⁷ In adopting the 40 dB μ V/m field strength limit in Section 22.983, the Commission also found it appropriate to permit Cellular licensees to negotiate different field strength limits with one another “consistent with other geographic-based wireless services.”²⁴⁸ No one has reported problems thus far under Section 22.983, and the record is insufficient to compel a change at this time. As explained in the *Further Notice*, the Commission had deferred a decision on this same issue for AWS-3 due to a lack of consensus and an interest in developing a more complete record to explore the best method or metric to address boundary limits between licensees.²⁴⁹ We similarly conclude that altering the rule at this time solely for the Cellular Service would be at odds with our reform goal of harmonizing rules among flexible

²⁴¹ *R&O*, 29 FCC Rcd at 14109-11; 47 CFR § 22.983.

²⁴² *Further Notice*, 29 FCC Rcd at 14146.

²⁴³ *Id.* The Commission also asked whether a 100 kHz or 1 MHz measurement bandwidth would be appropriate for power measurement for the various technologies used by Cellular licensees in the band. *Id.* However, as discussed above in Section II.C.1., we conclude that Cellular licensees should consult the FCC Laboratory’s KDB website for the recommended procedures that reflect the latest measurement techniques for current technologies, and we find that it is unnecessary to specify a measurement bandwidth. In addition, the Commission sought comment on whether any other Part 22 Cellular rules are not technologically neutral and, if so, whether and how they should be amended. *See id.* No one responded to this general query on technological neutrality (i.e., other than with respect to proposed rules specifically discussed in the *Further Notice*).

²⁴⁴ Verizon Comments at 10 (emphasis added). *See also* Verizon Reply Comments at 3. Verizon reiterates its argument in subsequent *ex parte* submissions. *See, e.g.*, Verizon Oct. 2015 *Ex Parte* Letter.

²⁴⁵ AT&T July 2015 *Ex Parte* Letter at 2.

²⁴⁶ *See* Verizon Wireless Comments at 4-5 (Feb. 23, 2009) (submitted prior to release of the *NPRM*) (noting that field strength limits were already in place for PCS, certain AWS, 700 MHz, and 800 MHz ESMR licensees).

²⁴⁷ *See NPRM*, 27 FCC Rcd at 1767 n.146 and accompanying text; 47 CFR § 24.236.

²⁴⁸ *R&O*, 29 FCC Rcd at 14109-10.

²⁴⁹ *Further Notice*, 29 FCC Rcd at 14146 nn.269-270 and accompanying text.

(continued....)

commercial wireless services and would not serve the public interest.²⁵⁰ Accordingly, we retain Section 22.983 without change.

3. Out of Band Emission (OOBE) Limit

100. *Background.* Section 22.917 currently specifies that, for the Cellular Service, the power of any emission outside of the authorized operating frequency ranges (P) must be attenuated below the transmitting power by a factor of at least $43 + 10 \log(P)$ dB and describes the procedures for measuring compliance with this OOBE limit.²⁵¹ The *Further Notice* sought comment on revising the Cellular OOBE limit, given the changing 800 MHz spectrum environment, technological developments, and compliance measurement techniques, and specifically asked whether it should increase the attenuation level to facilitate higher PSD limits without increasing the potential for unacceptable interference to legacy public safety operations.²⁵²

101. In measuring Cellular OOBE in close proximity to the authorized frequency band edge, we permit the use of a narrower-resolution bandwidth (of at least one percent of the emission bandwidth of the fundamental emission) to measure the unwanted emissions that are on frequencies “immediately outside and adjacent to the frequency block” without any requirement for subsequently integrating the results over the full reference bandwidth.²⁵³ The Commission proposed in the *Further Notice* to clarify that this provision only applies in the first 100 kHz immediately outside and adjacent to the authorized frequency block/band, and sought comment on the proposal.²⁵⁴ The current resolution bandwidth for measuring unwanted emissions outside of the Cellular band is 100 kHz or greater.²⁵⁵ The Commission also sought comment on whether it should adopt a standard reference resolution bandwidth (e.g., 10 kHz) that would be applicable to all cases irrespective of the signal bandwidth, and thus not create any unnecessary limit discrepancies.²⁵⁶

102. Verizon argues that the Commission should not change the existing OOBE limit because it has worked well and has been “adopted by standards bodies such as 3GPP and 3GPP2.”²⁵⁷ AT&T agrees that the OOBE limit should not be changed, asserting that it will continue to work well for licensees whether they use narrowband networks under current power limits or broadband networks using PSD limits.²⁵⁸

103. In *ex parte* filings in December 2015 and January 2016, Gogo argues that adoption of a

²⁵⁰ Verizon’s argument that we should change the field strength limit rules for *all* bands is outside the scope of this proceeding.

²⁵¹ 47 CFR § 22.917(a) (providing for an alternative limit by contractual agreement under 47 CFR § 22.917(c)).

²⁵² See *Further Notice*, 29 FCC Rcd at 14150.

²⁵³ 47 CFR § 22.917(b). In the past, “emission bandwidth” has been used as a substitute for “99% occupied bandwidth” (OBW). Section 22.917(b) uses -26 dB emission bandwidth as a good approximation, but this could potentially introduce significant error when used as a means for estimating the OBW of wide-bandwidth multi-carrier modulation technologies. With the advent of the advanced spectrum analyzers and other measurement instruments, which offer post-processing capabilities that include an accurate OBW measurement capability, we do not see a need for a simplified alternative to OBW.

²⁵⁴ *Further Notice*, 29 FCC Rcd at 14150.

²⁵⁵ See 47 CFR § 22.917(b).

²⁵⁶ *Further Notice*, 29 FCC Rcd at 14150 (noting that allowing a reduced bandwidth as a percentage of the fundamental emission (occupied) bandwidth introduces a bias toward narrowband technologies).

²⁵⁷ Verizon Comments at 11.

²⁵⁸ AT&T Reply Comments at 4.

(continued...)

PSD model for the Cellular Service will result in increased risk of OOB interference to Gogo's ATG operations in the adjacent band.²⁵⁹ Gogo asserts that "the direct adjacency of the Cellular and ATG bands, the lack of any guard band between the two, and the reverse duplexing scheme of the two bands create a significant risk of interference . . . ,"²⁶⁰ and that the risk to Gogo's operations will increase with LTE deployment in the Cellular Service even at PSD limits of 250 W/MHz (non-rural) and 500 W/MHz (rural).²⁶¹ To mitigate the alleged increased risk, Gogo urges the following two "safeguards": (1) a requirement that Cellular carriers execute inter-operator interference mitigation agreements with the ATG incumbent prior to commencing PSD operations; and (2) a more stringent OOB limit for Cellular base stations within a specific distance of ATG base stations.²⁶²

104. No party responded to Gogo's arguments in this proceeding, but AT&T addressed them in the docket for AT&T's pending Kentucky/Tennessee Waiver Request. Specifically, AT&T asserted that, in using a PSD model at 250 W/MHz ERP with 5 MHz of channel bandwidth, it would not be operating at power levels higher than currently permitted under Section 22.913, and that therefore the interference environment for Gogo would be no worse when compared to a Cellular licensee deploying its system using a narrowband technology such as GSM.²⁶³ In response, Gogo states that wideband LTE carriers generally have stronger out of band emissions—and therefore pose a greater risk of interference to Gogo's operations, compared to narrowband carriers.²⁶⁴

105. *Discussion.* We conclude that the existing OOB limit in Section 22.917(a), which is the same as the limit for other commercial wireless services such as PCS and AWS,²⁶⁵ continues to serve the public interest and we decline to change it at this time for the Cellular Service. The Commission expects licensees to work together to resolve interference problems; indeed, Section 22.917(c) allows licensees to negotiate a different limit from the one specified in Section 22.917(a)—by private contractual agreement—"to be used at specified band edge(s) in specified geographical areas."²⁶⁶ Gogo indicates that it is working with AT&T and other Cellular licensees to address interference as it occurs.²⁶⁷ We encourage Gogo and Cellular carriers to continue to work together not only to address interference as it

²⁵⁹ See generally Gogo Dec. 2015 *Ex Parte* Letter; Letter from Tom Peters, Hogan Lovells US LLP, to FCC Secretary Dortch (filed Jan. 7, 2016) (Gogo Jan. 7 *Ex Parte* Letter); and Letter from Michele Farquhar, Hogan Lovells US LLP, Counsel to Gogo Inc., to FCC Secretary Dortch (filed Jan. 20, 2016) (Gogo Jan. 20 *Ex Parte* Letter).

²⁶⁰ Gogo Jan. 7 *Ex Parte* Letter at 2. See also Gogo Dec. 2015 *Ex Parte* Letter at 2, Figure 1 (chart depicting these adjacent bands and duplexing schemes).

²⁶¹ See, e.g., Gogo Jan. 20 *Ex Parte* Letter at 1-2.

²⁶² See Gogo Dec. 2015 *Ex Parte* Letter at 1, 4 (noting, at n.8, that an appropriate protection distance should be discussed formally "with the relevant stakeholders"). Gogo argues that, under 47 CFR § 22.917(d), case-by-case resolution of what it expects would be numerous instances of interference post-adoption of a Cellular PSD model would be time-consuming, inefficient, burdensome for the parties and Commission alike, and would put ATG service at great risk because of the inherent delays in obtaining relief. *Id.* at 4.

²⁶³ AT&T Reply Comments, WT Docket No. 15-300, at 4-5 (Jan. 11, 2016).

²⁶⁴ Gogo Jan. 20, 2016 *Ex Parte* Letter at 2 (adding that narrowband technologies such as GSM have "much sharper 'roll-off' than wider-band technologies, and thus produce much lower out of band emissions"). See also Gogo Dec. 2015 *Ex Parte* Letter at 3 (claiming, at n.5, that UMTS carriers also present an increased interference risk to ATG if a PSD model is permitted for the Cellular Service).

²⁶⁵ See 47 CFR §§ 24.238(a) (PCS), 27.53(h)(1) (AWS). See also *id.* § 27.53(g) (lower 700 MHz).

²⁶⁶ 47 CFR § 22.917(c).

²⁶⁷ Gogo Jan. 20, 2016 *Ex Parte* Letter at 2.

(continued...)

occurs, but also to be proactive in avoiding increased interference to Gogo's ATG operations from Cellular PSD operations under the revised radiated power rules we are adopting today. We also remind all parties that, under Section 22.917(d), the Commission may require a greater attenuation if any emission from a Cellular transmitter results in interference to users of another radio service.

106. Regarding the Commission's proposal to clarify that the provision in Section 22.917(b) only applies in the first 100 kHz immediately outside and adjacent to the authorized frequency block/band, no commenter addressed it, nor did any commenter respond to the query about adopting a standard reference resolution bandwidth (e.g., 10 kHz) that would be applicable to all cases irrespective of the signal bandwidth.²⁶⁸ The International Telecommunications Union (ITU) recommends different measurement bandwidths for operations above and below 1 GHz.²⁶⁹ To remain consistent with international practices, we conclude that the 100 kHz resolution bandwidth should be used only for measurements in the spectrum below 1 GHz, and that any measurements in the spectrum above 1 GHz should use a resolution bandwidth of 1 MHz. Accordingly, we revise Section 22.917(b) to retain the existing provision (renumbered as Section 22.917(b)(1)) and specify that it applies for measurements in the spectrum below 1 GHz, and we add Section 22.917(b)(2) to specify that measurements of out of band emissions from Cellular licensees into the spectrum above 1 GHz should use a resolution bandwidth of 1 MHz.²⁷⁰ We reiterate that, as technologies change, the Commission updates its Part 2 rules and its measurement procedures to keep pace, and therefore, licensees should regularly consult the KDB website for the latest recommended measurement procedures and Commission-approved techniques, and Part 2 of the Commission rules.

4. Permanent Discontinuance of Operations

107. *Background.* Under Section 1.955(a)(3) of the Commission's rules, an authorization will be automatically terminated if service is "permanently discontinued."²⁷¹ Section 22.317 of the Commission's rules, which applies to all Part 22 Public Mobile Services stations including those in the Cellular Service, defines permanent discontinuance as the failure to provide service to subscribers for 90 continuous days (up to 120 continuous days with an extension).²⁷² If a Cellular site is permanently discontinued under that definition, the licensee's CGSA is modified accordingly in ULS, reflecting the reduction in service coverage. While the licensee is required to file the appropriate form in ULS, the authorization for the permanently discontinued site is automatically terminated without Commission action whether or not the appropriate form is filed.²⁷³

108. After the Commission released the *NPRM*, a coalition of Cellular licensees (Coalition) advocated a more flexible rule governing permanent discontinuance of service.²⁷⁴ Having adopted new and revised rules in the *R&O* to transition the Cellular Service to a geographically-licensed regime, the Commission proposed and sought comment in the *Further Notice* on additional licensing reforms, including a more flexible rule governing permanent discontinuance of service.²⁷⁵ Specifically, consistent

²⁶⁸ See *Further Notice*, 29 FCC Rcd at 14150.

²⁶⁹ See ITU Radio Regulations, Edition of 2012, Appendices, APPENDIX 3 (available at <http://www.itu.int/pub/R-REG-RR-2012>).

²⁷⁰ See Appendix A (Final Rules), § 22.917(b).

²⁷¹ 47 CFR § 1.955(a)(3).

²⁷² 47 CFR § 22.317.

²⁷³ 47 CFR § 1.955(a)(3).

²⁷⁴ See *Further Notice*, 29 FCC Rcd at 14106, 14126.

²⁷⁵ *Id.* at 14126-28.

(continued....)

with the approach in proceedings involving certain AWS bands (AWS-3, AWS-4, and H Block)²⁷⁶ and the 600 MHz band,²⁷⁷ the Commission proposed to define permanent discontinuance for Cellular licensees as 180 consecutive days during which the licensee does not operate or, in the case of a Cellular CMRS provider, does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to the providing carrier.²⁷⁸ As in the AWS and 600 MHz proceedings, this proposed new definition recognized that, while most licensees use their systems to provide CMRS offerings, flexibility is needed where Cellular licensees use their systems for private, internal communications because such licensees generally do not provide service to unaffiliated subscribers.

109. The Commission further proposed to apply the new permanent discontinuance rule to the entire geographic license area, i.e., the CGSA, rather than individual cell sites, and to revise Section 22.317 accordingly, so that it would no longer apply to the Cellular Service.²⁷⁹ In addition, the Commission proposed that, following grant of a new-system application, the 180-day permanent discontinuance rule would not apply to the new-system licensee until the expiration of the initial construction period for that system (including extensions, if any), so as not to penalize such licensees in the event they commence service early in their construction periods.²⁸⁰ Here too, as explained in the *Further Notice*, the Commission's proposal was consistent with the AWS-4, H Block, AWS-3, and 600 MHz proceedings, where the permanent discontinuance rule was not applied to licensees until at least after the interim construction deadline. An interim construction deadline is not present in the Cellular Service; licensees are generally subject to a one-year build-out deadline for new-system or modification authorizations.²⁸¹ The one exception is the Chambers License, whose interim and final build-out requirements are set forth in Section 22.960.²⁸² For the Chambers License, the Commission proposed to apply the geographic-based permanent discontinuance rule immediately after the interim construction deadline.²⁸³

110. Finally, consistent with Section 1.955(a)(3), the Commission proposed that, if a Cellular licensee permanently discontinues service, it must notify the Commission of the license cancellation within 10 days by filing FCC Form 601.²⁸⁴ The Commission emphasized that, as under current rules, the Cellular license would be automatically terminated without specific Commission action if service is permanently discontinued, even if the licensee fails to file the required FCC Form. The Commission would update ULS, as it does under Section 22.317. The Commission sought comment on all aspects of the proposal and the Coalition's, and invited comment on any other alternatives not discussed in the

²⁷⁶ See *AWS-3 Report and Order*, 29 FCC Rcd at 4670-71 (permanent discontinuance rule for AWS-3 frequency bands); *H Block Order*, 28 FCC Rcd at 9570-71 (permanent discontinuance rule for AWS in H Block); *AWS-4 Report and Order*, 27 FCC Rcd at 16203 (permanent discontinuance rule for AWS-4 frequency bands).

²⁷⁷ See *BIA Report and Order*, 29 FCC Rcd at 6887-89.

²⁷⁸ *Further Notice*, 29 FCC Rcd at 14127 and Appendix B (Proposed Rules), § 22.947.

²⁷⁹ *Id.* at 14126-27 and Appendix B (Proposed Rules), § 22.317.

²⁸⁰ *Id.* at 14127-28.

²⁸¹ 47 CFR § 22.946.

²⁸² See 47 CFR § 22.960 (as adopted in the *R&O*); *R&O*, 29 FCC Rcd at 14120-22 (explaining the history of the Chambers License and adoption of the interim and final build-out deadlines). See also 47 CFR § 22.961 (as adopted in the *R&O*).

²⁸³ *Further Notice*, 29 FCC Rcd at 14128 n.172 (explaining that this would be consistent with the AWS-3, AWS-4, H Block, and 600 MHz proceedings, where the permanent discontinuance rule was not applied to licensees until after the interim construction deadline).

²⁸⁴ *Id.* at 14128.

(continued...)

