6712-01

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 22

[**WT Docket Nos. 12-40, 10-112; RM-11510, RM-11660; FCC 17-27**]

Cellular Service, Including Changes in Licensing of Unserved Area

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Federal Communications Commission (Commission) adopts revised rules governing the 800 MHz Cellular Radiotelephone (Cellular) Service. The Commission revises the outdated Cellular radiated power rules and related technical provisions, most notably allowing licensees the option to comply with power spectral density (PSD) power limits, while also safeguarding systems that share the 800 MHz band, especially public safety systems, from increased unacceptable interference. These updated rules will allow Cellular licensees to deploy advanced mobile broadband services such as long term evolution (LTE) more efficiently. The Cellular licensing rule revisions continue the transition to a geographic-based regime by eliminating certain filing requirements, and also eliminate the comparative hearing process for Cellular license renewals. Both the technical and licensing reforms provide Cellular licensees with more flexibility, reduce administrative burdens, and enable Cellular licensees to respond more quickly – and at lower cost – to changing market conditions and consumer demand. They also promote similar treatment across competing commercial wireless spectrum bands.

DATES: Effective **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER],** except for the amendments to 47 CFR 22.317, 22.911(a) through (c), 22.913(a), (c), and (f), 22.947, and 22.953(c), which contain information collection requirements that have not yet been approved by the Office of Management and Budget (OMB) under the Paperwork Reduction Act. The Commission will publish a document in the Federal Register announcing the effective date of those amendments.

FOR FURTHER INFORMATION CONTACT: Nina Shafran (Legal), (202) 418-2781, or Moslem Sawez (Technical), (202) 418-8211, regarding the Cellular Second R&O; and Kathy Harris, (202) 418-0609, regarding the WRS R&O. All three contact persons are in the Mobility Division, Wireless Telecommunications Bureau, and may also be contacted at (202) 418-7233 (TTY).

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Second Report and Order in the Cellular Reform proceeding (Cellular Second R&O), WT Docket No. 12-40, RM Nos. 11510 and 11660, and the Commission's companion Report and Order in the Wireless Radio Services (WRS) Reform proceeding (WRS R&O), WT Docket No. 10-112, FCC 17-27, adopted March 23, 2017 and released March 24, 2017. The full text of the Cellular Second R&O and WRS R&O, including all Appendices, is available for inspection and copying during normal business hours in the FCC Reference Center, 445 12th Street SW, Room CY-A157, Washington, DC 20554, or by downloading the text from the Commission's website at https://apps.fcc.gov/edocs_public/attachmatch/FCC-17-27A1.pdf. Alternative formats are available for people with disabilities (Braille, large print, electronic files, audio format), by sending an e-mail to FCC504@fcc.gov or calling the Consumer and Government Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (TTY).

Synopsis

I. SECOND REPORT AND ORDER (CELLULAR REFORM PROCEEDING, WT DOCKET NO. 12-40)

A. Background

1. In a Report and Order released on November 10, 2014 in the Cellular Reform proceeding (WT Docket No. 12-40) (2014 Cellular R&O), the Commission adopted new and revised rules to change to a geographic-based licensing regime. Specifically, it revised the rules to establish geographic licenses based on cellular geographic service area (CGSA) boundaries and provided licensees with significant new flexibility to improve their systems through modifications within those boundaries. It preserved the ability of licensees to expand their CGSAs into Unserved Area if the area is at least 50 contiguous square miles, but dramatically reduced application filing burdens by permitting incumbents to serve indefinitely, on a secondary basis, Unserved Area parcels smaller than 50 contiguous square miles. It eliminated other

filing requirements and established a field strength limit rule tailored to reflect the continued ability to expand Cellular service area coverage. These reforms put Cellular licensing more on par with the flexible licensing schemes in other similar mobile services, such as the Broadband Personal Communications Service (PCS), the commercial service in the 700 MHz band (700 MHz Service), the 600 MHz Service, and various advanced wireless services (AWS).