*Further Notice.*²⁸⁵

111. Commenters that addressed the proposal favor a new rule that provides for a longer discontinuance of service period applied to the entire CGSA, as in other geographically licensed commercial wireless services.²⁸⁶ AT&T supports the proposed 180-day period, and argues that the current rule's site-based filing requirement "contravene[s] the new geographic-area licensing scheme and undermine[s] the Commission's goal of reducing the number of unnecessary filings."²⁸⁷ AT&T also agrees with the proposal to apply the 180-day rule to new Cellular systems only after the initial construction period (typically one year) expires.²⁸⁸ Verizon similarly supports the proposal, arguing that the 180-day period will help facilitate technology upgrades that entail replacement or addition of antennas at each cell site location "without putting licenses at risk or disrupting service to customers."²⁸⁹ CTIA echoes this view and adds that the proposed new rule would bring the Cellular Service into parity with other CMRS.²⁹⁰ RWA argues that instead of the proposed 180 days, the permanent discontinuance period should be 12 months, which it considers a "reasonable amount of time to ensure that a carrier . . . intended to permanently cease operations."²⁹¹ In addition, RWA argues that the Commission should clarify that a carrier providing only roaming services "will not be deemed to have permanently discontinued service as long as it continues to provide roaming services to at least one roamer."²⁹² No other commenter addressed the Commission's proposals regarding permanent discontinuance of service.

112. *Discussion.* Based on the record, consistent with the approach in various other commercial services as stated above, and as proposed in the pending proceeding for certain wireless radio services (WRS Reform proceeding),²⁹³ we conclude that it serves the public interest to adopt the Commission's proposals regarding permanent discontinuance of service by Cellular licensees. Specifically, by this Second Report and Order, we adopt a modernized provision that defines permanent discontinuance as 180 consecutive days during which a Cellular licensee does not operate or, in the case of a Cellular CMRS provider, does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to the providing carrier.²⁹⁴ We decline to adopt RWA's proposed 12-month discontinuance period, finding that it would be unreasonably long for an entire CGSA to be non-operational, or in the case of a CMRS provider, without service to at least one subscriber, before being

²⁸⁵ *Id.*

²⁸⁶ No commenter addressed the Commission's query (*see id.*) regarding costs and benefits of a more flexible rule, including the resulting lack of data that would otherwise be collected and available to the public through ULS and other databases (i.e., data currently available regarding notifications for individual cell sites that cease operations).

²⁸⁷ AT&T Comments at 5-6.

²⁸⁸ *Id.* at 6.

²⁸⁹ Verizon Comments at 8.

²⁹⁰ CTIA Reply Comments at 5.

²⁹¹ RWA Comments at 5 (but stating its agreement with the proposed 10-day notification period).

²⁹² *Id.* at 4.

²⁹³ *See Further Notice*, 29 FCC Rcd at 14127 n.169 (citing *Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 to Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services*, WT Docket No. 10-112, Notice of Proposed Rulemaking and Order, 25 FCC Rcd 6996, 7017-19 (2010) (proposing to harmonize rules governing permanent discontinuance of service (as well as renewal and certain other issues) for 40 wireless radio services regulated under Parts 22, 24, 27, 74, 80, 90, 95, and 101) (*WRS Reform NPRM and Order*)).

²⁹⁴ *See Appendix A (Final Rules)*, § 22.947.

(continued....)

deemed permanently discontinued.

113. Cellular licensees will be required to notify the Commission of the permanent discontinuance within 10 days of the expiration of the 180-day period by filing FCC Form 601, as proposed.²⁹⁵ However, whether or not the licensee files the proper notification form, the license for a Cellular system that has permanently discontinued service will be terminated automatically, and the area will revert back to the Commission for relicensing.²⁹⁶ Commencing on the day following public notice of cancellation of the Cellular license, the Unserved Area will be available to applicants seeking to establish a new Cellular system or expand an existing CGSA by at least 50 contiguous square miles.²⁹⁷

114. We also conclude, based on the record, that it serves the public interest to apply the 180-day discontinuance period to new Cellular systems (other than the Chambers License system) only after the initial construction period has ended—including extensions, if any—following grant of the new-system application, as proposed.²⁹⁸ This approach is reflected in Section 22.947 and will ensure that licensees of new systems will not be penalized in the event they complete construction and commence operations prior to expiration of their build-out period.

115. As proposed and based on the record before us, we will apply Section 22.947 to the entire geographic licensed area—the CGSA, thus enhancing licensees' flexibility. We also adopt revised Section 22.317 as proposed, such that its site-based approach will no longer apply to the Cellular Service.²⁹⁹ Thus, consistent with other geographically licensed services, permanent discontinuance of service at an individual cell site will no longer result in modification of the CGSA to reflect reduced service coverage. Once these rules as adopted today have taken effect, we will dismiss as unnecessary a site-based cancellation notification, i.e., a filing concerning permanent discontinuance of any individual cell site(s).

116. No commenter addressed the Chambers License in the context of the permanent discontinuance rule. We find that it serves the public interest to apply the new rule to the Chambers licensee as proposed: The 180-day period for purposes of determining permanent discontinuance will commence immediately after the interim construction deadline set forth in Section 22.961.

117. As explained in the *Further Notice* and as noted above, the flexible approach that we are adopting today regarding permanent service discontinuance was initially discussed in the Commission's pending WRS Reform proceeding, which also covers the Cellular Service. Notwithstanding our adoption today of Section 22.947 and revised Section 22.317, Cellular Service licensees will remain subject to any future Commission action affecting wireless radio services in the WRS Reform proceeding.

D. Elimination of Unnecessary Rules and Industry Burdens

118. In line with our commitment to streamline our regulations to the extent possible to reduce unnecessary regulatory costs and burdens, we take additional action to revise or eliminate certain Cellular service or administrative rules that are outdated or no longer warranted. Pursuant to these rule revisions,

²⁹⁵ *See id.*

²⁹⁶ If a Cellular licensee permanently discontinues service but has a still-pending application to expand that particular CGSA, the application will be dismissed if not withdrawn.

²⁹⁷ 47 CFR § 22.949. Applicants should consult the CGSA map-file database before filing, to verify that the area is no longer attributed to the cancelled license. They should report any discrepancies to Bureau staff, who use the CGSA map files to determine the official boundary of a proposed CGSA when reviewing a Cellular Service application. *See* <http://fcc.gov/encyclopedia/cgsa>; *R&O*, 29 FCC Rcd at 14108 n.41 and accompanying text.

²⁹⁸ We emphasize that by “new” system, we exclude expansions of existing CSGAs through major modifications.

²⁹⁹ *See* Appendix A (Final Rules), § 22.317.

(continued...)

Cellular licensees will no longer be forced to comply with certain outdated rules that waste licensee resources, or hinder licensees' ability to utilize spectrum effectively to provide advanced services. Licensees will therefore be able to focus their time and resources more efficiently in transitioning from legacy technologies to broadband technologies.

1. Filings for Certain Minor Modifications

119. *Background.* Cellular licensees are required under existing rules to file a minor modification application for any change to a non-internal cell site that results in a reduction in service area coverage (e.g., an antenna adjustment to a Cellular site along the CGSA border), no matter how small the change.³⁰⁰ The CGSA boundary is modified accordingly in ULS to reflect the reduction in service coverage. This is a lingering vestige of the legacy site-based Cellular licensing scheme, similar to the existing permanent service discontinuance rule addressed above in Section II.C.4.

120. *Discussion.* As stated in the *R&O*, a hallmark of geographic licensing is a defined area within which each licensee can make certain system changes without Commission filings.³⁰¹ Throughout this proceeding, the Commission has pursued the goals of removing unnecessary filing requirements and providing Cellular licensees with significant new flexibility to make changes within their CGSA boundaries.³⁰² In light of establishment of the CGSA as a geographic license area coupled with today's elimination of the filing requirement and resulting CGSA reduction when an individual cell site ceases operating entirely, we find that eliminating the site-based provision requiring filings for non-permanent-discontinuance changes to operational cell site(s) advances our reform goals and serves the public interest. Accordingly, we adopt revised Section 22.953(c).³⁰³ Consistent with other geographically licensed commercial wireless services, even following such minor system changes, the CGSA boundary will remain fixed, except that Cellular licensees may continue to expand their CGSAs under Section 22.949.³⁰⁴ We expect our decision to better enable licensees to implement technology upgrades involving reconfiguration and possible relocation of cell sites and other network elements. We clarify that, once revised Section 22.953(c) as adopted today has taken effect, we will dismiss as an unnecessary filing an application for a CGSA reduction.³⁰⁵ Notwithstanding this rule change, Cellular licensees remain subject to any future Commission action affecting wireless radio services in the pending WRS Reform proceeding.

2. Domestic Coordination Requirements

121. *Background.* Under Section 22.907 of the Commission's rules, Cellular licensees are required to coordinate channel usage at each transmitter location within 121 kilometers (75 miles) of any

³⁰⁰ See 47 CFR § 22.953(c) ("Existing systems – minor modifications," referencing 47 CFR § 1.929(k)).

³⁰¹ See *Further Notice*, 29 FCC Rcd at 14108.

³⁰² See, e.g., *id.* at 14126 (indicating our intent "to establish a more flexible and efficient licensing approach"). We also invited comment on the costs (if any) of the lack of data resulting from a more flexible rule applied on the basis of the entire CGSA. See *id.* at 14128.

³⁰³ See Appendix A (Final Rules), § 22.953(c). See also 47 CFR § 1.947(b) which, in referencing § 1.929(k), provides that, "[w]here other rule parts permit licensees to make permissive changes to technical parameters without notifying the Commission . . . , no notification is required."

³⁰⁴ 47 CFR § 22.949.

³⁰⁵ We emphasize that certain filings will continue to be required under all rules applicable to Cellular licensees. These include, for example, filings required under the rules implementing the National Environmental Policy Act of 1969, as amended (see 47 CFR Part 1, Subpart I, §§ 1.1301 *et seq.*), administrative updates, license renewals, and CGSA-expansion applications. Licensees are obligated to be familiar with applicable requirements.

(continued....)

transmitter locations that are authorized to other licensees or proposed by applicants.³⁰⁶ The *Further Notice* sought comment on whether the current coordination requirements under Section 22.907 would be sufficient in the event we revised Section 22.913 to permit use of a PSD model.³⁰⁷

122. Verizon argues that the requirements of Section 22.907 are still important where two adjacent systems both deploy technologies that re-use frequencies by dividing them into channels, such as GSM, but are not needed for systems that do not divide frequencies into channels (systems such as CDMA and certain LTE deployments).³⁰⁸ Verizon proposes an exemption by adding the following sentence to Section 22.907 at the end of the introductory paragraph: “Licensees utilizing systems employing a frequency reuse factor of 1 (universal reuse) are exempt from this requirement.”³⁰⁹ AT&T agrees.³¹⁰ No other commenter addressed this issue.

123. *Discussion.* As intended by this rule, coordination has played a major role in avoiding co-channel and adjacent-channel interference between neighboring systems. We agree, however, that the coordination requirement is not necessary for systems that deploy technologies such as CDMA and LTE, which do not utilize frequency re-use techniques. Accordingly, we revise the introductory paragraph of Section 22.907 to exempt those Cellular licensees that deploy technologies with a frequency re-use factor of one.³¹¹ In that same paragraph, we also delete the reference to “tentative selectees”—a vestige of the lottery system that had been in place for Cellular licensing many years ago that is now obsolete.

3. International Coordination Requirements

124. *Background.* Cellular licensees are currently subject to three separate Part 22 rules governing coordination between the United States government and the governments of Canada and Mexico. The generic rule applicable to all Part 22 Public Mobile Services licensees, Section 22.169, states that channel assignments are “subject to the applicable provisions and requirements of treaties and other international agreements between the United States government and the governments of Canada and Mexico.”³¹² The other two rules—Sections 22.955 and 22.957—are in Subpart H (Cellular Service-specific), and each sets forth the text of a condition that is to be placed on authorizations for all Cellular systems, requiring them to coordinate any transmitter installations within 72 kilometers (45 miles) of the U.S.-Canada or U.S.-Mexico border, as applicable.³¹³

125. To advance its regulatory reform agenda by deleting unnecessary or redundant provisions, the Commission proposed to eliminate Sections 22.955 and 22.957 while preserving Section 22.169 with a minor revision (referencing “operation of systems”) and sought comment on the proposal.³¹⁴ It tentatively concluded that the proposed slightly revised rule applicable to all Part 22 licensees would be sufficient and consistent with the international coordination requirements set forth in

³⁰⁶ 47 CFR § 22.907 (with an exception for mutually exclusive applications, which are resolved by closed auction).

³⁰⁷ *Further Notice*, 29 FCC Rcd at 14151-52.

³⁰⁸ Verizon Comments at 13.

³⁰⁹ *Id.*

³¹⁰ AT&T Reply Comments at 5.

³¹¹ See Appendix A (Final Rules), § 22.907.

³¹² 47 CFR § 22.169 (international coordination of channel assignments).

³¹³ See 47 CFR § 22.955 (Canadian condition); *id.* § 22.957 (Mexican condition).

³¹⁴ *Further Notice*, 29 FCC Rcd at 14152 and Appendix B (Proposed Rules), § 22.169.

(continued....)

other rule parts.³¹⁵

126. Verizon supports the Commission's proposed rule changes and argues that the Commission should adopt them.³¹⁶ No other commenter addressed this issue.

127. *Discussion.* We find that it serves the public interest to adopt the Commission's proposal. Accordingly, we delete Sections 22.955 and 22.957 and revise Section 22.169 to add the proposed reference to "operation of systems."³¹⁷

E. Miscellaneous Other Issues

128. The *Further Notice* raised and sought comment on the following Cellular Service issues: expressing power as ERP vs. EIRP; the effect of MIMO techniques in the context of equipment authorization; equipment standards; the power limit for mobile transmitters and auxiliary test transmitters; and the use of frequency coordinators. In the Sections that follow, we discuss the specifics of those queries, comments (if any) on the record, and our decisions. We also discuss an issue raised by Broadpoint subsequent to release of the *Further Notice*, and a proposed ministerial correction to Section 22.355.

1. ERP vs. EIRP

129. The *Further Notice* sought comment on whether we should express the Cellular power limits as EIRP, as proposed by Union Wireless.³¹⁸ While ERP and EIRP entail a simple mathematical conversion from one to another, the Commission queried whether EIRP would make more sense for the Cellular Service, particularly for mobile and portable devices that have integrated antennas.³¹⁹ Commenters did not address this question.

130. *Discussion.* There is inconsistency in how the radiated power limits are expressed in the various bands in which commercial wireless services are generally provided. For example, in the PCS rules, EIRP is used, but for AWS and 700 MHz, the power limits are expressed in terms of ERP.³²⁰ Given that Cellular licensees are long accustomed to ERP limits under the existing Section 22.913, we conclude that it serves the public interest to continue to express the non-PSD limits in terms of ERP, and also to express the newly adopted PSD limits in terms of ERP. This will avoid unnecessary confusion and maintain consistency for Cellular licensees.

2. MIMO Antennas

131. In the *Further Notice*, the Commission asked whether the use of MIMO techniques requires a modification to the way measurements are performed for equipment authorization.³²¹ No commenter addressed this specific aspect of using MIMO antenna techniques. As already discussed above, both AT&T and Verizon state their intent to use spectrally efficient MIMO techniques in their

³¹⁵ *Id.* at 14152 (citing, as an example, 47 CFR § 27.57, which is the international coordination rule governing various Part 27 flexible wireless services).

³¹⁶ Verizon Comments at 13.

³¹⁷ See Appendix A (Final Rules), § 22.169.

³¹⁸ *Further Notice*, 29 FCC Red at 14149 (citing GSM Licensees Comments at 9).

³¹⁹ *Id.* (noting our understanding that dipole antennas are infrequently used to perform compliance measurements and that practically all measurement antennas in use today provide gain values in terms of dBi).

³²⁰ See 47 CFR §§ 24.232(a) (PCS), 27.50(c)(6) and 27.55(b) (lower 700 MHz), and 27.50(d) (AWS).

³²¹ *Id.*

(continued....)

Cellular LTE deployments,³²² and we have taken that into account in adopting the PSD and PFD limits described above.

3. Equipment Standards

132. The Commission also sought comment on whether any other Part 22 rules regarding equipment standards and measurement need to be updated or modified to be consistent with the equipment certification rules in Part 2.³²³ For instance, Part 2 requirements related to spurious emissions at an antenna terminal assume that the unwanted emissions are measured at the antenna terminals (i.e., a conducted signal measurement).³²⁴ The Commission asked whether Section 22.917 of our rules, which is not clear on whether the Cellular measurement is conducted or radiated, should be modified to be consistent with this Part 2 requirement.³²⁵ We did not receive any comments about whether Part 22 equipment standards and measurement rules need to be updated or modified to be consistent with the equipment certification rules in Part 2.

133. *Discussion.* In the absence of any interest by commenters, we conclude that no changes concerning this issue are warranted at this time in Part 22. However, we note that as technologies change, the Commission updates its procedures in Part 2 to keep pace. As we have explained above, licensees should consult Part 2 of Commission rules and the FCC Laboratory's KDB website so they can be aware of the most up-to-date requirements, recommended measurement procedures, and Commission-approved techniques.³²⁶

4. Mobile Transmitters and Auxiliary Test Transmitters

134. *Background.* Section 22.913(a)(2) states that the ERP of Cellular mobile and auxiliary test transmitters must not exceed 7 W.³²⁷ In the *Further Notice*, the Commission tentatively concluded that this limit is adequate even for 10 MHz channel bandwidths, but sought comment on whether the existing limit should be updated or changed, including whether it should be lowered to be consistent with other CMRS bands.³²⁸ Although we have not adopted PSD for mobile stations in other services such as PCS or 700 MHz,³²⁹ the Commission sought comment on whether a PSD limit should be established for

³²² AT&T Comments at 14; Verizon Comments at 3.