2. Also in the Cellular Reform proceeding, the Commission released a companion Further Notice of Proposed Rulemaking on November 10, 2014 (Cellular Further Notice) proposing additional reforms of the Cellular licensing rules as well as reforms to the Cellular radiated power and related technical rules to further enhance flexibility and spectral efficiency. The Commission sought comment on its proposed reforms, including various options that would accommodate the use of a power spectral density (PSD) model, and on numerous related technical issues and licensing matters. The Commission sought comment on all aspects of its proposals as well as on other ideas, proposals, and comments discussed in the Cellular Further Notice, and also invited the submission of alternative ideas.

3. In response to the Cellular Further Notice, interested parties submitted comments, reply comments, and ex parte letters. The specific reforms adopted by the Commission in the Cellular Second R&O are described below.

B. Power Spectral Density (PSD) Limits and Safeguards to Protect Public Safety Systems

4. Introduction. "PSD" describes the amount of effective radiated power (ERP)[1] 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. With adoption of the Cellular Second R&O, the Commission adds a definition of PSD to the part 22 definitions in the rules, substantially as proposed in the Cellular Further Notice. Under the existing Cellular radiated power rules, as set forth in 47 CFR 22.913, power limits are expressed in terms of ERP without any

[1] A generic definition of the term "effective radiated power" is in existing part 2 of the 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.

reference to bandwidth, and these limits are applied per emission. The existing limits favor narrowband technologies, such as GSM, and disadvantage licensees wishing to deploy wideband technologies such as LTE. To facilitate efficient provision of advanced mobile wireless services using wideband technologies such as LTE, based on the record, the Commission adopts PSD limits as an option for Cellular licensees, with an advance notification requirement at specified higher PSD levels, and a power flux density (PFD) limit that will apply for a seven-year transition period if the Cellular licensee operates at PSD limits that exceed a certain threshold. 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.

5. In reaching its decisions revising the Cellular power rules, the Commission recognizes that PSD and PFD limits are not a complete answer to eliminating unacceptable Cellular interference to public safety systems in the 800 MHz band, at least for the immediate term. The restructuring (rebanding) of the 800 MHz band commenced soon after the Commission adopted its Order in the 800 MHz rebanding proceeding in WT Docket No. 02-55 (2004 800 MHz Rebanding Order) 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. The rebanding has not yet been completed in portions of states bordering Mexico where complex international coordination is required, and in these areas, some public safety licensees continue to operate on frequencies adjacent to the lower edge of the Cellular band at 869 MHz. 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. Therefore, in revising the Cellular power rules in the Cellular Second R&O, the Commission has taken steps to protect public safety systems from a potential increase in unacceptable interference from Cellular PSD operations. These steps include: (1) retaining (without change) the existing provisions in 47 CFR 22.970 through 22.973 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; and (2) additional safeguards that

will apply to Cellular PSD systems under certain circumstances. The Commission emphasizes that the additional safeguards, described further below, are in addition to, and not a replacement for, the interference resolution procedures set forth in 47 CFR 22.970 through 22.973. The Commission also directs the Wireless Telecommunications Bureau (Bureau), in conjunction with the Commission's Public Safety and Homeland Security Bureau (PSHSB) and Office of Engineering and Technology (OET) (collectively, Bureaus), to convene a public forum to facilitate stakeholder-led co-existence efforts. The components of this multi-pronged approach, including the specific PSD limits adopted for the Cellular Service, are discussed below.

6. 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; it can bring faster speeds, reduced latency, and better mobile service for the public. Carriers have already deployed LTE on their 700 MHz, AWS, and PCS spectrum, and the Commission's rules governing those services provide for use of a PSD model. If carriers were to deploy LTE on Cellular frequencies using the existing non-PSD limits, the result would be reduced coverage. To compensate for this reduction of coverage, additional sites would be needed. 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 utilizing techniques such as multiple-input-multiple-output (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.

7. 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. The Commission finds that revising its rules to permit a PSD model option serves the public interest by allowing for

efficient use of wideband technologies in the Cellular Service.[2] Consistent with the radiated power rules adopted for other commercial wireless services, such as PCS and AWS, which include doubled PSD limits to facilitate economical coverage in rural areas, the Commission also finds 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 Census. As in the case of the existing Cellular rule for non-PSD limits, this rural area power increase is limited to base stations more than 72 km (45 miles) from the Mexican and Canadian borders, consistent with current agreements with those countries.

8. Based on the record, the Commission concludes 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, in both non-rural and rural areas, a PFD limit for seven years and an advance notification requirement. The advance notification requirement and the seven-year PFD limit are described further below.

9. 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 the 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, the Commission finds 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

[2] To accommodate filings by licensees and applicants, several of the rules that the Commission adopts in this Cellular Second R&O will require changes to FCC Form 601 and/or the Commission's Universal Licensing System (ULS). The Wireless Telecommunications Bureau will issue public notices, as appropriate, announcing completion of these changes and, where required, OMB approval thereof, along with the effective date(s) of the new rules pursuant to the Ordering Clauses, below.

is needed for sites at higher elevation to achieve sufficient coverage in sparsely populated areas.[3] As explained below, this higher-PSD-plus-PFD approach will enable better broadband service in such areas without increasing 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 power.

10. The Commission further concludes that the PSD limits should be applied per sector, rather than per transmitter. If the PSD limit were applied 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 the primary goals in this proceeding and is contrary to the public interest. The Commission declines to adopt a bandwidth dividing line for PSD operations, finding it unnecessary and potentially a disadvantage to certain carriers.

11. 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, one of the important safeguards the Commission adds to 47 CFR 22.913, as adopted in the Cellular Second R&O, is an advance notification requirement. Every Cellular licensee preparing to activate a cell site at the Higher PSD Limits will be required 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. 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. 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 47 CFR 22.970 through 22.973.

[3] The Commission also adopts a revised definition of "Cellular system." See 47 CFR 22.99.

12. The advance notification will 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 47 CFR 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. This 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 the Commission's approach thus advances its goals 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. Accordingly, the revised rule 22.913 adopted in the Cellular Second R&O includes an advance notice requirement.

13. The Commission emphasizes that this mandatory notice requirement is in addition to, and not a replacement for, any notice that a Cellular licensee may choose to provide voluntarily, nor is it a replacement for any other information exchanges that Cellular and public safety licensees undertake in the interest of interference avoidance.

14. The Commission places great weight on stakeholder-led measures – involving Cellular licensees, public safety licensees, and the manufacturers of public safety equipment – to achieve improved co-existence between commercial broadband and public safety communications in neighboring bands. The Commission therefore applauds the discussions that have already taken place among AT&T, Verizon, and the Association of Public-Safety Communications Officials-International, Inc. (APCO), and it applauds the resulting voluntary commitments made by AT&T and Verizon, as documented on the record and summarized in paragraphs 25 and 26 of the full text of the Cellular Second R&O – particularly

their commitments that will entail testing, extensive collaboration with local public safety entities, and phased PSD roll-out in select markets. The Commission expects 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 four interim PSD 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. The Commission also acknowledges 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 also summarized in paragraphs 25 and 26 of the full text of the Cellular Second R&O. 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). The Commission encourages any and all cooperation aimed at avoiding interference to public safety communications.

15. Non-PSD ERP Limits. The Commission concludes that it serves the public interest to retain non-PSD ERP limits for Cellular licensees that either cannot or choose not to deploy systems using a PSD model. It further finds that the existing non-PSD ERP limits of 500 watts (W) ERP (non-rural) and 1000 W ERP (rural) continue to be sufficient and appropriate for the Cellular Service, and makes explicit in the rule that these non-PSD ERP limits apply per emission. The doubled power limits for Cellular licensees' rural operations 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 current agreements with those countries. The 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.

16. Cellular licensees will continue to be subject to the field strength limit rule adopted in the 2014 Cellular 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 dBμV/m, with certain exceptions outlined in the rule (47 CFR 22.983). Cellular licensees not deploying PSD operations will also continue to be subject to the coordination requirements set forth in 47 CFR 22.907 (discussed

further below).