³²³ *Further Notice*, 29 FCC Rcd at 14149 (citing 47 CFR §§ 2.1046 (“Measurements required: RF power output”), 2.1047 (“Measurements required: Modulation characteristics”), 2.1049 (“Measurements required: Occupied bandwidth”), 2.1051 (“Measurements required: Spurious emissions at antenna terminals”), 2.1053 (“Measurements required: Field strength of spurious radiation”), and 2.1055 (“Measurements required: Frequency stability”)).

³²⁴ See 47 CFR § 2.1051.

³²⁵ See *Further Notice*, 29 FCC Rcd at 14149.

³²⁶ See generally Part 2, Subpart J of the Commission's rules (“Equipment Authorization Procedures”), and specifically 47 CFR § 2.947 (“Measurement procedures”). In ET Docket No. 15-170, the FCC is considering updates to the measurement procedures in Part 2, Subpart J. See *Amendment of Parts 0, 1, 2, 15 and 18 of the Commission's Rules Regarding Authorization of Radiofrequency Equipment*, ET Docket No. 15-170, RM-11673, Notice of Proposed Rulemaking, 30 FCC Rcd 7725 (2015). In the same docket, OET is seeking comment on adoption of the measurement procedure standard ANSI C63.26-2015. See *Comments Sought on Newly Published ANSI C63.26-2015 Standard in Conjunction with Ongoing Equipment Authorization Rulemaking Proceeding*, ET Docket No. 15-170, Public Notice, 31 FCC Rcd 2314 (OET 2016).

³²⁷ 47 CFR § 22.913(a)(2) (existing rule).

³²⁸ *Further Notice*, 29 FCC Rcd at 14147 (citing, as an example, the upper 700 MHz band, where mobile devices are only permitted 3 W ERP pursuant to 47 CFR § 27.50(b)(10)). The corresponding limit for PCS mobile devices is 2 W EIRP pursuant to 47 CFR § 24.232(c).

³²⁹ See, e.g., 47 CFR §§ 24.232(c) (PCS), 27.50(b)(10) (upper 700 MHz).

(continued...)

mobile and portable Cellular transmitters.³³⁰ It queried whether the use of MIMO antenna techniques affects how power is measured and how it should be regulated in mobile transmitters, and also sought comment on whether auxiliary test transmitters are still in use and whether a provision applying to them is still warranted in Section 22.913.³³¹

135. No commenter addressed any of the queries related to mobile transmitters and auxiliary test transmitters, except for Broadpoint, which commented on the issue of changing the current power limits. For Cellular carriers using narrowband technologies, Broadpoint supports either retaining the current power limits as an option (i.e., for base transmitters and Cellular repeaters), or increasing them.³³² If the limits are increased, Broadpoint argues, there should be a “corresponding increase” in the mobile station ERP limit.³³³ For carriers using broadband technologies, Broadpoint similarly argues that any increase in power limits should be accompanied by mobile station ERP increases.³³⁴ Broadpoint does not, however, propose a specific new ERP limit for mobile stations.

136. *Discussion.* Because we are retaining the current non-PSD power limits for Cellular base stations and repeaters as an option so as not to disrupt systems that use narrowband Cellular technology, Broadpoint’s argument for a “corresponding increase” in the mobile station ERP limit is moot. Moreover, even if we had decided to increase the Cellular base station and repeater power limits, whether for narrowband or wideband technologies, there is no technical evidence on the record to suggest that the current 7 W limit is limiting the use of mobile and auxiliary test transmitters. As pointed out in the *Further Notice*, the current Cellular limit is higher than the limit for the 700 MHz Service (3 W ERP); it is also higher than the limit for PCS (2 W EIRP, equivalent to 1.43 W ERP).³³⁵ Typically Cellular handsets operate at much lower power than the mobile station ERP limit of 7 W. Accordingly, and in the absence of comments on the record concerning all the other issues raised in the *Further Notice* related to mobile and auxiliary test transmitters, including whether we should lower the power limit, we find that it serves the public interest to retain the existing provision, including the existing 7 W limit. We do, however, create a new subsection of the rule for this provision (Section 22.913(a)(5)), as proposed in the *Further Notice*.³³⁶

5. Frequency Coordinators

137. *Background.* The *Further Notice* proposed to require that frequency coordinators perform the first-line review of Cellular applications for CGSA expansions and new Cellular systems, and submit them to the Commission through ULS if compliant (in the coordinator’s assessment) with our technical rules applicable to the Cellular Service, with a recommendation for approval.³³⁷ Consistent with the Commission’s rules governing frequency coordination in other wireless services, the *Further Notice* proposed that the coordinators’ recommendations be purely advisory and indicated that final action on all

³³⁰ *Further Notice*, 29 FCC Rcd at 14147.

³³¹ *Id.* (emphasizing that, even with changes to the provision of Section 22.913(a)(2) governing mobile and auxiliary test transmitters, our environmental regulations would still apply pursuant to 47 CFR §§ 1.1307 and 1.1310, citing as well 47 CFR §§ 2.1091 governing RF radiation exposure evaluation specifically for mobile devices, and 2.1093 governing RF radiation exposure evaluation specifically for portable devices).

³³² Broadpoint Reply Comments at 3-4.

³³³ *Id.*

³³⁴ *Id.* at 5.

³³⁵ 47 CFR §§ 27.50(b)(10) (700 MHz), 24.232(c) (PCS).

³³⁶ See Appendix A (Final Rules), § 22.913(a)(5); *Further Notice*, Appendix B (Proposed Rules), § 22.913(a)(3).

³³⁷ *Further Notice*, 29 FCC Rcd at 14128-35.

(continued....)

applications filed by a frequency coordinator on behalf of an applicant would be taken by the Commission.³³⁸ The *Further Notice* proposed that the coordinators be private organizations certified by the Commission and emphasized that they would review only applicable technical information.³³⁹

138. The *Further Notice* sought comment generally on establishing Cellular frequency coordinators and specifically on numerous aspects of using them, with the proposals and queries organized under the following topics: coordinator duties; the Commission's continued role in reviewing and approving applications following their submission by the coordinators, including conditional operating authority and the resolution of disputes between applicants and coordinators; the number of coordinators and fees; and coordinator certification criteria and the selection process.³⁴⁰ Under the topic of coordinator duties, the queries included whether Cellular frequency coordinators should be required to file applications electronically using the ULS electronic batch format, and what preparations would be warranted, such as modifying ULS to accommodate frequency coordinator information and receive electronic batch filing of the applications (with any maps submitted electronically).³⁴¹ The Commission urged all parties interested in being frequency coordinators to so indicate on a preliminary, non-binding basis.³⁴²

139. Two parties express interest in serving as frequency coordinators for the Cellular Service: Enterprise Wireless Alliance (EWA)³⁴³ and the Wireless Infrastructure Association (WIA).³⁴⁴ EWA asserts its experience as a frequency coordinator for other services, its qualifications to serve as a coordinator for the Cellular Service, and its understanding of the scope of the review process.³⁴⁵ In the event there are multiple certified coordinators, EWA argues that each “must be willing to invest in a system such as the type of system in place for Part 90 coordination data exchanges”³⁴⁶ WIA likewise describes its experience as a frequency coordinator in other services and its qualifications to serve as a coordinator for the Cellular Service.³⁴⁷ WIA asserts that Cellular new-system and major modification applications are complex, and that using coordinators “could potentially reduce the error rate in applications most likely to consume significant [FCC] staff resources.”³⁴⁸ To enhance efficiency, WIA

³³⁸ *Id.* (citing, as examples, 47 CFR §§ 87.305(a) (2) and 90.175(h)).

³³⁹ *See id.* at 14131.

³⁴⁰ *Id.* at 14130-35.

³⁴¹ *Id.* at 14131 (noting that Part 90 private LMR frequency coordinators are subject to this requirement).

³⁴² *Id.* at 14130.

³⁴³ *See* Letter from Mark E. Crosby, President/CEO, Enterprise Wireless Alliance, to FCC Secretary Dortch, at 1-2 (Feb. 20, 2015) (EWA Reply Comments).

³⁴⁴ *See* WIA Comments (Jan. 21, 2015). *See also* WIA Reply Comments (Feb. 20, 2015). Although WIA submitted its Comments and Reply Comments under its former name, PCIA – The Wireless Infrastructure Association, we reference it herein under its current name.

³⁴⁵ *See* EWA Reply Comments at 1-2 (stating, at 1, that it would provide services “on a non-discriminatory nationwide basis, and at a reasonable fee structure that reflects only the actual costs of providing the coordination on a not-for-profit basis”).

³⁴⁶ *Id.* at 2.

³⁴⁷ WIA Reply Comments at 1-3 (stating that it “recognizes the value a qualified frequency coordinator brings to the FCC application process”).

³⁴⁸ *Id.* at 3. *See also id.* at 5 (supporting allowing market forces to set rates for the coordination services and asserting that applicants “may realize cost savings from a more streamlined and expedient . . . process if frequency coordination is implemented”).

(continued....)

argues, the Commission should require coordinators to submit Cellular applications in an electronic batch file format, and “can attest that the process works well.”³⁴⁹

140. RWA supports the proposal to use frequency coordinators on grounds that it will ensure complete and accurate applications prior to submission to the Commission and “should expedite the FCC’s process.”³⁵⁰ NRAO is “not averse to the use of frequency coordinators under [Section 1.924(a) concerning Quiet Zones],” but notes that this would be “a new and as-yet undefined process,” with a learning curve on both sides.³⁵¹ AT&T also does not oppose the Commission’s proposal, but “encourages the Commission to consider whether the volume of [applications] in the future justifies utilizing frequency coordinators.”³⁵² Further, it argues, as applicants will pay a fee directly to the coordinator for its first-line review, the Commission should reduce the FCC’s application fees.³⁵³ Verizon opposes the use of frequency coordinators, arguing that it is unnecessary in light of the licensing reforms adopted in the *R&O*, would “impose additional delays” and “add significant costs” for applications, and “create confusion for licensees in determining which process applies to different application types.”³⁵⁴ In response, WIA suggests that the Commission could make coordination optional, and that extending conditional operating authority to frequency-coordinated applications would provide an incentive to opt for coordinator review.³⁵⁵ Broadpoint agrees with Verizon that frequency coordinators are unnecessary and would add costs, but supports, as does CTIA, AT&T’s argument to reduce application filing fees if the Commission adopts its proposal.³⁵⁶ CTIA “does not at this time support the immediate use of frequency coordinators” and, like AT&T, urges the Commission to allow time under the revised rules to determine if coordinators are necessary.³⁵⁷

141. *Discussion.* Based on our experience during the nearly two years under the revised Cellular licensing scheme and our own cost-benefit analysis, we conclude that the requisite Commission outlay of resources to introduce frequency coordination into the Cellular Service would not be justified. We had reported that the total number of CGSA-expansion (major modification) applications in 2013 was 565 (908 if amendments are included).³⁵⁸ For calendar year 2015, Commission data show that only 42 CGSA-expansion applications were filed (60 if amendments are included).³⁵⁹ This represents a decrease of more than 90 percent since 2013, and the trend is further downward, as only 23 CGSA-expansion

³⁴⁹ *Id.* at 6. *See also id.* at 4-8 (addressing several other frequency coordination issues on which the *Further Notice* sought comment).

³⁵⁰ RWA Comments at 5.

³⁵¹ National Radio Astronomy Observatory Comments at 2 (Jan. 7, 2015). *See also* Letter from Harvey S. Liszt, Astronomer and Spectrum Manager, NRAO, to FCC Secretary Dortch (filed Sept. 30, 2015).

³⁵² AT&T Comments at 6.

³⁵³ *Id.* at 9 (arguing that, rather than charging the “major application” fee established for new-system and CGSA-expansion applications, the “minor application” fee should be charged whenever the Cellular applicant is required to submit its application to the certified frequency coordinator for first-line review).

³⁵⁴ Verizon Comments at 8.

³⁵⁵ WIA Reply Comments at 2. *See also Further Notice*, 29 FCC Rcd at 14132 (tentatively concluding to permit conditional operating authority following a certified coordinator’s recommendation, so long as the Commission “does not find a problem with the recommendation”).

³⁵⁶ *See* Broadpoint Reply Comments at 7; CTIA Reply Comments at 4. *See also* WIA Reply Comments at 3.

³⁵⁷ CTIA Reply Comments at 2-3. *See also* Verizon Comments at 9.

³⁵⁸ *Further Notice*, 29 FCC Rcd at 14130 n.185.

³⁵⁹ The comparable figure for 2014 is 494 (732 if amendments are included).

(continued....)

applications were filed through the third quarter of 2016. This is a far greater decrease than the Commission anticipated when it proposed frequency coordination for the Cellular Service.³⁶⁰

142. To accommodate the use of frequency coordinators for Cellular applications, the Commission would need to make numerous changes to ULS at the taxpayers' expense. Additionally, Commission staff resources would necessarily be expended for selection and certification of frequency coordinators and preparation of requisite Commission releases, including a Memorandum of Understanding to be executed with those selected.³⁶¹ Thereafter, as WIA states, the certified coordinators and Commission staff would need to collaborate "to devise, test, and deploy a batch file format that incorporates the frequency coordination process."³⁶² Taking into account all such expenditures and uncertainties weighed against the sparse number of affected applications being filed, we conclude that it does not serve the public interest at this time to adopt the use of frequency coordinators for the Cellular Service. However, we will monitor the application volume and, if the data show a significant upward trend, we will revisit establishing frequency coordinators for the Cellular Service.

6. Definition of "Rural" for Purposes of Section 22.913

143. *Background.* Broadpoint argues that the Section 22.913 definition of a rural county should be automatically adjusted after each completed U.S. Census, "whereby the upper threshold of the population per square mile for rural areas is increased in proportion with the average rate of growth of the United States' population over the corresponding time period."³⁶³ Because the U.S. population grows each year, Broadpoint argues, if the Section 22.913 definition of a rural county remains static, the number of market areas defined as rural "would decrease over time, even though in comparison to other markets in the United States, they may still remain the most rural markets."³⁶⁴

144. *Discussion.* Revising the definition of a rural area under Section 22.913 (or any other Part 22 rule) was not previously raised by any commenter in this proceeding, and the Commission did not mention it in the *Further Notice*. We are not persuaded by the record that we should revisit the longstanding definition of "rural" for the purpose of Section 22.913, and we make no change to the definition in this Second Report and Order.

7. Section 22.355 (Frequency Tolerance)

145. The *Further Notice* proposed to correct a ministerial error that appeared in the third-column heading of the table in Section 22.355 of our rules.³⁶⁵ We note that the current edition of the Code of Federal Regulations does not contain this error, and therefore no Commission action is required in this proceeding.

III. REPORT AND ORDER (WRS REFORM)

A. Introduction

146. As noted above, in 2010, the Commission released the *WRS Reform NPRM and Order* (WT Docket No. 10-112) proposing to revise and harmonize numerous rules applicable to "wireless radio

³⁶⁰ See *R&O*, 29 FCC Rcd at 14114-15.

³⁶¹ See *Further Notice*, 29 FCC Rcd at 14134-35.

³⁶² WIA Comments at 6-7.

³⁶³ Broadpoint Reply Comments at 6.

³⁶⁴ *Id.*

³⁶⁵ See *Further Notice*, 29 FCC Rcd at 14152 and Appendix B (Proposed Rules), § 22.355.

(continued...)

services” (WRS), which include the Cellular Service.³⁶⁶ Regarding license renewals, the Commission noted that the requirements and procedures applicable to WRS vary widely, with some, such as the Part 22 Cellular Service rules, providing for competing applications to be resolved by comparative hearings,³⁶⁷ and others, including the 700 MHz Service rules under Part 27, disallowing the filing of competing applications.³⁶⁸ Among other issues addressed in the *WRS Reform NPRM and Order*, the Commission generally proposed to establish a uniform renewal process modeled after the 700 MHz Service rules, and specifically proposed to adopt a three-part approach to renewal for all WRS that would entail: (1) a uniform requirement regarding the content of a “renewal showing” necessary to support renewal; (2) a prohibition on the filing of competing renewal applications; and (3) in the event of denial of a renewal application, return of the associated spectrum to the Commission for reassignment.³⁶⁹ The Commission’s companion Order imposed a freeze on the filing of new applications that are mutually exclusive with renewal applications and established an interim process for addressing renewal applications.³⁷⁰

147. With respect to Cellular licensees, the Commission proposed to delete all five existing Part 22 rules governing Cellular comparative renewal proceedings.³⁷¹ In the Section below, we provide background and discuss pertinent comments on the record, and explain our decision to eliminate, in this WRS Reform Report and Order (WRS Reform R&O), the five existing Part 22 Cellular renewal rules today as a step in resolving the issues raised in the WRS Reform proceeding.

B. Cellular Service Renewal Rules, Including Comparative Renewal Hearings

148. *Background.* The Cellular license renewal rules in Part 22 establish a two-step comparative hearing process for addressing renewal applications as well as any timely-filed competing applications. These rules require an administrative law judge (ALJ) to conduct a threshold hearing to determine whether a Cellular renewal applicant is entitled to a renewal expectancy.³⁷² If the ALJ determines that the applicant is entitled to a renewal expectancy and is otherwise basically qualified, the license is renewed and any competing applications are denied.³⁷³ If, on the other hand, the ALJ determines that a renewal expectancy is not warranted, all mutually exclusive applications in the renewal

³⁶⁶ See generally *WRS Reform NPRM and Order*, 25 FCC Rcd 6996. As defined by Section 1.907 of the Commission’s Rules, “wireless radio services” include “[a]ll radio services authorized in parts 13, 20, 22, 24, 26, 27, 74, 80, 87, 90, 95, 97 and 101 of this chapter, whether commercial or private in nature.” 47 CFR § 1.907.

³⁶⁷ See *WRS Reform NPRM and Order*, 25 FCC Rcd at 6999-7000 (citing 47 CFR §§ 22.936-22.940).

³⁶⁸ See *id.* at 7000 (citing 47 CFR 27.14(e)).

³⁶⁹ See *id.* at 6997-7016, 7047-48, Appendix A (Proposed Rules) (proposing to remove 47 CFR §§ 22.935-22.943).

³⁷⁰ See *id.* at 6999, 7033-39.

³⁷¹ The specific rules that the Commission proposed to delete are 47 CFR §§ 22.935 (“Procedures for comparative renewal proceedings”), 22.936 (“Dismissal of applications in cellular renewal proceedings”), 22.939 (“Site availability requirements for applications competing with cellular renewal applications”), 22.940 (“Criteria for comparative cellular renewal proceedings”), and 22.943 (“Limitations on transfer of control and assignment for authorizations issues as a result of a comparative renewal proceeding”). *WRS Reform NPRM and Order*, 25 FCC Rcd at 7047-48, Appendix A (Proposed Rules).

³⁷² A renewal expectancy is awarded if the ALJ finds that the renewal applicant has provided substantial service and has substantially complied with the Commission’s rules, policies, and the Communications Act. See 47 CFR §§ 22.935(c), 22.940(a). Additional issues (e.g., qualifications of the renewal applicant) also may be specified for consideration by the ALJ. See 47 CFR § 22.935(c).

³⁷³ See 47 CFR § 22.935(c).

(continued....)

filing group are considered in a full comparative hearing.³⁷⁴ The rules also establish certain specific requirements for the filing of competing applications, and procedures governing their withdrawal during the hearing.³⁷⁵

149. The majority of commenters who addressed the issue of WRS renewal rules and procedures in WT Docket No. 10-112 support the Commission's tentative conclusion to harmonize those rules and eliminate any service-specific rules regarding the filing of competing applications and the use of comparative hearings to resolve them.³⁷⁶ More recently, in response to the Commission's Public Notice seeking comment on the 2016 Biennial Review of Telecommunications Regulations,³⁷⁷ CTIA requests that the Commission repeal the comparative hearing rules applicable to Cellular licensees under Sections 22.935, 22.936, 22.939, and 22.940.³⁷⁸ CTIA argues that, for newer wireless services such as those in the 700 MHz Service, the Commission has already determined that there should be no comparative renewal process, and that the Commission's reasoning there applies equally to Part 22 licensees.³⁷⁹

150. *Discussion.* As part of our efforts to eliminate unnecessary requirements for Cellular licensees and promote comparable treatment of spectrum bands commonly used to provide comparable wireless services, we find that it serves the public interest to delete—as of the effective date of this WRS Reform R&O—the Part 22 rules pertaining to Cellular renewal comparative hearings, as proposed in the 2010 *WRS Reform NPRM and Order*. Our action today with respect to the Cellular Service is consistent with the Commission's determinations in various other commercial wireless service proceedings over the last ten years, including those for AWS-3, AWS-4, H-Block, the 600 MHz Service, and the 700 MHz Service.³⁸⁰ Also, as noted above, the elimination of service-specific renewal rules and adoption of uniform renewal procedures that would apply to all WRS licensees, including the elimination of comparative renewal hearings, is supported by the majority of commenters responding to the 2010 *WRS Reform NPRM and Order*, and was most recently endorsed by CTIA in response to the *Biennial Review*

³⁷⁴ See 47 CFR § 22.935(c). The specific elements to be considered by the ALJ in comparing the competing applications are delineated in the rules. See 47 CFR § 22.940.

³⁷⁵ See 47 CFR §§ 22.936, 22.939.

³⁷⁶ See AT&T Comments, WT Docket No. 10-112, at 6; Blooston Comments, WT Docket No. 10-112, at 4; CTIA Comments, WT Docket No. 10-112, at 28-30; FiberTower Comments, WT Docket No. 10-112, at 4; LightSquared Comments, WT Docket No. 10-112, at 6; MariTEL Comments, WT Docket No. 10-112, at 1; MetroPCS Comments, WT Docket No. 10-112, at 5, 7; Sprint Comments, WT Docket No. 10-112, at 14-15; T-Mobile Comments, WT Docket No. 10-112, at 3; Verizon Comments, WT Docket No. 10-112, at 14-15; WCS Coalition Comments, WT Docket No. 10-112, at 1-4. Commenters that support retention of the existing renewal rules argue that, without the ability to file competing applications, there is no way to discover disqualifying facts about incumbent licensees and, moreover, that there is no reason to eliminate the rules because competing applications are rare. See Comment Comments, WT Docket No. 10-112, at 6; Green Flag Comments, WT Docket No. 10-112, at 7-9; USCC Comments, WT Docket No. 10-112, at 8. NOTE: All these comments were filed Aug. 6, 2010.

³⁷⁷ *Commission Seeks Public Comment in 2016 Biennial Review of Telecommunications Regulations*, WT Docket No. 16-138 (other docket numbers omitted), Public Notice, 31 FCC Rcd 12166, 12174-75 (2016) (*Biennial Review Public Notice*).

³⁷⁸ See CTIA Comments, WT Docket No. 16-138 (other docket numbers omitted), at 10 (filed Dec. 5, 2016) (CTIA Biennial Review Comments).

³⁷⁹ See CTIA Biennial Review Comments at 10-11.

³⁸⁰ See *April 700 MHz Order*, 22 FCC Rcd at 8067, 8093-94 (eliminating rules that permit competing applications and comparative hearings for license renewal for 700 MHz Service licensees); *AWS-4 Report and Order*, 27 FCC Rcd at 16202 (same, for AWS-4); *H-Block Order*, 28 FCC Rcd at 9568 (same, for H-Block); *AWS-3 Report and Order*, 29 FCC Rcd at 4668 (same, for AWS-3); *BIA Report and Order*, 29 FCC Rcd at 6887 (same, for 600 MHz).

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Public Notice.³⁸¹ Accordingly, the revised Cellular Service rules that we are adopting today reflect deletion of Sections 22.935, 22.936, 22.939, 22.940, and 22.943.³⁸²

151. We defer, however, any decision on the remaining issues raised in the *WRS Reform NPRM and Order*, including what standard or requirements to apply in determining whether a renewal application should be granted, and whether licensed spectrum that does not meet specified renewal requirements shall be returned to the Commission for reassignment.³⁸³ Pending further action in the WRS Reform proceeding, the freeze imposed on the filing of new competing applications and the procedures established in the *WRS Reform NPRM and Order* will remain in effect for all covered wireless services, including the Cellular Service.³⁸⁴

IV. SECOND FURTHER NOTICE OF PROPOSED RULEMAKING (CELLULAR REFORM)

A. Introduction

152. In this Second Further Notice of Proposed Rulemaking in WT Docket No. 12-40 (Second Further Notice), we seek comment on eliminating several Part 22 rules that we believe may disadvantage Cellular licensees and licensees of other Part 22 bands as compared to licensees of other spectrum bands, or that seem no longer necessary in today's digital age, or for which the benefits may no longer outweigh the costs and burdens of compliance imposed on Part 22 licensees.

153. In comments submitted in response to the *Further Notice*, Verizon and CTIA ask the Commission to eliminate rules that they argue are no longer necessary, are costly and burdensome, or place Cellular licensees at a disadvantage as compared to other CMRS carriers.³⁸⁵ Commenters raise similar concerns in response to the Commission's *Biennial Review Public Notice*.³⁸⁶ Specifically, commenters identify as ripe for elimination Sections 22.301, 22.303, and 22.325 of the Commission's rules, which provide for retention and inspection of certain paper records at each station's control point, and on-duty personnel at control points responsible for station operation.³⁸⁷ Verizon also highlights Section 22.321(c), requiring the filing of annual Equal Employment Opportunity (EEO) complaint reports

³⁸¹ Although we consider CTIA's comments regarding the Part 22 rules in response to the *Biennial Review Public Notice* here, such consideration does not otherwise impact the Bureau's review of other comments filed in response to the *Biennial Review Public Notice*, including those submitted by CTIA regarding other rule provisions. *Biennial Review Public Notice*, 31 FCC Rcd at 12166-67.

³⁸² See Appendix A (Final Rules), §§ 22.936 – 22.943.

³⁸³ Because we defer decision on whether to prohibit competing license applications, we need not address, at this time, the arguments that such a prohibition would be unlawful under the Act or otherwise inappropriate. See Commnet Comments, WT Docket No. 10-112, at 6; Green Flag Comments, WT Docket No. 10-112, at 7-9; USCC Comments, WT Docket No. 10-112, at 8.

³⁸⁴ *WRS Reform NPRM and Order*, 25 FCC Rcd at 7033-39.

³⁸⁵ See Verizon Comments at 14; CTIA Reply Comments at 7.

³⁸⁶ *Biennial Review Public Notice*, 31 FCC Rcd at 12166. The proceeding we initiate here is limited to addressing those issues raised in comments filed in the Biennial Review proceeding regarding the Part 22 rules, and does not otherwise impact the Bureau's review of comments filed in response to the *Biennial Review Public Notice*. See *id.* at 12166-67.

³⁸⁷ See CTIA Biennial Review Comments at 10 (mistakenly referring to Section 22.303 as 22.305); CTIA Comments at 7; T-Mobile Reply Comments, WT Docket No. 16-138 (other docket numbers omitted), at 3 (filed Jan. 3, 2017) (T-Mobile Biennial Review Reply Comments) (mistakenly referring to Section 22.303 as 22.305); Verizon Comments at 14.

(continued....)

with the Commission.³⁸⁸ Each of these rules was adopted more than twenty years ago, when the Commission revised Part 22 in its entirety with the goal of making the rules better organized and easier to understand and use.³⁸⁹

154. As discussed below, we now propose to eliminate these four rules and invite comment on the effects of doing so, including the potential impact of repealing these rules not just for Cellular licensees, but for *all* Part 22 licensees—i.e., Paging, Air-Ground, Rural Radiotelephone, and Offshore Radiotelephone licensees. More generally, in this Second Further Notice, we seek comment on any other measures that could help advance the Commission’s goal of ensuring flexibility and consistency in licensing across commercial wireless services, while taking into account the unique features of each service. In this context, we also seek comment on possibly relocating the Part 22 Cellular Service and Part 24 PCS rules to Part 27.

B. Sections 22.301, 22.303—Station Inspection, Retention of Station Authorizations

155. *Background.* Section 22.301 of the Commission’s rules requires that, “[u]pon reasonable request, the licensee of any station authorized in the Public Mobile Services must make the station and station records available for inspection by authorized representatives of the Commission at any reasonable hour.”³⁹⁰ Section 22.303 of the Commission’s rules more broadly requires Part 22 licensees to retain, among other documentation, the authorization for each station as a permanent part of station records.³⁹¹ Specifically, Section 22.303 states that:

The current authorization for each station, together with current administrative and technical information concerning modifications to facilities pursuant to § 1.929 of this chapter, and added facilities pursuant to § 22.165 must be retained as a permanent part of the station records. A clearly legible photocopy of the authorization must be available at each regularly attended control point of the station, or in lieu of this photocopy, licensees may instead make available at each regularly attended control point the address or location where the licensee’s current authorization and other records may be found.³⁹²

156. No similar rules exist for commercial licensees governed by Part 24 of the Commission’s rules, nor for licensees governed by the Part 27 rules. In its comments in response to the *Further Notice*, Verizon argues that Cellular licensees should not be required to retain and post information about license authorizations, calling this requirement “burdensome, outdated and unnecessary.”³⁹³ Verizon notes that, because the Commission does not send copies of licenses when minor modifications are granted, licensees “have to periodically take inventory of their licenses and print copies of licenses once applications are granted to ensure they have the current license in the file.”³⁹⁴ It argues that this

³⁸⁸ Verizon Comments, WT Docket No. 16-138 (other docket numbers omitted), at 8 (filed Dec. 5, 2016) (Verizon Biennial Review Comments).

³⁸⁹ See generally *Revision of Part 22 of the Commission’s Rules Governing the Public Mobile Services, et al.*, CC Docket No. 92-115, Report and Order, 9 FCC Rcd 6513 (1994). Prior to the 1994 revision, the Commission undertook a comprehensive review and revision of the Part 22 rules in 1983. See *Revision of Part 22 of the Commission’s Rules Governing the Public Mobile Services*, CC Docket No. 92-115, Notice of Proposed Rulemaking, 7 FCC Rcd 3658, 3658 (1992).

³⁹⁰ 47 CFR § 22.301.

³⁹¹ 47 CFR § 22.303.

³⁹² 47 CFR § 22.303.

³⁹³ Verizon Comments at 14.

³⁹⁴ *Id.*

(continued....)

administrative burden is unjustified given that the Bureau now maintains official authorizations in ULS.³⁹⁵ CTIA echoes these concerns, and more broadly supports elimination of rules that “inhibit Cellular licensees from benefitting from the same level of flexibility as is available in other CMRS spectrum bands.”³⁹⁶ CTIA and T-Mobile reiterate arguments for eliminating Sections 22.301 and 22.303 in their Biennial Review comments.³⁹⁷ CTIA again stresses that there is no justification for asymmetry across different wireless services, particularly when electronic licensing renders these requirements unnecessary.³⁹⁸

157. *Discussion.* Sections 22.301 and 22.303 collectively require hard copies of license authorizations and other records to be maintained for each station and made available for inspection upon request. We propose to eliminate each of these provisions in their entirety from the Commission’s rules, and seek comment on this proposal. As mentioned above, no similar rules exist for Part 24 or Part 27 licensees, and we question whether the benefit of maintaining hard copies outweighs the costs and burdens to Part 22 licensees in the age of electronic licensing and recordkeeping. When these rules were adopted in 1994, maintaining hard copies in files for inspection at a station control point made sense. But today, the justification for continuing to require this paperwork burden seems to have significantly diminished if not disappeared entirely, particularly given that license authorizations are maintained in ULS. We seek comment on these assumptions. Is there any reason that warrants licensees continuing to maintain hard copies of records at each station’s control point? Are there any other relevant records that are maintained at a station’s control point but are not readily available electronically? We note that in response to the *Biennial Review Public Notice*, Public Knowledge has suggested that, even if we eliminate Sections 22.301 and 22.303, we should nonetheless affirmatively require Part 22 licensees “to have electronic copies [of licenses] easily accessible to personnel and FCC inspectors.”³⁹⁹ We seek comment on Public Knowledge’s suggestion and whether such a requirement would be necessary.

158. We also note that Section 22.301 requires that the *station itself*, not just the stations’ records, be available for inspection by the Commission. There is no corollary requirement in Parts 24 or 27. We emphasize that, regardless of whether we retain a rule in Part 22 explicitly requiring licensees to make their stations available for inspection, we retain our general station inspection authority under Section 303(n) of the Communications Act.⁴⁰⁰ Similarly, Section 22.303 requires “administrative and technical information concerning modifications to facilities . . . and added facilities” to be retained in the stations’ records. Is there a need to keep that portion of the rule? Or do Sections 1.929 and 22.165 of the Commission’s rules⁴⁰¹—which are cross-referenced in Section 22.303—render the reference to such materials in Section 22.303 unnecessary and duplicative? We also seek comment on whether this type of administrative and technical information is maintained by stations electronically.

³⁹⁵ *Id.* at 14-15.

³⁹⁶ CTIA Comments at 7.

³⁹⁷ See CTIA Biennial Review Comments at 10; T-Mobile Biennial Review Reply Comments at 3.

³⁹⁸ CTIA Biennial Review Comments at 10; see also T-Mobile Biennial Review Reply Comments at 3 (stating that “there are many regulations that are simply outdated or irrelevant Others are overly complex and administratively burdensome. For example . . . Sections 22.301 and 22.305 [sic] require cellular and Part 22 licensees to have paper licenses available in the age of electronic licensing.”).

³⁹⁹ Public Knowledge Reply Comments, WT Docket No. 16-138 (other docket numbers omitted), at 9 (filed Jan. 3 2017).

⁴⁰⁰ 47 U.S.C. § 303(n).

⁴⁰¹ 47 CFR §§ 1.929 (“Classification of filings as major or minor”), 22.165 (“Additional transmitters for existing systems”).

(continued....)