17. Seven-year PFD Limit at Higher PSD Limits; Sunset Date. The Commission's PSD decisions in this Cellular Second R&O further align the rules for the Cellular Service band with other bands used to provide competing commercial wireless services, but the Commission also considers the Cellular band's unique circumstances that warrant special requirements to prevent interference. 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, the Commission adopts 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 rule 22.913. Specifically, the Commission adopts a modeled PFD limit of 3000 μW/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, and the Commission requires that the limit be observed over at least 98% of the area within 1 km of each base station antenna. For purposes of the Cellular Second R&O, the Commission uses "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. To determine compliance, this limit is to be modeled using good engineering practices accounting for terrain and local conditions – at the time of initial deployment at the Higher PSD Limits and for any site modifications thereafter that may increase the PFD levels around the site.

18. 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 μW/m²/MHz, and that this limit is not exceeded in at least 98% of the area within 1 km of the base station. The Commission therefore concludes that a modeled PFD limit of 3000 μW/m²/MHz – not to be exceeded over 98% of the area within 1 km of the base station at 1.6 meters above ground – is appropriate for the Cellular Service.

19. 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.

20. The Commission declines to adopt a commenter's proposal to apply any PFD limit to (1) non-PSD Cellular systems that operate above 500 W ERP, and (2) non-PSD Cellular systems operating at or below 500 W ERP after receipt of an interference complaint or when replacing radio equipment or antennas. Imposing such a heavy new burden on Cellular licensees for their extensively deployed facilities is unwarranted. First, given that the Commission is not adopting any increase to the existing non-PSD power limits, 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, the existing interference resolution provisions in 47 CFR 22.970 through 22.973 have provided a workable mechanism to address interference problems as they arise. Applying a PFD limit to non-PSD Cellular systems (as proposed by one of the commenters) 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 2004 800 MHz Rebanding Order, the Commission 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." The Commission reaches the same conclusion in this Cellular Reform proceeding. For all these reasons, the Commission declines to add a PFD component to the existing Cellular non-PSD power limits.

21. The Commission also declines to adopt a commenter's recommendation to adopt a PFD limit of 625 $\mu W/m^2$ with the goal of transitioning to a PFD limit of 3000 $\mu W/m^2$ after five years; it also

declines to adopt that same commenter's proposals to: (1) not allow licensees to exceed the PFD limit at any ground level locations within 1 km of the base station; and (2) only allow non-compliance at 1% of locations well above ground level within 1 km of the base station. The record indicates that these limits are not realistic or achievable by Cellular systems even as currently deployed (non-PSD), nor are they workable for Cellular systems that will be deployed at the PSD limits adopted in the Cellular Second R&O. Cellular carriers will deploy wideband technologies such as LTE that use bandwidths of 5 MHz or more. A PFD of 625 μW/m² measured across 5 MHz would be equivalent to 125 μW/m²/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 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 the commenter advocates. Moreover, meeting such PFD limits 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. Instead, the Commission adopts a PFD limit that is achievable to minimize impact at ground level and avoid potentially worsening the existing interference environment.

22. The Commission is not persuaded by a commenter's argument that PFD is different from PSD and cannot be specified per unit of bandwidth. Any power or energy of a system can be stated per unit of bandwidth. The Commission agrees that PSD by its nature is specified with a reference bandwidth of 1 MHz, but in the interest of consistency and accuracy, adopts the same reference bandwidth for PFD.

23. The Commission finds 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. 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% of the area within a 1 km radius of the base station antennas, at 1.6 meters above ground. 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 around the site. The purpose of the modeling 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. The Commission reiterates 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 47 CFR 22.970 through 22.973.

24. The Commission also rejects a commenter'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. There is no evidence that such relief is necessary, nor is there evidence that an immediate exemption from the Cellular PFD limit at the Higher PSD Limits would provide benefits to consumers. The provision for operations at higher PSD limits combined with a PFD limit will accommodate cases where a carrier needs additional power—for example, systems with antennas well above street level or on mountain tops. Moreover, 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. Permitting Cellular licensees to deploy at the higher PSD levels without a PFD limit during the 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, the Commission finds that the commenter's proposal does not serve the public interest and, accordingly, declines to adopt it.