C. Section 22.325, Control Points

159. *Background.* Section 22.325 of the Commission's rules requires that "[e]ach station in the Public Mobile Services [] have at least one control point and a person on duty who is responsible for station operation."⁴⁰² It specifies that "[t]his section does not require that the person on duty be at the control point or continuously monitor all transmissions of the station. However, the control point must have facilities that enable the person on duty to turn off the transmitters in the event of a malfunction."⁴⁰³ No corollary rule exists under Parts 24 and 27 of the Commission's rules. Some commenters argue that the requirement to designate a person who is responsible for the station and who has the ability to shut down service at any time "is unique to Part 22 and should be removed as another example of unnecessary, costly, and asymmetrical regulation."⁴⁰⁴

160. *Discussion.* We propose to eliminate Section 22.325 in its entirety from the Commission's rules and invite comment on this proposal. As with the rules discussed above, there is no similar rule in Part 24 or Part 27 of the Commission's rules related to station control points or requiring a person on duty who is responsible for station operation. We seek comment on the costs and burdens of having such an employee on duty. Do automatic and remote monitoring render this rule unnecessary from a technological standpoint? We also note that Section 22.325 requires each Part 22 licensee's station to have at least one control point. Is it necessary for us to retain that part of the rule? Is the control point requirement duplicative of other Part 22 rules, or unnecessary given the way stations are operated and monitored today? We seek comment on any information relevant to the proposed elimination of this requirement from Part 22 of the rules.

D. Section 22.321(c), Equal Employment Opportunity Complaint Report

161. *Background.* Section 22.321(c) of the Commission's rules requires all Part 22 licensees to submit an annual report to the Commission indicating whether any Equal Employment Opportunity (EEO) complaints have been filed at the federal, state, or local level against the licensee.⁴⁰⁵ For any such complaint, the report must state the parties involved, date of filing, court or agencies reviewing the complaint, appropriate file number, and disposition of the complaint.⁴⁰⁶ As with the other Part 22 rules discussed above in this Second Further Notice, there is no similar requirement for Part 24 and Part 27 licensees. However, all common carriers must comply with a similar requirement in Section 1.815 of the Commission's rules.⁴⁰⁷ That section requires that "[e]ach common carrier licensee or permittee with 16 or more full time employees [] file with the Commission . . . an annual employment report" on FCC Form 395.⁴⁰⁸ Form 395 requires carriers to check a box if EEO complaints have been filed, and to attach to Form 395 the same information about the complaints that is required under Section 22.321(c). In comments filed in response to the *Biennial Review Public Notice*, Verizon asks the Commission to repeal Section 22.321(c), arguing that other regulated entities required to file Form 395 do not have to file a separate "charge report" akin to that required under Part 22.321(c).⁴⁰⁹

162. *Discussion.* We propose to eliminate Section 22.321(c) from the Commission's rules.

⁴⁰² 47 CFR § 22.325.

⁴⁰³ 47 CFR § 22.325.

⁴⁰⁴ CTIA Biennial Review Comments at 10.

⁴⁰⁵ 47 CFR § 22.321(c).

⁴⁰⁶ 47 CFR § 22.321(c)(1).

⁴⁰⁷ 47 CFR § 1.815.

⁴⁰⁸ 47 CFR § 1.815.

⁴⁰⁹ See Verizon Comments at 8.

For all practical purposes, this rule appears duplicative of the requirement to complete FCC Form 395 under Section 1.815 of our rules—a rule that applies broadly to *all* common carriers, including licensees subject to Part 22 of our rules. We seek comment on this proposal, and on whether there is any need to retain a separate requirement related to reporting of EEO complaints for Part 22 licensees in addition to what is already required of common carriers on FCC Form 395 pursuant to Section 1.815.

E. Other Measures to Increase Flexibility for Cellular Licensees

163. In addition to the proposed rule eliminations discussed above, we invite comment more broadly on other steps or measures the Commission could take to ensure that Cellular licensees benefit from the same level of flexibility available to other commercial wireless licensees. Are there other rules that commenters deem unnecessary that apply to Part 22 licensees but not to the flexibly licensed services under Part 24 or Part 27? Are there other Part 22 rules ripe for removal in light of changed technology, electronic licensing and recordkeeping, or other modernizations that have occurred over the past two decades? We invite comment on anything else that could aid the Commission in its efforts to bring Cellular licensing more in line with the flexible licensing approach used for other CMRS.

F. Possible Relocation of Rules to Part 27

164. We seek comment on whether our goal of providing, to the extent possible, the same flexibility in licensing across competing commercial wireless bands would be furthered by migrating the Part 22 Cellular Service and Part 24 PCS rules to Part 27. The Commission sought comment on this issue in the *NPRM*, as explained further below. We seek here to revisit the issue and refresh the record on the potential benefits and costs of such relocation in light of the rule changes we have made thus far in this proceeding.

165. In 2012, the Commission's proposal to bring the Cellular licensing rules more in line with the flexible rules that govern competing wireless services entailed issuing geographic-area (CMA-based) "overlay licenses" through competitive bidding in two stages.⁴¹⁰ In connection with the overlay licensing proposal, the Commission invited comment regarding placement of the revised Cellular rules that might ultimately be adopted. Specifically, the Commission queried whether, in the event that it were to adopt a geographic-based regime that would include overlay licenses, the new Cellular rules should be incorporated into Part 27, which contains the rules for certain other flexible wireless services such as AWS.⁴¹¹ The Commission also suggested that, if those Cellular Service rules were to be moved into Part 27, then the rules for PCS, which is also a flexibly licensed wireless service, should be moved from Part 24 into Part 27.⁴¹² It asked as well whether the Commission should initiate a separate rulemaking to revise the Part 27 rules and reserve the possible relocation of Cellular and PCS rules to that separate proceeding.⁴¹³

166. In response to the *NPRM*, RWA objected to relocating any Part 22 rules to Part 27 at that time; it also contended that any consideration of relocating the Part 24 PCS rules was beyond the scope of that proceeding and should be addressed, if at all, in a separate rulemaking proceeding.⁴¹⁴ No other commenter addressed this issue.

⁴¹⁰ See *NPRM*, 27 FCC Rcd at 1746-47, 1755-66. The *NPRM* was released partly in response to a CTIA petition for rulemaking that sought to eliminate site-based Unserved Area applications altogether. See *id.* at 1747, n.3, 1750-52.

⁴¹¹ See *id.* at 1771.

⁴¹² See *id.*

⁴¹³ See *id.*

⁴¹⁴ See *R&O*, 29 FCC Rcd at 14125 (citing RWA's Comments filed May 15, 2012).

(continued....)

167. As noted in the *R&O*, commenters generally opposed the Commission's overlay licensing proposal.⁴¹⁵ Based on the record, which included a subsequent proposal by an industry coalition to retain key elements of the site-based Cellular licensing model,⁴¹⁶ the Commission adopted a geographic-based transition approach that preserves direct site-based access to Unserved Area while dramatically reducing licensees' regulatory burdens.⁴¹⁷ In that context, and given the absence of express support in the record, the Commission decided not to relocate the Part 22, Subpart H Cellular Service rules to Part 27.⁴¹⁸ Moreover, as the Commission's suggestion to relocate the Part 24 PCS rules was contingent on relocating the Part 22 Cellular rules, the Commission declined to pursue relocation of the PCS rules.⁴¹⁹

168. With the adoption of revised and modernized Cellular rules as described above, all greatly enhancing licensees' flexibility within their licensed geographic (CGSA) boundaries and eliminating numerous regulatory restrictions, we believe it is timely to revisit the issue of relocating the Cellular-specific rules of Part 22, Subpart H to Part 27. In addition, we consider it timely to ask anew whether we should initiate a new rulemaking to revise the Part 27 rules and reserve the possible relocation of Cellular rules to that separate proceeding. We further explain our queries below.

169. The rules in Part 22 applicable to the Cellular Service include general rules on definitions, licensing, and technical matters that are applicable to *all* Part 22 services (Subparts A, B, and C), as well as the Cellular-specific rules in Subpart H. Some of the applicable rules correspond to similar rules in Part 27, while others reflect unique characteristics of Part 22 (including Cellular) licensees and have no corresponding rules in Part 27. For example, as discussed above, the revised Cellular licensing scheme is now largely geographically based but nonetheless includes site-based rules allowing carriers to continue to expand into Unserved Area, which exists primarily in rural areas in the western United States and Alaska.⁴²⁰ The particular rules governing the Cellular Service, including the revised licensing scheme addressed in Part 22 Subpart H, would need to be retained as separate provisions if we were to migrate all the Part 22 rules to Part 27. Would such relocation promote similar regulatory treatment for geographically licensed services and improve clarity for licensees? Or would such relocations—e.g., moving the Cellular build-out requirements into Section 27.14, and the Cellular radiated power rules (as revised today) into Section 27.50⁴²¹—result in less clarity for licensees? Further, if those Cellular Service rules are to be moved into Part 27, should we also consider moving the rules for PCS from Part 24 into Part 27?

170. Commenters should also address whether we should reorganize Part 27 in order to accommodate these additional Part 22 and Part 24 rules more efficiently. We also note that there are other geographically-licensed, auctioned services that are not included in Part 27, including Public Coast (Part 80), Specialized Mobile Radio (SMR), Location and Monitoring, and 220 MHz (Part 90), and 218-219 MHz (Part 95). Of these, only SMR is used today by wireless carriers to provide services directly to consumers nationwide. Should we move the Part 22 Cellular and Part 24 PCS rules to Part 27 in conjunction with moving those other service rule parts to Part 27 as well?

171. We seek comment on all aspects of these possible approaches to relocation of our rules,

⁴¹⁵ *See id.* at 14105.

⁴¹⁶ *See id.* at 14106.

⁴¹⁷ *See generally id.*; *see also supra* Section II.A.

⁴¹⁸ *R&O*, 29 FCC Rcd at 14125.

⁴¹⁹ *Id.*

⁴²⁰ The rules also continue to permit establishment of new Cellular systems in Unserved Area.

⁴²¹ 47 CFR §§ 27.14, 27.50.

(continued....)

including the optimal timing for them, and we invite alternative ideas. We also seek comment on the potential economic costs and benefits of the various possible approaches to rule placement.

V. PROCEDURAL MATTERS

A. Paperwork Reduction Act Analysis

172. The Second Report and Order contains new and modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA).⁴²² It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other Federal agencies will be invited to comment on the new and modified information collection requirements contained in the rules adopted in this proceeding.⁴²³ In addition, pursuant to the Small Business Paperwork Relief Act of 2002,⁴²⁴ the Commission previously sought specific comment, in both the Cellular Reform and WRS Reform proceedings, on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. We have assessed the effects of the rule changes we are adopting on small business concerns and find that businesses with fewer than 25 people will benefit from the additional reforms in the Cellular licensing regime, i.e., the new rule governing permanent discontinuance of service, our elimination of “CGSA reduction” filings when modifying a border cell-site, and our elimination of the Part 22 Cellular renewal rules, as well as from the new PSD option and related technical rule revisions, which provide added flexibility for Cellular licensees no matter their size.

173. The Second Further Notice seeks comment on modified information collection requirements. If the Commission adopts revised information collection requirements, the Commission will publish a notice in the *Federal Register* inviting the public to comment on the requirements, as required by the PRA.⁴²⁵ In addition, pursuant to the Small Business Paperwork Relief Act of 2002,⁴²⁶ the Commission seeks specific comment on how it might further reduce the information collection burden for small business concerns with fewer than 25 employees.

B. Congressional Review Act

174. The Commission will send a copy of today’s Second Report and Order, WRS Reform R&O, and Second Further Notice to Congress and the Government Accountability Office pursuant to the Congressional Review Act.⁴²⁷

C. Final Regulatory Flexibility Analysis

175. The Regulatory Flexibility Act of 1980, as amended (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.”⁴²⁸ The Final Regulatory Flexibility Analysis concerning the possible impact of the rule changes contained in both the Second Report and Order and the WRS Reform R&O is attached as

⁴²² Pub. L. No. 104-13.

⁴²³ The Commission will publish a notice in the *Federal Register* inviting the public to comment on the new and modified requirements, as required by the PRA. See 44 U.S.C. §§ 3501-3520.

⁴²⁴ Public Law 107-198, see 44 U.S.C. § 3506(c)(4).

⁴²⁵ See 44 U.S.C. §§ 3501-3520).

⁴²⁶ Public Law 107-198, see 44 U.S.C. § 3506(c)(4).

⁴²⁷ See 5 U.S.C. § 801(a)(1)(A).

⁴²⁸ 5 U.S.C. §§ 601 *et seq.*

Appendix B.

D. Initial Regulatory Flexibility Analysis

176. As required by the RFA, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the rule revisions proposed in the Second Further Notice. The analysis is found in Appendix E. We request written public comment on the analysis. Comments must be filed in accordance with the same deadlines as comments filed in response to the Second Further Notice, and must have a separate and distinct heading designating them as responses to the IRFA. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of the Second Further Notice, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.

E. Ex Parte Presentations

177. *Permit-But-Disclose*. We will continue to treat the Cellular Reform and WRS Reform proceedings as "permit-but-disclose" proceedings in accordance with the Commission's *ex parte* rules.⁴²⁹ Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the Commission's Electronic Comment Filing System (ECFS) available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

F. Filing Requirements

178. *Comments and Replies*. Pursuant to Sections 1.415 and 1.419 of the Commission's rules,⁴³⁰ interested parties may file comments and reply comments concerning the Second Further Notice on or before the dates indicated on the first page of this document. **All filings related to the Second Further Notice should refer to WT Docket No. 12-40.** Comments may be filed using ECFS.⁴³¹

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://apps.fcc.gov/ecfs/>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing.

⁴²⁹ 47 C.F.R. §§ 1.1200 *et seq.*

⁴³⁰ *Id.* §§ 1.415, 1.419.

⁴³¹ See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121-01 (1998).

- Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
 - All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of *before* entering the building.
 - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
 - U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

179. *People with Disabilities.* To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer and Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

180. *Availability of Documents.* Comments, reply comments, and *ex parte* submissions will be publically available online via ECFS.⁴³² These documents will also be available for public inspection during regular business hours in the FCC Reference Information Center, which is located in Room CY-A257 at FCC Headquarters, 445 12th Street, SW, Washington, DC 20554. The Reference Information Center is open to the public Monday through Thursday from 8:00 a.m. to 4:30 p.m. and Friday from 8:00 a.m. to 11:30 a.m.

G. Contact Information

181. For further information regarding the Second Report and Order, contact: Nina Shafran (legal) at (202) 418-2781, Nina.Shafran@fcc.gov; or Moslem Sawez (technical) at (202) 418-8211, Moslem.Sawez@fcc.gov. For further information regarding the Report and Order, contact: Kathy Harris, (202) 418-0609, Kathy.Harris@fcc.gov. For further information regarding the Second Further Notice, contact: Nina Shafran at (202) 418-2781, Nina.Shafran@fcc.gov; or Jessica Greffenius at (202) 418-2896, Jessica.Grefenius@fcc.gov.

VI. ORDERING CLAUSES

182. Accordingly, IT IS ORDERED, pursuant to Sections 1, 2, 4(i), 4(j), 7, 301, 303, 307, 308, 309, and 332 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 154(j), 157, 301, 303, 307, 308, 309, and 332, that this SECOND REPORT AND ORDER and SECOND FURTHER NOTICE OF PROPOSED RULEMAKING in WT Docket No. 12-40 ARE ADOPTED.

183. IT IS FURTHER ORDERED, pursuant to Sections 1, 2, 4(i), 4(j), 301, 303, 307, 308, 309, and 332 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 154(j), 301, 303, 307, 308, 309, and 332, that this REPORT AND ORDER in WT Docket No. 10-112 IS ADOPTED.

184. IT IS FURTHER ORDERED that the SECOND REPORT AND ORDER and the REPORT AND ORDER SHALL BE EFFECTIVE 30 days after publication of a summary in the *Federal*

⁴³² Documents will generally be available electronically in ASCII, Microsoft Word, and/or Adobe Acrobat.

Register.

185. IT IS FURTHER ORDERED that Part 22 of the Commission's rules, 47 CFR Part 22, IS AMENDED as specified in Appendix A, effective 30 days after publication in the *Federal Register* except as otherwise provided herein.

186. IT IS FURTHER ORDERED that the amendments adopted in the SECOND REPORT AND ORDER, and specified in Appendix A, to Sections 22.317, 22.911(a)-(c), 22.913(a), 22.913(c), 22.913(f), 22.947, and 22.953(c), 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.

187. IT IS FURTHER ORDERED that, pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments on the SECOND FURTHER NOTICE OF PROPOSED RULEMAKING on or before 30 days after publication in the *Federal Register* and reply comments on or before 60 days after publication in the *Federal Register*.

188. 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 the SECOND REPORT AND ORDER, REPORT AND ORDER, and SECOND FURTHER NOTICE OF PROPOSED RULEMAKING to Congress and to the Government Accountability Office.

189. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of the SECOND REPORT AND ORDER, REPORT AND ORDER, and SECOND FURTHER NOTICE OF PROPOSED RULEMAKING, including the Final Regulatory Flexibility Analysis and the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Final Rules

Part 22 of Title 47 of the Code of Federal Regulations is amended as follows:

PART 22—PUBLIC MOBILE SERVICES

1. The authority citation for part 22 continues to read as follows:

Authority: 47 U.S.C. 154, 222, 303, 309 and 332.

2. Section 22.99 is amended by revising the definition of “Cellular system,” and by adding a new term and definition, to read as follows:

§ 22.99 Definitions.

* * * * *

Cellular system. An automated high-capacity system of one or more multi-channel base stations designed to provide radio telecommunication services to mobile stations over a wide area in a spectrally efficient manner. Cellular systems employ techniques such as automatic hand-off between base stations of communications in progress to enable channels to be re-used at relatively short distances.