25. PFD Sunset. The Commission concludes that it is appropriate to eliminate the Cellular PFD limit seven years after the effective date of the revised rule 22.913 adopted today. This "PFD

Sunset" decision is based 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 the Commission adopted PSD models for competing CMRS licensees (PCS, AWS, and the 700 MHz Service), to allow more time for the rebanding process to evolve. 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). The PFD limit 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.

26. The Commission is 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 time for this crucial three-way conversation, which the Commission intends to facilitate by holding a public forum (described further below), 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.

27. 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 one public safety commenter, many public safety 800 MHz radios were replaced as a result of the Commission's 2004 800 MHz Rebanding Order, which established receiver performance standards entitling public safety licensees to full interference abatement measures. That

same commenter states that public safety equipment replacement cycles often run 10-20 years.[4] A seven-year PFD Sunset date will be approximately 20 years after release of the Commission's 2004 800 MHz Rebanding Order. As noted above, 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. The Commission reiterates its 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 the Commission expects 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).

28. The PSD limits adopted 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 47 CFR 22.970 through 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, the Commission concludes that a seven-year PFD Sunset date is appropriate and serves the public interest.

29. Public Forum to Facilitate Multi-stakeholder Co-existence. The Commission reiterates

[4] 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. 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.

that it attaches great weight to multi-stakeholder co-existence efforts—good faith efforts to work through the issues by Cellular licenses, public safety entities, and public safety equipment manufacturers alike. While the discussions that the two major Cellular carriers, AT&T and Verizon, have already held with APCO are encouraging, and the voluntary commitments made by AT&T and Verizon are commendable, it is clear from the record 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. To foster the three-way conversation among Cellular carriers, public safety entities, and manufacturers of public safety equipment, the Commission directs the Bureaus to work together to organize and conduct a public forum that brings together representatives of all three stakeholder groups. This public forum shall be convened by the Bureaus no later than one year following release of the Cellular Second R&O. The Bureaus are 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. The Commission defers 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.

30. The Commission did not seek comment on public safety receiver standards in this proceeding, but several commenters raised this issue. Equipment manufacturers are not currently subject to Commission rules that mandate particular standards for public safety equipment. The Commission is nonetheless 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 adoption of the 2004 800 MHz Rebanding Order identifying the problem of deficient receivers. The Commission expects these radio manufacturers to be part of the conversation now—and particularly encourages 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. The Commission also expects public safety equipment purchasers to specify interference rejection in their requests for proposal for new radio systems, 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. The Commission encourages 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 key recommendations made by the Commission's Technological Advisory Council (as discussed in the full text of the Cellular Second R&O, para. 68).

31. 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. The Commission directs the Bureaus to seek an update on progress from all three stakeholder groups no later than four years from the release of the Cellular Second R&O, and to issue a Public Notice announcing the mechanism for filing such updates. The Commission also encourages all stakeholders to share their experiences on spectrum sharing in the band throughout the seven-year transition period. It believes that the rules and expectations established in the Cellular Second R&O, 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.

32. Retention of Part 22 Interference Resolution Rules and Procedures. The existing interference resolution provisions in 47 CFR 22.970 through 22.973 place strict responsibility for remedying unacceptable interference on the licensee(s) causing that interference to public safety communications in the 800 MHz band. The Commission finds that these provisions continue to work well and also notes that the number of interference complaints lodged by public safety entities against

Cellular and ESMR carriers via the 800 MHz Interference Notification Site[5] has been steadily declining. The Commission recognizes that identifying sources of interference is burdensome to public safety entities and that certain areas of the country such as Oakland, CA are unusually troublesome in terms of unacceptable interference to public safety operations. At the same time, the Commission recognizes that Cellular licensees themselves incur costs to investigate and address complaints, including those that are determined to arise from non-Cellular operations. Noting that rules 22.970 through 22.973 were carefully crafted based on the extensive record compiled in the 800 MHz rebanding proceeding, and that those provisions establish shared responsibility between part 22 and part 90 licensees, the Commission declines to adopt the proposal made by some commenters to amend rule 22.970 such that a Cellular licensee that is found to have caused interference to an 800 MHz public safety radio system would be required to reimburse that entity's "reasonable costs expended to locate and mitigate the interference." The Commission concludes 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 existing part 22 interference resolution provisions and, accordingly, retains the existing rules 22.970 through 22.973 without change. The Commission emphasizes that the obligations set forth in those provisions will continue to apply notwithstanding the new requirements established under revised rule 22.913 including, when applicable, advance notification and the PFD limit.

C. Power-related Technical Provisions

1. Revision of 47 CFR 22.911 to Accommodate Cellular PSD Systems

33. Rule 22.911(a) sets forth the formula for calculating the service area boundary (SAB) of an individual cell site and the CGSA boundary. This formula 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, the Commission concludes that it serves the public interest to retain the existing formula in rule 22.911(a) without change,

[5] This is a website (www.publicsafety800mhzinterference.com) established collectively by Cellular and ESMR carriers in the 800 MHz band and serves as a vehicle for licensees who operate non-cellular architecture systems in the 800 MHz band to report interference to the commercial carriers in this band.

rather than requiring such licensees to change their long-standing methodology for determining their SABs and CGSA boundaries.

34. However, for Cellular licensees that elect to use PSD to deploy LTE and other more advanced mobile broadband technologies, the Commission finds that the formula in rule 22.911(a) is not practical, as the result would be much larger SABs and CGSAs that would not accurately reflect service coverage. Rule 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. The Commission finds that adapting this methodology 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. Accordingly, the Commission adopts rule 22.911(c) for PSD systems, and requires that the SAB be defined in terms of distances from the cell site(s) to the 32 dBμV/m contour along the eight cardinal radials, consistent with SAB calculations under the existing rule. The distances used for the cardinal radials must be representative of the coverage within the 45º sectors. The Commission concludes that this approach will result in accurate coverage calculations when operating a cell site using PSD, and thus serves the public interest. 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 rule 22.911(c), 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 in that scenario.

2. Height-Power Limit—Exemption for PSD Systems

35. The existing provision in 47 CFR 22.913(b) 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. The existing provision in 47 CFR 22.913(c) provides an exemption from the height-power limit if the licensee coordinates with, and obtains concurrence from, all co-channel licensees within 121 km. 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 rule 22.911(a). Although 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. Given that the Commission is retaining the formula set forth in 47 CFR 22.911(a) 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, it concludes that the height-power rule continues to serve the public interest as applied to such licensees. Likewise, the Commission finds that the exemption in existing rule 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. The domestic coordination provision in rule 22.907 does not obviate the need for the exemption provided in existing rule 22.913(c), which, unlike rule 22.907, includes the concurrence requirement. Moreover, the Cellular field strength rule (47 CFR 22.983) does not obviate the need for the existing provisions in rules 22.913(b) and (c). 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. With adoption of the field strength rule, the Commission concluded there was no longer a need to regulate SAB extensions into neighboring CGSAs (with limited exceptions). Nonetheless, in the absence of the height-power limit, SABs calculated under rule 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.

36. However, the Commission finds that the Cellular height-power rule is not appropriate for

systems that are operated using PSD. With adoption of a predictive model requirement for SAB and CGSA calculations under rule 22.911(c), Cellular licensees that operate their cell sites pursuant to the PSD limits will not be calculating their service area using the existing formula in 47 CFR 22.911(a). Accordingly, the Commission retains the height-power limit and coordination exemption provisions for licensees deploying narrowband systems, but now exempts licensees operating their systems using PSD. Also, the Commission changes the title of the existing rule 22.913(c) to "Exemptions from height-power limit," and renumbers paragraphs (b) and (c) to accommodate the provisions concerning PSD and PFD limits and related measurement provisions, described above.