* * * * *

Power spectral density (PSD). The power of an emission in the frequency domain, such as in terms of ERP or EIRP, stated per unit bandwidth, e.g., watts/MHz.

* * * * *

3. Section 22.169 is revised in its entirety to read as follows:

§ 22.169 International coordination.

Operation of systems and channel assignments under this part are subject to the applicable provisions and requirements of treaties and other international agreements between the United States government and the governments of Canada and Mexico.

4. Section 22.317 is revised by adding a sentence at the end to read as follows:

§ 22.317 Discontinuance of station operation.

* * * This section 22.317 does not apply to the Cellular Radiotelephone Service (*see* § 22.947).

5. Section 22.907 is amended by revising the introductory paragraph to read as follows:

§ 22.907 Coordination of channel usage.

Licenses in the Cellular Radiotelephone Service must coordinate, with the appropriate parties, channel usage at each transmitter location within 121 kilometers (75 miles) of any transmitter locations authorized to other licensees or proposed by other applicants, except those with mutually exclusive applications. Licensees utilizing systems employing a frequency re-use factor of 1 (universal re-use) are exempt from this requirement.

* * * * *

6. Section 22.911 is amended by revising the introductory paragraph, and by revising the heading and introductory paragraph in paragraph (a), and by revising the heading in paragraph (b) and the last sentence of (b)(1), and by adding new paragraph (c), and by revising paragraph (d), and by removing and reserving paragraph (e), to read as follows:

§ 22.911 Cellular geographic service area.

The Cellular Geographic Service Area (CGSA) of a Cellular system is the geographic area considered by the FCC to be served by the Cellular system and is the area within which (1) Cellular systems are entitled to protection and (2) adverse effects for the purpose of determining whether a petitioner has standing are recognized. The CGSA is the composite of the service areas of all of the cells in the system, excluding any Unserved Area (even if it is served on a secondary basis) or area within the CGSA of another Cellular system. The service area of a cell is the area within its service area boundary (SAB). Licensees that use power spectral density (PSD) at cell sites within their licensed geographic area are subject to paragraph (c) of this section; all other licensees are subject to paragraph (a) (or, as applicable, (b)) of this section. If the calculation under paragraph (a), (b), or (c) (as applicable) yields an SAB extension comprising at least 130 contiguous square kilometers (50 contiguous square miles), the licensee must submit an application for major modification of the CGSA using FCC Form 601. *See also* §§ 22.912, 22.949, and 22.953.

- (a) *CGSA determination (non-PSD)*. For the purpose of calculating the SABs for cell sites and determining CGSA expansion areas for Cellular base stations that do not operate using PSD (as permitted under section 22.913), the distance to the SAB is calculated as a function of effective radiated power (ERP) and antenna center of radiation height above average terrain (HAAT), height above sea level (HASL), or height above mean sea level (HAMSL). * * *
- (b) *Alternative CGSA determination (non-PSD)*. * * *
 - (1) The alternative CGSA determination must define the CGSA in terms of distances from the cell sites to the 32 dB μ V/m contour along the eight cardinal radials, with points in other azimuthal directions determined by the method given in paragraph (a)(6) of this section. The distances used must be representative of the coverage within the eight cardinal radials, as depicted by the alternative CGSA determination. * * *
- (c) *CGSA determination (PSD)*.
 - (1) For the purpose of calculating the SABs for cell sites and determining CGSA expansion areas for Cellular base stations that operate using PSD (as permitted under section 22.913), the licensee must use a predictive propagation model that is appropriate for the service provided, taking into account terrain and local conditions. The SAB and CGSA boundary must be defined in terms of distances from the cell site to the 32 dB μ V/m contour along the eight cardinal radials, with points in other azimuthal directions determined by the method set forth in paragraph (a)(6) of this section. The distances used must be representative of the coverage within the eight cardinal radials.

- (2) An application for major modification of the CGSA under this paragraph (c) must include, as an exhibit, a depiction of the CGSA accompanied by one or more supporting propagation studies using methods appropriate for the 800-900 MHz frequency range, including all supporting data and calculations, and/or by extensive field strength measurement data. For the purpose of such submissions, Cellular service is considered to be provided in all areas, including “dead spots,” between the transmitter location and the locus of points where the predicted or measured median field strength finally drops to 32 dB μ V/m (i.e., does not exceed 32 dB μ V/m further out). If, after consideration of such submissions, the FCC finds that adjustment to a CGSA is warranted, the FCC may grant the application.
- (d) *Protection afforded.* Cellular systems are entitled to protection only within the CGSA (as determined in accordance with this section) from co-channel and first-adjacent channel interference (see § 22.983). Licensees must cooperate in resolving co-channel and first-adjacent channel interference by changing channels used at specific cells or by other technical means.
- (e) [reserved]

7. Section 22.913 is revised in its entirety to read as follows:

§ 22.913 Effective radiated power limits.

Licensees in the Cellular Radiotelephone Service are subject to the effective radiated power (ERP) limits and other requirements in this Section. *See also* § 22.169.

- (a) *Maximum ERP.* The ERP of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.
- (1) Except as described in paragraphs (a)(2), (a)(3), and (a)(4) of this section, the ERP of base stations and repeaters must not exceed—
 - i. 500 watts per emission; or
 - ii. 400 watts/MHz (PSD) per sector.
 - (2) Except as described in paragraphs (a)(3) and (a)(4) of this section, for systems operating in areas more than 72 kilometers (45 miles) from international borders that:
 - (i) are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, or
 - (ii) extend coverage into Unserved Area on a secondary basis (see § 22.949), the ERP of base transmitters and repeaters must not exceed—
 - i. 1000 watts per emission; or
 - ii. 800 watts/MHz (PSD) per sector.
 - (3) Provided that they also comply with paragraphs (b) and (c) of this section, licensees are permitted to operate their base transmitters and repeaters with an ERP greater than 400 watts/MHz (PSD) per sector, up to a maximum ERP of 1000 watts/MHz (PSD) per sector unless they meet the conditions in paragraph (a)(4) of this section.
 - (4) Provided that they also comply with paragraphs (b) and (c) of this section, licensees of systems operating in areas more than 72 kilometers (45 miles) from international borders that:
 - (i) are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from

the Bureau of the Census, or (ii) extend coverage into Unserved Area on a secondary basis (*see* § 22.949), are permitted to operate base transmitters and repeaters with an ERP greater than 800 watts/MHz (PSD) per sector, up to a maximum of 2000 watts/MHz (PSD) per sector.

- (5) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.
- (b) *Power flux density (PFD)*. Until [SEVEN YEARS FROM THE EFFECTIVE DATE OF THIS RULE], each Cellular base station that operates at the higher ERP limits permitted under paragraphs (a)(3) and (a)(4) of this section must be designed and deployed so as not to exceed a modeled PFD of 3000 microwatts/m²/MHz over at least 98% of the area within 1 km of the base station antenna, at 1.6 meters above ground level. To ensure its compliance with this requirement, the licensee must perform predictive modeling of the PFD values within at least 1 km of each base station antenna prior to commencing such operations and, thereafter, prior to making any site modifications that may increase the PFD levels around the base station. The modeling tools must take into consideration terrain and other local conditions and must use good engineering practices for the 800 MHz band.
- (c) *Advance notification requirement*. At least 30 days but not more than 90 days prior to activating a base station at the higher ERP limits permitted under paragraphs (a)(3) and (a)(4) of this section, the Cellular licensee must provide written advance notice to any public safety licensee authorized in the frequency range 806-816 MHz/851-861 MHz with a base station located within a radius of 113 km of the Cellular base station to be deployed. The written notice shall be required only one time for each such cell site and is for informational purposes only; the public safety licensees are not afforded the right to accept or reject the activation or to unilaterally require changes in the operating parameters. The written notification must include the base station's location, ERP level, height of the transmitting antenna's center of radiation above ground level, and the timeframe for activation, as well as the Cellular licensee's contact information. Additional information shall be provided by the Cellular licensee upon request of a public safety licensee required to be notified under this paragraph (c). *See also* §§ 22.970-22.973.
- (d) *Power measurement*. Measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB. Power measurements for base transmitters and repeaters must be made in accordance with either of the following:
- (1) A Commission-approved average power technique (*see* FCC Laboratory's Knowledge Database); or
 - (2) Peak transmit power. For purposes of this section, peak transmit power must be measured over an interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, *etc.*, so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.
- (e) *Height-power limit*. The ERP of base transmitters must not exceed the amount that would result in an average distance to the service area boundary of 79.1 kilometers (49 miles) for Cellular systems authorized to serve the Gulf of Mexico MSA and 40.2 kilometers (25 miles) for all other Cellular systems. The average distance to the service area boundary is calculated by taking the arithmetic mean of the distances determined using the procedures specified in § 22.911 for the eight cardinal radial directions.

(f) *Exemptions from height-power limit.* Licensees need not comply with the height-power limit in paragraph (e) of this section if either of the following conditions is met:

- (1) The proposed operation is coordinated with the licensees of all affected Cellular systems on the same channel block within 121 kilometers (75 miles) and concurrence is obtained; or
- (2) The licensee's base transmitter or repeater is operated at the ERP limits (W/MHz) specified above in paragraphs (a)(1)(ii), (a)(2)(ii), (a)(3), or (a)(4) of this section.

8. Section 22.917 is amended by revising paragraph (b) to read as follows:

§22.917 Emission limitations for Cellular equipment.

* * * * *

(b) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows:

- (1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
- (2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.

* * * * *

9. Sections 22.935, 22.936, 22.939, 22.940, and 22.943 are removed and reserved.

§§ 22.935-22.943

[Reserved]

10. New Section 22.947 is added to part 22 to read as follows:

§ 22.947 Discontinuance of service.

- (a) *Termination of authorization.* (1) Except with respect to CMA672-A (*see* paragraph (a)(2) of this section 22.947), a licensee's Cellular Geographic Service Area (CGSA) authorization will automatically terminate, without specific Commission action, if the licensee permanently discontinues service. A new-system licensee is not subject to this provision until after expiration of the construction period specified in § 22.946.
- (2) *CMA672-A (Chambers, TX).* The licensee's authorization for CMA672-A will automatically terminate, without specific Commission action, if the licensee permanently discontinues service after meeting its interim construction requirement as specified in § 22.961(b)(1).

- (b) *Permanent discontinuance.* Permanent discontinuance of service is defined as 180 consecutive days during which a Cellular licensee does not operate or, in the case of a commercial mobile radio service provider, does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to the providing carrier.
- (c) *Filing requirements.* A licensee that permanently discontinues service as defined in this section must notify the Commission of the discontinuance within 10 days by filing, via the ULS, FCC Form 601 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.

11. Section 22.953 is amended by revising paragraph (c) to read as follows:

§ 22.953 Content and form of applications for Cellular Unserved Area authorizations.

* * *

- (c) *Existing systems - minor modifications.* Licensees making minor modifications pursuant to § 1.929(k) of this chapter must file FCC Form 601 or FCC Form 603, provided, however, that a resulting reduction in coverage within the CGSA is not subject to this requirement. *See* § 1.947(b). *See also* § 22.169. If the modification involves a contract SAB extension into or from the Gulf of Mexico Exclusive Zone, it must include a certification that the required written consent has been obtained. *See* §§ 22.912(c) and 22.950.

12. Sections 22.955 and 22.957 are removed and reserved.

§§ 22.955-22.957

[Reserved]

APPENDIX B

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ an Initial Regulatory Flexibility Analysis (Cellular Reform IRFA) was incorporated in the *Report and Order and Further Notice of Proposed Rulemaking* in WT Docket No. 12-40 released in November 2014 (*Cellular Reform R&O/FNPRM*).² Also pursuant to the RFA, an Initial Regulatory Flexibility Analysis (WRS Reform IRFA) was incorporated in the *Notice of Proposed Rulemaking and Order* in WT Docket No. 10-112 released in May 2010 (*WRS Reform NPRM and Order*).³

2. The Commission sought written public comment on the proposals in each of the *Cellular Reform R&O/FNPRM* and the *WRS Reform NPRM and Order*, including comment on both the Cellular Reform IRFA and the WRS Reform IRFA. No comments were filed addressing either IRFA. This present FRFA conforms to the RFA.⁴

A. Need for, and Objectives of, the Cellular Reform Second Report and Order

3. In today's Second Report and Order in the Cellular Reform proceeding (WT Docket No. 12-40), the Commission adopts several additional reforms of the 800 MHz Cellular Radiotelephone (Cellular) Service rules. These include critical updates to the Cellular radiated power and related technical rules, facilitating efficient deployment of more advanced broadband communications services such as LTE, and additional licensing reforms that recognize the CGSA as a geographically licensed area within which licensees are afforded flexibility to make certain modifications without the need for Commission filings. All of these rule changes advance the Commission's goals of harmonizing our rules across competing commercial wireless services where practicable, and enhancing the use of licensee and Commission resources. Because the Cellular Service shares the 800 MHz spectrum with public safety licensees, today's reforms also take into account the need to avoid increased interference to public safety communications, which are so vital to our daily lives.

4. Most importantly among the technical rule changes adopted today, the Commission revises the ERP limits in Section 22.913 to provide the option of using a PSD model for base station transmitters and repeaters. This updates the decades-old rule that has favored narrowband emission systems (e.g., GSM) and has penalized wideband emission systems. The PSD model can better accommodate newer, wideband technologies by establishing ERP limits on a "watts per MHz of spectrum bandwidth" basis. While we are retaining the existing ERP limits of 500 W per emission in non-rural

¹ See 5 U.S.C. § 603. The RFA, 5 U.S.C. § 601–612, was amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² *Amendment of Parts 1 and 22 of the Commission's Rules with Regard to the Cellular Service, Including Changes in Licensing of Unserved Area; Amendment of the Commission's Rules with Regard to Relocation of Part 24 to Part 27; Interim Restrictions and Procedures for Cellular Service Applications; Amendment of Parts 0, 1, and 22 of the Commission's Rules with Regard to Frequency Coordination for the Cellular Service; Amendment of the Commission's Rules Governing Radiated Power Limits for the Cellular Service*, WT Docket No. 12-40, RM Nos. 11510 and 11660, Report and Order and Further Notice of Proposed Rulemaking, 29 FCC Rcd 14100, 14176 (2014).

³ *Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services; Imposition of a Freeze on the Filing of Competing Renewal Applications for Certain Wireless Radio Services and the Processing of Already-Filed Competing Renewal Applications*, WT Docket No. 10-112, Notice of Proposed Rulemaking and Order, 25 FCC Rcd 6996, 7050 (2010).

⁴ See 5 U.S.C. § 604.

areas and up to 1000 W per emission in rural areas as an option for Cellular licensees that either cannot or choose not to operate their systems using a PSD model, we also establish PSD limits of 400 W/MHz per sector for non-rural operations and 800 W/MHz per sector for rural operations, without any PFD limit or special conditions. These limits will permit robust Cellular deployment of more advanced technologies without increasing the potential for unacceptable interference to 800 MHz public safety communications.

5. Recognizing, however, that Cellular licensees may need additional power to achieve sufficient coverage in sparsely populated areas as, for example, when using systems with antennas well above street level or on a mountain top, we also revise Section 22.913 to permit Cellular licensees to operate at the Higher PSD Limits—up to 1000 W/MHz in non-rural areas, and up to 2000 W/MHz in rural areas, provided that they comply with two special requirements. First, at least 30 days (but not more than 90 days) prior to activating a cell site at the Higher PSD Limits, the Cellular licensee must provide written advance notice to any public safety licensee authorized in the frequency range of 806-816 MHz/851-869 MHz with a base station located within a radius of 113 km of the Cellular base station to be deployed. The new provision in Section 22.913(c) sets forth this one-time requirement and delineates the specific information that is to be included in the written notice, along with the requirement to provide additional information upon request of a public safety licensee.

6. As an additional safeguard during a seven-year transition period of PSD deployment, we adopt a PFD limit for Cellular base transmitters and repeaters operating at the Higher PSD Limits. Specifically, we adopt Section 22.913(b), which establishes a modeled PFD limit of 3000 $\mu\text{W}/\text{m}^2/\text{MHz}$ at 1.6 meters above ground level, and we require that the limit be observed over at least 98 percent of the area within 1 km of each applicable base station antenna. To determine compliance, Cellular licensees must perform predictive modeling using good engineering practices and modeling tools (software) accounting for terrain and local conditions prior to operating their systems at the Higher PSD Limits or, thereafter, prior to changing the parameters of these sites such that it could increase the PFD levels. Notably, the Commission is retaining as-is the important provisions in Sections 22.970-22.973 of our rules, which were carefully crafted in the 800 MHz rebanding proceeding to address incidents of interference to 800 MHz public safety radio systems caused by Cellular and commercial ESMR licensees. During the seven-year transition period, the PFD limit is therefore an addition to, and not a replacement for, the interference resolution process set forth in Sections 22.970-22.973.

7. The PFD safeguard will sunset seven years from the effective date of new Section 22.913(b). The seven-year period will provide time for a crucial three-way conversation and good faith co-existence efforts on the part of Cellular (and other commercial) system operators and public safety communications operators, as well as public safety equipment manufacturers. To facilitate the conversation, the Commission directs the Bureaus to convene a public forum within the first 12 months following release of today's Second Report and Order, to bring together representatives of the three industry groups—Cellular carriers, public safety representatives, and the leading public safety equipment manufacturers—to focus attention on what has been achieved, what remains to be done, and how to implement the changes necessary to improve spectrum sharing in the 800 MHz bands.