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

37. Because the peak power associated with a noise-like signal is a random variable, it can place unachievable requirements on the measuring instrumentation (e.g., a resolution/measurement bandwidth that exceeds the signal bandwidth). 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, as well as for other flexible wireless services, including the 700 MHz services (both commercial and public safety broadband), the Commission concludes that Cellular power limits should be measured on the basis of average power. Also consistent with the average power measurement provisions adopted for PCS and AWS, the Commission finds 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.

38. Accordingly, the Commission revises rule 22.913 to specify that Cellular power shall be measured on an average basis, and establishes a PAR limit of 13 dB. Additionally, as in the rule governing PCS measurements, the revised rule 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. The Commission's 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 the important goal of harmonizing, where possible, various commercial wireless service rules. Coupled with the average power measurement, a 13 dB PAR limit furthers the 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. The Commission disagrees with a commenter's argument to 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 takes this into account and addresses the concern.

4. Field Strength Limit

39. As noted above, the Cellular Service rule 22.983 establishes a field strength limit of 40 dBμV/m, and (with certain exceptions) this limit must be observed at every point along the neighboring licensee's CGSA, taking into account that some licensees' CGSAs are adjacent to Unserved Area. Cellular licensees are permitted under the rule to negotiate different field strength limits with one another. The Commission considered a commenter's recommendation to change the limit, but there is a lack of consensus, and the record is insufficient to compel a change. Moreover, the Commission concludes, altering the rule at this time solely for the Cellular Service would be at odds with the goal of harmonizing rules among flexible commercial wireless services and would not serve the public interest. Accordingly, the Commission retains 47 CFR 22.983 without change.

5. Out of Band Emission (OOBE) Limit

40. Existing rule 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. The current resolution bandwidth for measuring unwanted emissions outside of the Cellular band is 100 kHz or greater. The Commission concludes that the existing OOBE limit in 47 CFR 22.917(a), which is the same as the limit for other commercial wireless services such as PCS and AWS, continues to serve the public interest and declines to change it at this time. In response to

a commenter's concerns that Cellular PSD operations will cause increased interference to its adjacent-band operations, the Commission notes its expectation that licensees will work together to resolve interference problems, and also notes that rule 22.917(c) allows licensees to negotiate a different limit from the one specified in rule 22.917(a) by private contractual agreement. The Commission encourages Cellular and adjacent-band carriers to continue to work together not only to address interference as it occurs, but also to be proactive in avoiding increased interference from Cellular PSD operations under the revised radiated power rules adopted by the Cellular Second R&O. The Commission also reminds parties that, under rule 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.

41. Regarding the existing provision in rule 22.917(b), the Commission notes that the International Telecommunications Union (ITU) recommends different measurement bandwidths for operations above and below 1 GHz. To remain consistent with international practices, the Commission concludes 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, the Commission adopts revised 47 CFR 22.917(b) to retain the existing provision (renumbered as 22.917(b)(1)) and specifies that it applies for measurements in the spectrum below 1 GHz; the Commission adds 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. 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.

D. Other Technical and Licensing Issues

1. Permanent Discontinuance of Operations

42. Under 47 CFR 1.955(a)(3), an authorization will be automatically terminated if service is "permanently discontinued." Existing rule 22.317, 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). 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. After the Commission released the NPRM, a coalition of Cellular licensees (Coalition) advocated a more flexible rule governing permanent discontinuance of service.

43. Having adopted rules in the 2014 Cellular R&O to transition the Cellular Service to a geographically-licensed regime, and consistent with the approach in various other commercial wireless services, the Commission concludes that it serves the public interest to adopt a modernized provision—47 CFR 22.947—that defines permanent discontinuance as 180 consecutive days during which a Cellular licensee does not operate or, in the case of a Cellular commercial mobile radio services (CMRS) provider, does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to the providing carrier. Under this provision, 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. 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. 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. Based on the record, the Commission finds that it serves the public interest to apply the 180-day discontinuance period to new Cellular systems—other than the Chambers, TX license system (Chambers License)—only after the initial construction period has ended, including extensions, if any, following grant of the new-system application. This approach will ensure that licensees of new systems are not penalized in the event they complete construction and commence operations prior to expiration of their build-out period. The rule will apply to the entire geographic licensed area—the CGSA, thus enhancing licensees' flexibility. The Commission also adopts revised 47 CFR 22.317 such that its site-based approach will no longer apply to the Cellular Service. 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, the Commission will dismiss as unnecessary a site-based cancellation notification, i.e., a filing concerning permanent discontinuance of any individual cell site(s). Regarding the Chambers License, the Commission finds that it serves the public interest to apply the new rule such that the 180-day period for purposes of determining permanent discontinuance will commence immediately after the interim construction deadline set forth in 47 CFR 22.961.