8. Today the Commission also adopts Section 22.913(d), which specifies that Cellular power shall be measured on an average basis and establishes a peak-to-average ratio of 13 dB. The revised Section 22.913 specifies that measurement of average power for Cellular operations must be made during a period of continuous transmission based on Commission-approved average techniques, consistent with those set forth in Section 24.232(d) for PCS. In the renumbered Sections 22.913(e) and (f), the Commission retains the existing height-power limit and the exemption for coordination, but adds an exemption for licensees that operate their systems using PSD. We also leave unchanged the current ERP limit set forth in existing Section 22.913(a)(2) (renumbered as 22.913(a)(5)) of 7 W ERP for mobile transmitters and auxiliary test transmitters. Furthermore, Cellular licensees will continue to be subject to the field strength limit rule (Section 22.983), and thus, regardless of location, power level, or height of the Cellular base station, the licensee's signal strength at the neighboring licensee's CGSA boundary

generally may not exceed 40 dB μ V/m (Cellular licensees may negotiate a different limit, and there is an exception for the Gulf of Mexico market).

9. Section 22.911(a) of our current rules sets forth a formula for determining the SAB of a cell site, using height above average terrain (H) and power (P) values of the proposed new or modified Cellular base station along eight cardinal radials. Existing Section 22.911(b) provides for an alternative calculation if the formula in Section 22.911(a) would yield a CGSA that departs from the licensed geographic area by $\pm 20\%$ where reliable Cellular service is actually provided. In light of our adoption of PSD limits, today we also adopt new Section 22.911(c) that will apply solely to Cellular licensees that operate their systems using a PSD model. Section 22.911(c) is an adaptation of Section 22.911(b) and must be used to calculate the SAB for cell sites and determine CGSA expansion areas for Cellular base stations that operate at the PSD limits we are adopting today. For such licensees, we will require that the SAB be defined in terms of distances from the cell site(s) to the 32 dB μ V/m contour along the eight cardinal radials. This will ensure that applicants seeking to expand their CGSA or start a new Cellular system in Unserved Area are treated on par with one another regardless of the technology they choose.

10. If the methodology in Section 22.911(c) yields an SAB extension comprising at least 50 contiguous square miles, *regardless* of whether the CGSA departs $\pm 20\%$ in the service area of any cell site, the Cellular licensee will be required to file an application for major modification of the CGSA using FCC Form 601. The applicant will be required to submit its CGSA determination pursuant to the new provision of Section 22.911, depicting the CGSA using a predictive model. If the predictive model results in calculations that depict an SAB extension comprising less than 50 contiguous square miles, the licensee may not claim the area as part of its CGSA; it may provide service in the extension area on a secondary basis only. No application should be filed (and we will not process any such application that is filed) in that scenario.

11. Section 22.917(a) of our rules specifies the current Cellular OOBE limit for suppression of unwanted emissions. We leave this provision unchanged, but we revise the measurement procedure provision in renumbered Section 22.917(b)(1), which applies for measurements in the spectrum below 1 GHz, and specify, in Section 22.917(b)(2), that measurements in the spectrum above 1 GHz should use a reference bandwidth of 1 MHz. We also revise the introductory paragraph of Section 22.907, governing channel usage coordination, to exempt those Cellular licensees that deploy technologies with a frequency re-use factor of one.

12. In today's Second Report and Order, we also streamline the international coordination rules by eliminating Sections 22.955 (Canada) and 22.957 (Mexico), which are specific to the Cellular Service but essentially redundant to Section 22.169, which requires *all* Part 22 licensees to comply with applicable provisions and requirements of treaties and other international agreements between the United States government and the governments of Canada and Mexico. In Section 22.169, we adopt a minor revision to add a reference to "operation of systems."

13. In today's Second Report and Order, the Commission also adopts two additional reforms to the Cellular licensing rules, furthering the transition to geographically-based licensing that was largely accomplished in the *Cellular Reform R&O/FNPRM*. First, consistent with our approach in recent proceedings involving other flexible commercial wireless services, we adopt a new rule—Section 22.947—that defines permanent discontinuance for Cellular licensees as 180 consecutive days during which the licensee does not operate or, in the case of a Cellular commercial service provider, does not provide service to at least one unaffiliated subscriber. This new rule will be applied to the entire licensed area, i.e., the CGSA, and once it takes effect, Cellular licensees will no longer be subject to the existing Part 22 rule, Section 22.317, which is applied to individual cell sites. Consequently, cessation of operations at an individual cell site will no longer result in modification of the CGSA to reflect the reduction in service coverage. If a Cellular licensee files a cancellation notification concerning permanent discontinuance of any individual cell site(s) once Section 22.947 as adopted today has taken

effect, we will dismiss it as an unnecessary filing. If an Unserved Area application is granted to create a *new* Cellular system, the new-system licensee will be allowed the full construction period of one year from the date of grant of the authorization (plus any granted extension period) before counting the 180-day permanent discontinuance period. The newly adopted Cellular permanent discontinuance rule includes a special provision (Section 22.947(a)(2)) for the Chambers, Texas CMA.

14. Consistent with Section 1.955(a)(3) of our rules, if a licensee permanently discontinues service under new Section 22.947, the licensee must notify the Commission of the discontinuance within 10 days by filing FCC Form 601 authorizing license cancellation for the entire CGSA. We emphasize, however, that the Cellular license will be terminated automatically without specific Commission action if service is permanently discontinued, even if the licensee fails to file the applicable FCC Form. Consistent with Section 22.949 of our rules, following public notice of cancellation of the Cellular license, the Unserved Area will be available to applicants seeking to establish a new Cellular system or expand an existing CGSA by at least 50 contiguous square miles. We also emphasize that, notwithstanding today's adoption of Section 22.947, Cellular licensees remain subject to any future Commission action affecting wireless radio services in the pending proceeding concerning certain wireless radio services (WT Docket No. 10-112) (the WRS Reform proceeding), which covers the Cellular Service among others.

15. The second licensing reform adopted in today's Second Report and Order eliminates another lingering vestige of the legacy site-based licensing regime: the requirement to file a minor modification application when making a change to a Cellular site that results in reduced service coverage within the CGSA. This approach is consistent with other geographically licensed commercial wireless services and will afford Cellular licensees more flexibility, as the CGSA boundary will remain fixed, even after minor changes to cell sites, except insofar as Cellular licensees will continue to be able to expand their CGSAs under Section 22.949 of our current rules. Today's revision is reflected in revised Section 22.953(c) of our rules. If a licensee files a minor modification application for a "CGSA reduction" once the revised Section 22.953(c) as adopted today has taken effect, we will dismiss it as an unnecessary filing. Notwithstanding this rule change, Cellular licensees remain subject to any future Commission action affecting wireless radio services in the pending WRS Reform proceeding.

16. In Section II.E.5. of the Second Report and Order, the Commission discusses the dramatic reduction in the number of CGSA-expansion applications filed in 2015 and 2016 as compared to prior years, noting that it is far greater than the reduction anticipated when the Commission adopted the numerous licensing reforms in the *Cellular Reform R&O/FNPRM*. The Commission concludes that it would not serve the public interest at this time to expend resources on establishing the use of frequency coordinators for the Cellular Service, but it will monitor the data and revisit today's decision if there is a significant uptick in CGSA-expansion or new-system filings.

17. All new and revised rules adopted in today's Second Report and Order are set forth in Appendix A (Final Rules).

B. Need for, and Objectives of, the WRS Reform Report and Order

18. In today's Report and Order in the WRS Reform proceeding (WT Docket No. 10-112) (WRS Reform R&O), the Commission eliminates the comparative hearing rules applicable to Cellular license renewal applications in Part 22 of the Commission's rules—Sections 22.935, 22.936, 22.939, 22.940, and 22.943. This change is made to bring the Cellular licensing renewal procedures into conformance with the rules applicable to newer wireless services, such as those for the 700 MHz band. By making this change, the Commission simplifies the regulatory process for Cellular licensees, including small entity Cellular licenses, and reduces the regulatory burden on all such licensees.

C. Summary of Significant Issues Raised by Public Comments in Response to IRFA

19. There were no comments filed that specifically addressed the proposed rules and policies

presented in the Cellular Reform IRFA or with respect to the elimination of the comparative hearing rules applicable to Cellular license renewal applications in the WRS Reform IRFA. Nonetheless, the agency considered the potential impact of the rules proposed in the Cellular Reform IRFA on small entities and reduced the compliance burden for all small entities (as discussed below in paragraphs 29-32) in order to reduce the economic impact of the rules enacted herein on such entities. The elimination of the comparative hearing rules applicable to Cellular license renewal applications would reduce the burden on all Cellular licensees, specifically including small entity Cellular licensees.

D. Response to Comments by Chief Counsel for Advocacy of the Small Business Administration

20. Pursuant to the Small Business Jobs Act of 2010, which amended the RFA, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rules as a result of those comments.⁵

21. The Chief Counsel did not file any comments in response to the proposed rules in the Cellular Reform proceeding or the proposed deletion of the Part 22 comparative hearing rules applicable to Cellular license renewal applications in the WRS Reform proceeding.

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

22. 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 rules adopted herein.⁶ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁷ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁸ 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.⁹

23. *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 new and revised rules adopted today. As of 2014, according to the SBA, there were 28.2 million small businesses in the U.S., which represented 99.7% of all businesses in the United States.¹⁰ Additionally, a “small organization” is generally “any not-for-profit

⁵ 5 U.S.C. § 604 (a)(3).

⁶ 5 U.S.C. § 604(a)(3).

⁷ 5 U.S.C. § 601(6).

⁸ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

⁹ 15 U.S.C. § 632.

¹⁰ See Small Business Administration, Office of Advocacy, “Frequently Asked Questions,” http://www.sba.gov/sites/default/files/FAQ_Sept_2012.pdf.

(continued...)

enterprise which is independently owned and operated and is not dominant in its field.”¹¹ Nationwide, as of 2007, there were approximately 1,621,215 small organizations.¹² 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.”¹³ Census Bureau data for 2012 indicate that there were 89,476 governmental jurisdictions in the United States.¹⁴ We estimate that, of this total, as many as 88,761 entities may qualify as “small governmental jurisdictions.”¹⁵ Thus, we estimate that most governmental jurisdictions are small.

24. *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 services, paging services, wireless internet access, and wireless video services.¹⁶ The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, Census data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had fewer than 1,000 employees. Thus under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities. Similarly, according to internally developed Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including the Cellular Service, PCS, and Specialized Mobile Radio services.¹⁷ Of this total, an estimated 261 have 1,500 or fewer employees.¹⁸ Thus, using available data, we estimate that the majority of wireless firms can be considered small. The Commission’s own data—available in its Universal Licensing System—indicate that, as of October 25, 2016, there are 280 Cellular licensees that will be affected by our actions today.¹⁹ The Commission does not know how many of these licensees are small, as the Commission does not collect that information for these types of entities.

F. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

25. The projected reporting, recordkeeping, and other compliance requirements resulting

¹¹ 5 U.S.C. § 601(4).

¹² INDEPENDENT SECTOR, *THE NEW NONPROFIT ALMANAC & DESK REFERENCE* (2010).

¹³ 5 U.S.C. § 601(5).

¹⁴ U.S. CENSUS BUREAU, *STATISTICAL ABSTRACT OF THE UNITED STATES:2012* at 331, Table 429 (Effective Oct 2011), <http://www2.census.gov/library/publications/2011/compendia/statab/131ed/2012-statab.pdf> (citing data from 2007).

¹⁵ The 2012 U.S. Census data for small governmental organizations are not presented based on the size of the population in each organization. There were 89,476 local governmental organizations in the Census Bureau data for 2012, which is based on 2007 data. As a basis of estimating how many of these 89,476 local government organizations were small, we note that there were a total of 715 cities and towns (incorporated places and minor civil divisions) with populations over 50,000 in 2011. See U.S. Census Bureau, *City and Town Totals Vintage: 2011*, <http://www.census.gov/popest/data/cities/totals/2011/index.html> (last visited Oct. 20, 2016). If we subtract the 715 cities and towns that meet or exceed the 50,000 population threshold, we conclude that approximately 88,761 are small.

¹⁶ NAICS Code 517210. See <http://www.census.gov/cgi-bin/ssd/naics/naicsrch>.

¹⁷ *Trends in Telephone Service*, at tbl. 5.3.

¹⁸ *Id.*

¹⁹ See <http://wireless.fcc.gov/uls>. For the purposes of this FRFA, consistent with Commission practice for wireless services, the Commission estimates the number of licensees based on the number of unique FCC Registration Numbers.

from the Cellular Reform Second Report and Order will apply to all entities in the same manner, consistent with the approach we adopted in the *Cellular Reform R&O/FNPRM*. The rule modifications, taken as a whole, should have a beneficial, if any, reporting, recordkeeping, or compliance impact on small entities because all Cellular licensees will be subject to reduced filing burdens and recordkeeping. We also expect today's action to better enable all Cellular licensees, no matter their size, to implement technology upgrades, including those involving reconfiguration and possible relocation of cell sites and other network elements.

26. The primary changes are as follows: (1) we revise the rule governing Cellular base station ERP limits to add PSD limits as an option for all Cellular Service carriers, also allowing PSD limits to exceed a certain threshold subject to compliance with (a) an advance notification requirement to alert public safety licensees within a certain radius of the planned activation, and (b) a modeled PFD limit for a transition period of 7 years; (2) we adopt an average power measurement requirement and a PAR limit of 13 dB; (3) we revise the rule setting forth the methods of determining the SABs and CGSAs by adding a separate methodology applicable to carriers that operate their systems using PSD, so that applicants for Unserved Area are treated on par with one another regardless of the technology they choose; (4) we streamline the existing international coordination requirements; (5) we adopt a much more flexible, geographically-based rule concerning permanent discontinuance of service; and (6) we eliminate the requirement to file a minor modification application when a non-permanent-discontinuance change to a cell site results in coverage reduction. With these reforms, we achieve major Commission goals of promoting spectral efficiency and providing Cellular licensees with flexibility to select the technology that best suits their needs without being disadvantaged one way or the other, while also taking into account the need to protect systems in the immediately adjacent bands, particularly public safety operations.

27. For small entities choosing to operate under the new PSD model at the Higher PSD Limits, we recognize that those entities may need to purchase new specialized computer software in order to ensure their compliance with the PFD limit by performing the requisite predictive modeling during the 7-year transition period. We note the possibility that small entities may already use specialized software to comply with existing requirements, and therefore would not need to incur any additional costs in compliance with new Section 22.913(b). We do not anticipate that the advance notification requirement will require small entities to hire any professionals. We also note that for those licensees who cannot or choose not to deploy systems using a PSD model, we have retained the existing ERP limits. Under this option, small entities will not incur any additional costs beyond their existing compliance measures.

28. We also do not anticipate that the revised rules governing power measurement provisions and PSD-related SAB and CGSA calculation methodologies will impose burdens beyond existing compliance costs for small entities. While the Commission is not currently in a position to determine whether these rule changes will require small entities to hire attorneys, engineers, consultants, or other professionals, we believe licensees will largely be able to employ the compliance mechanisms they already have in place. Additionally, by streamlining existing coordination requirements and adopting more flexible permanent discontinuance and minor system modification provisions, the rules we adopt today will reduce existing reporting, recordkeeping, and other compliance requirements.

29. 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. In fact, the revisions adopted by the Commission should benefit small entities by reducing certain administrative burdens while simultaneously giving them more flexibility in their Cellular operations.

30. The action taken in today's WRS Reform R&O to delete the five Part 22 rules applicable to Cellular license renewal applications will decrease the projected reporting, recordkeeping, and other compliance requirements for all entities previously subject to the rules, specifically including small

entities.

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

31. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed 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 and 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.”²⁰

32. In order to minimize the economic impact on small entities resulting from the rules we adopt today, we leave existing models of measurement, calculation, and prediction largely intact, giving licensees the choice to continue operating under existing compliance mechanisms. Particularly in view of the additional cost to small entities that a mandatory transition to PSD might impose, our decision to retain the existing non-PSD limits as an option will ensure that carriers who continue using narrowband technologies such as GSM are not disadvantaged.

33. For licensees that choose to operate under the new PSD limits, the Commission sought to minimize the economic impact on small entities by limiting additional compliance requirements to only those absolutely necessary to achieve effective implementation of the new rules. For example, the advance notification requirement we adopt is only a one-time requirement for licensees choosing to operate at the Higher PSD Limits, prior to activating the cell site and commencing operations at the Higher PSD Limits. While the Commission considered the possibility of also requiring licensees to provide advance notice with each subsequent increase in the ERP PSD level at the same cell site, we found that requiring more than a one-time notification would impose an unnecessary burden on Cellular licensees. We also considered and rejected a proposed requirement that licensees measure PFD at every base station deployed at the Higher PSD Limits. Instead, we adopt a predictive modeling requirement, imposing significantly less additional costs of compliance. Minimizing these requirements particularly benefits small entities, which might be more sensitive to increased operation and compliance costs than larger national carriers.

34. The Commission believes that its changes to the radiated power rules and related technical rules, the permanent discontinuance rule, and its elimination of filings for non-permanent-discontinuance changes to cell sites within the CGSA will benefit all Cellular incumbents and new entrants, including small entities. These technical and licensing rule reforms will provide significant new flexibility to all Cellular licensees to respond more rapidly to changes in demographics, technologies, and market demands. In view of our efforts to minimize significant costs resulting from these rule changes, we believe the benefits of streamlining and increased flexibility will outweigh the costs, if any, of new compliance requirements. The changes also put Cellular licensees more on a regulatory par with other wireless licensees that hold geographic area licenses, such as PCS and certain AWS licensees, thus easing the regulatory burden of compliance by eliminating discrepancies in competing services. The Commission has historically valued harmonization in the rules for wireless licensees by eliminating burdensome requirements, as appropriate. We believe small entities stand to benefit particularly from this increased flexibility and harmonization, as it may allow them to overcome barriers to entry in more competitive Cellular markets. We anticipate that the changes adopted today will facilitate Cellular licensees’ investment in—and deployment of—ever more advanced technologies as they evolve, which benefits the entire Cellular industry, including small entities.

²⁰ 5 U.S.C. § 603(c)(1)-(4).

35. The deletion of the five Part 22 comparative hearing rules applicable to Cellular license renewal applications will reduce the burdens on small entities by removing unnecessary requirement and promoting comparable treatment of competing wireless services.

H. Report to Congress

36. The Commission will send a copy of this Cellular Reform Second Report and Order and WRS Reform R&O, including this FRFA, in a report to Congress pursuant to the Congressional Review Act.²¹ In addition, the Commission will send a copy of this Cellular Reform Second Report and Order and WRS Reform R&O, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of this Cellular Reform Second Report and Order, WRS Reform R&O, and FRFA (or summaries thereof) will also be published in the *Federal Register*.²²

²¹ See 5 U.S.C. § 801(a)(1)(A).

²² See 5 U.S.C. § 604(b).

APPENDIX C**List of Commenters****WT Docket No. 12-40 (RM Nos. 11510 and 11660)**Comments

AT&T Services, Inc. (AT&T)
National Radio Astronomy Observatory (NRAO)
Pericle Communications Company and Shulman, Rogers, Gandal, Porody & Ecker, P.A. (Pericle-Shulman)
Rural Wireless Association, Inc.
Verizon
Wireless Infrastructure Association (WIA)

Reply Comments

Association of Public-Safety Communications Officials-International, Inc. (APCO)
AT&T
Broadpoint, LLC d/b/a Cellular One
CTIA
Enterprise Wireless Alliance
National Public Safety Telecommunications Council
Pericle-Shulman
Verizon
WIA

Ex Parte Letters

APCO
AT&T
CTIA
Gogo Inc.
Morton Leifer (PE), Electronic Communications Specialist, Town of Clarkstown, NY
New Jersey Transit Corporation
NRAO
Pericle-Shulman
State of Connecticut Department of Emergency Services and Public Protection
The Port Authority of New York and New Jersey
Verizon

WT Docket No. 10-112 (Commenters cited that addressed the comparative renewal rules)Comments

AT&T
Blooston Licensees
Commnet Wireless, LLC
CTIA
FiberTower Corporation

Green Flag Wireless, LLC, CWC License Holding, LLC and James McCotter (Green Flag)
LightSquared Inc.
MariTEL, Inc.
MetroPCS Communications, Inc.
Sprint Corporation
T-Mobile USA, Inc. (T-Mobile)
United States Cellular Corporation (USCC)
Verizon
WCS Coalition

WT Docket No. 16-138 (Commenters cited that addressed Part 22 Rules in the 2016 Biennial Review)

Comments

CTIA
Verizon

Reply Comments

Public Knowledge, Common Cause, and North America's Open Technology Institute (Public Knowledge)
T-Mobile

APPENDIX D

Proposed Rules

Part 22 of Title 47 of the Code of Federal Regulations is amended as follows:

PART 22—PUBLIC MOBILE SERVICES

- 1. The authority citation for part 22 continues to read as follows:

Authority: 47 U.S.C. 154, 222, 303, 309 and 332.

- 2. Remove and reserve Section 22.301.

§ 22.301 [Reserved]

- 3. Remove and reserve Section 22.303.

§ 22.303 [Reserved]

- 4. Amend Section 22.321 by removing the existing paragraph (c), renumbering the existing paragraph (d) as paragraph (c), renumbering the existing paragraph (e) as paragraph (d), and renumbering the existing paragraph (f) as paragraph (e), to read as follows:

§ 22.321 Equal Employment Opportunities

* * * * *

(c) *Complaints of violations of Equal Employment Programs.* * * *

(d) *FCC records.* * * *

(e) *Licensee records.* * * *

- 5. Remove and reserve Section 22.325.

§ 22.325 [Reserved]

APPENDIX E

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ the Commission has prepared this 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 today's Second Further Notice of Proposed Rulemaking in the Cellular proceeding (WT Docket No. 12-40) (Second Further Notice). Written comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments listed on the first page of this document. The Commission will send a copy of the Second Further Notice, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).² In addition, the Second Further Notice and IRFA (or summaries thereof) will be published in the *Federal Register*.³

A. Need for, and Objectives of, the Proposed Rules

2. In today's Second Report and Order in the Cellular Reform proceeding (Cellular Reform Second Report and Order), the Commission has taken numerous steps to modernize its Part 22 rules and ensure that Cellular licensees benefit from the same flexibility afforded to licensees of other commercial wireless services. It has also taken steps in the Second Report and Order and in today's companion Report and Order in the WRS Reform proceeding (WT Docket No. 10-112) (WRS Reform R&O) to eliminate from its Cellular rules unnecessary or burdensome requirements. On November 3, 2016, the Commission released a Public Notice seeking comment on the 2016 Biennial Review of our Telecommunications Regulations pursuant to Section 11 of the Communications Act of 1934, as amended.⁴ In their comments in response to the *Biennial Review Public Notice*, CTIA, T-Mobile, Public Knowledge, and Verizon recommend that we eliminate certain administrative and filing requirements.⁵ In response to these recommendations and consistent with our objectives noted above, the Second Further Notice proposes to eliminate several Part 22 rules that treat Cellular and other Part 22 licensees differently as compared to other commercial wireless licensees, or that seem no longer necessary in the age of electronic licensing, or for which the benefits of compliance may no longer outweigh the costs to licensees of compliance. Specifically, the Commission proposes to eliminate Sections 22.301, 22.303, 22.321(c), and 22.325 from our rules.

3. Sections 22.301 and 22.303 of our rules require Part 22 licensees to retain and make available for inspection at station control points hard copies of license authorizations and other records. No similar rules exist for other commercial wireless licensees under Part 24 or Part 27. We propose to eliminate these Part 22 rules in their entirety. In light of electronic licensing, the justification for continuing to require this paperwork burden seems to have significantly diminished if not disappeared entirely. We seek comment on this assumption and on whether there are other records that are not readily

¹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. §§ 601–612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² See 5 U.S.C. § 603(a).

³ See *id.*

⁴ *Biennial Review Public Notice*, 31 FCC Rcd 12174-75. Section 11 requires the Commission to (1) review biennially its regulations “that apply to the operations or activities of any provider of telecommunications service,” and (2) “determine whether any such regulation is no longer necessary in the public interest as the result of meaningful economic competition between providers of such service.” Section 11 directs the Commission to repeal or modify any regulations that it finds are no longer in the public interest. 47 U.S.C. § 161.

⁵ CTIA Biennial Review Comments; Public Knowledge Biennial Review Reply Comments; T-Mobile Biennial Review Reply Comments; Verizon Biennial Review Comments.

available electronically but that are maintained at the station control point. We also seek comment on whether there is a need to require Part 22 licensees to maintain hard copies of administrative and technical materials required under Sections 1.929 and 22.165 of our rules at their station control points.

4. Section 22.321(c) of the Commission's rules requires all Part 22 licensees to submit an annual report to the Commission indicating whether any EEO complaints have been filed at the federal, state, or local level, and if so, to provide for each complaint the names of the parties involved, date of filing, court or agencies reviewing the complaint, appropriate file number, and disposition of the complaint. No similar requirement exists for other commercial wireless licensees under Parts 24 or 27 of our rules. For all practical purposes, Section 22.321(c) appears duplicative of Section 1.815 of our rules, which requires all common carriers with 16 or more full-time employees to file an annual employment report with the Commission on FCC Form 395. Form 395 includes a box to check if EEO complaints have been filed against the carrier, and requires carriers to attach the same information about the complaints that is required under Section 22.321(c). We propose to eliminate Section 22.321(c) as it appears duplicative of Section 1.815, which applies more broadly to all common carriers. We seek comment on this proposal, including whether we may be overlooking a need to require reporting of EEO complaint information under both Sections 22.321(c) and 1.815.

5. Section 22.325 requires that stations have at least one control point and a person on duty who is responsible for station operations. It does not require the person on duty to be at the control point or to continuously monitor the station's transmissions; however, it does require that the control point have facilities that enable the person on duty to turn off transmitters in the event of a malfunction. No corollary rule exists for other commercial wireless licensees under Parts 24 or 27 of our rules. We propose to eliminate Section 22.325 and seek comment on doing so. We invite comment on the costs of having a person on duty who is enabled to shut down transmitters, and whether such a requirement is outdated in light of automated functions or remote monitoring.

6. More generally, in the Second Further Notice, we seek comment on other steps or measures that could help foster the Commission's goal of ensuring flexibility and consistency in licensing across competing commercial wireless services. As one possible measure, we invite comment on whether it would serve the public interest to relocate the Part 22 rules applicable to the Cellular Service, the Part 24 PCS rules, and certain other geographically licensed service rules to Part 27 of the Commission's rules. We also ask specifically whether a new rulemaking should be launched to examine Part 27, and if so, whether any relocation of Part 22, Part 24, and other rules should be reserved to such a rulemaking.

B. Legal Basis

7. The proposed action is taken under Sections 1, 2, 4(i), 4(j), 301, 303, 307, 308, 309, and 332 of the Communications Act of 1934, as amended, 47 U.S.C. §§151, 152, 154(i), 154(j), 301, 303, 307, 308, 309, and 332.

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

8. 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, if adopted.⁶ The RFA general defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁷ In addition, the term "small business" has the

⁶ 5 U.S.C. § 603(b)(3).

⁷ 5 U.S.C. § 601(6).

(continued...)

same meaning as the term “small business concern” under the Small Business Act.”⁸ 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 Small Business Administration (SBA).⁹

9. *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 new and revised rules adopted today. As of 2014, according to the SBA, there were 28.2 million small businesses in the U.S., which represented 99.7% of all businesses in the United States.¹⁰ Additionally, a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹¹ Nationwide, as of 2007, there were approximately 1,621, 215 small organizations.¹² 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.”¹³ Census Bureau data for 2012 indicate that there were 89,476 governmental jurisdictions in the United States.¹⁴ We estimate that, of this total, as many as 88,761 entities may qualify as “small governmental jurisdictions.”¹⁵ Thus, we estimate that most governmental jurisdictions are small.

10. *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 services, paging services, wireless internet access, and wireless video services.¹⁶ The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, Census data for 2012 show that there were 967

⁸ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small-business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

⁹ 15 U.S.C. § 632.

¹⁰ See Small Business Administration, Office of Advocacy, “Frequently Asked Questions,” http://www.sba.gov/sites/default/files/FAQ_Sept_2012.pdf.

¹¹ 5 U.S.C. § 601(4).

¹² INDEPENDENT SECTOR, THE NEW NONPROFIT ALMANAC & DESK REFERENCE (2010).

¹³ 5 U.S.C. § 601(5).

¹⁴ U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2012 at 331, Table 429 (Effective Oct 2011), <http://www2.census.gov/library/publications/2011/compendia/statab/131ed/2012-statab.pdf> (citing data from 2007).

¹⁵The 2012 U.S. Census data for small governmental organizations are not presented based on the size of the population in each organization. There were 89,476 local governmental organizations in the Census Bureau data for 2012, which is based on 2007 data. As a basis of estimating how many of these 89,476 local government organizations were small, we note that there were a total of 715 cities and towns (incorporated places and minor civil divisions) with populations over 50,000 in 2011. See U.S. Census Bureau, City and Town Totals Vintage: 2011, <http://www.census.gov/popest/data/cities/totals/2011/index.html> (last visited Oct. 20, 2016). If we subtract the 715 cities and towns that meet or exceed the 50,000 population threshold, we conclude that approximately 88,761 are small.

¹⁶ NAICS Code 517210. See <http://www.census.gov/cgi-bin/ssd/naics/naicsrch>.

(continued...)

firms that operated for the entire year. Of this total, 955 firms had fewer than 1,000 employees. Thus under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities. Similarly, according to internally developed Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including the Cellular Service, PCS, and Specialized Mobile Radio (“SMR”) services.¹⁷ Of this total, an estimated 261 have 1,500 or fewer employees.¹⁸ Thus, using available data, we estimate that the majority of wireless firms can be considered small. The Commission’s own data—available in its Universal Licensing System—indicate that, as of October 25, 2016, there are 280 Cellular licensees that will be affected by our actions today.¹⁹ The Commission does not know how many of these licensees are small, as the Commission does not collect that information for these types of entities.

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

11. We expect the rule eliminations proposed in the Second Further Notice to reduce reporting, recordkeeping, and other compliance requirements for all Part 22 licensees, regardless of size. The rule eliminations taken as a whole should have a beneficial reporting, recordkeeping, or compliance impact on small entities because all Cellular and other Part 22 licensees will be subject to fewer such burdens.

12. Specifically, Sections 22.301 and 22.303 of our rules currently require Part 22 licensees to retain hard copies of license authorizations and other documents as part of each station’s records. The Second Further Notice proposes to remove these requirements, which would reduce recordkeeping burdens on all licensees, regardless of size, and allow them to realize long-term cost savings associated with electronic recordkeeping. Section 22.321(c) of our rules currently requires Part 22 licensees to submit an annual EEO complaint report that, for all practical purposes, appears to be duplicative of materials that common carriers submit annually on their FCC Form 395. Our proposal to eliminate Section 22.321(c) is intended to remove a duplicative compliance obligation for all Cellular and other Part 22 licensees, regardless of size. Section 22.325 of our rules requires Part 22 licensees to maintain control points for each station and have on duty a person in charge of station operations who can terminate transmitters in the event of a malfunction. Elimination of this rule, as proposed in the Second Further Notice, is intended to decrease the costs of maintaining facilities and personnel to comply with this rule, and allow Cellular and other Part 22 licensees, regardless of size, to realize cost savings inherent in remote monitoring and automatic functions.

13. The Commission also seeks comment in the Second Further Notice on other possible rule eliminations. We ask whether there are other Part 22 rules that commenters think are ripe for removal in light of changed technology, electronic licensing and recordkeeping, or other modernizations. Inviting comment on these questions will help us ascertain whether further reductions in reporting, recordkeeping, and other compliance requirements can be realized for all Part 22 licensees, including small entities.

14. The Commission seeks comment broadly on other measures that could ensure that Cellular licensees benefit from the same level of flexibility available to other commercial wireless licensees, and specifically whether migrating the Part 22 Cellular Service and Part 24 PCS rules to Part 27 of the Commission’s rules would further this goal. The record developed in response to these questions could lead to further rule revisions that reduce compliance obligations for Cellular and other wireless

¹⁷ *Trends in Telephone Service*, at tbl. 5.3.

¹⁸ *Id.*

¹⁹ See <http://wireless.fcc.gov/uls>. For the purposes of this FRFA, consistent with Commission practice for wireless services, the Commission estimates the number of licensees based on the number of unique FCC Registration Numbers.

carriers, regardless of size.

15. The Commission believes that applying the same rules equally to all entities in this context promotes fairness. The Commission does not believe that any costs and/or administrative burdens associated with the rules will unduly burden small entities. In fact, the proposed rule eliminations in the Second Further Notice would benefit small entities by reducing certain administrative burdens while simultaneously giving them more flexibility in their Cellular operations, as discussed above.

E. Steps Taken to Minimize the Significant Economic Impact on Small Entities and Significant Alternatives Considered.

16. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed 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 and reporting requirements under the rule for such 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 such small entities.”²⁰

17. The Second Further Notice proposes to eliminate four current obligations applicable to Cellular carriers and other Part 22 licensees—two related to maintenance of hard copy records, one related to required facilities and personnel for station operation, and one related to annual EEO complaint reporting. The Commission believes that eliminating these four rules would reduce overall recordkeeping burdens and compliance costs for all Part 22 licensees, regardless of size. The proposed rule eliminations are also intended to put Cellular licenses, regardless of size, more on regulatory par with competing CMRS licensees.

18. The Second Further Notice invites comment on alternatives to eliminating the four rules at issue in their entirety. We seek comment on any reason that might warrant retention of paper records at station control points, retention of control points and a person on duty in charge of station operations, and retention of separate EEO complaint reporting obligations for Part 22 licensees. No record exists yet on these alternatives. At this time, the Commission has not excluded any alternative proposal from its consideration, but it would do so if the record indicates that a particular proposal would have a significant, unjustifiable, or disparate adverse economic impact on small entities.

19. The Commission believes that its proposals will benefit all Cellular licensees, regardless of size. Consistent with previous Commission action, the proposals would further the goal of harmonizing rules across commercial wireless bands and eliminating burdensome requirements where appropriate. We anticipate that a more modernized licensing scheme will encourage Cellular licensees to invest in and deploy even more advanced technologies as they evolve.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

None.

²⁰ 5 U.S.C. § 603(c)(1)–(c)(4).