44. The flexible approach being adopted regarding permanent service discontinuance was initially discussed in the Commission's pending WRS Reform proceeding, which also covers the Cellular Service. Notwithstanding adoption in the Cellular Second R&O of rule 22.947 and revised rule 22.317, Cellular Service licensees will remain subject to any future Commission action affecting wireless radio services in the WRS Reform proceeding.

2. Elimination of Filings for Certain Minor Modifications

45. 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. 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. As stated in the 2014 Cellular R&O, a hallmark of geographic licensing is a defined area within which each licensee can make certain system changes without Commission filings. 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. 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, the Commission finds that eliminating the site-based provision requiring filings for non-permanent-discontinuance changes to operational cell site(s) advances its reform goals and serves the public interest.

46. Accordingly, the Commission adopts revised 47 CFR 22.953(c). 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 47 CFR 22.949. This should better enable licensees to implement technology upgrades involving reconfiguration and possible relocation of cell sites and other network elements. Once revised rule 22.953(c) as adopted today has taken effect, the Commission will dismiss as an unnecessary filing an application for a CGSA reduction. Notwithstanding this rule change, Cellular licensees remain subject to any future Commission action affecting wireless radio services in the pending WRS Reform proceeding.

3. Domestic Coordination Requirements

47. Under 47 CFR 22.907, Cellular licensees are required to coordinate channel usage at each transmitter location within 121 kilometers (75 miles) of any transmitter locations that are authorized to other licensees or proposed by applicants. As intended by this rule, coordination has played a major role in avoiding co-channel and adjacent-channel interference between neighboring systems. However, the Commission finds 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, the Commission adopts a revised introductory paragraph of the rule to exempt those Cellular licensees that deploy technologies with a frequency re-use factor of one. In that same paragraph, the Commission deletes 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.

4. International Coordination Requirements

48. 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, 47 CFR 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." The other two rules—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. To advance its regulatory reform agenda by deleting unnecessary or redundant provisions, the Commission now eliminates rules 22.955 and 22.957 while preserving rule 22.169 with a minor revision—adding a reference to "operation of systems." The Commission finds that this approach is sufficient and consistent with the international coordination requirements set forth in other rule parts and serves the public interest.

E. Miscellaneous Other Provisions

1. ERP vs. EIRP; MIMO Antennas; Equipment Standards

49. ERP vs. EIRP. As noted above, the Cellular radiated power limits are expressed in terms of ERP. 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 (equivalent isotropically radiated power) is used, but for AWS and 700 MHz, the power limits are expressed in terms of ERP. Given that Cellular licensees are long accustomed to ERP limits under the existing rule 22.913, the Commission concludes 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.

50. MIMO Antennas. No commenter addressed the Commission's query as to whether the use of MIMO techniques requires a modification to the way measurements are performed for equipment authorization. Some carriers state their intent to use spectrally efficient MIMO techniques in their Cellular LTE deployments, and the Commission has taken that into account in adopting the PSD and PFD limits described above.

51. Equipment Standards. Part 2 of the Commission's rules include equipment certification requirements. In the absence of any interest by commenters on the issue of 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, the Commission concludes that no changes concerning this issue are warranted at this time in part 22. However, as technologies change, the Commission updates its procedures in part 2 to keep pace, and 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.

2. Mobile Transmitters and Auxiliary Test Transmitters

52. The existing provision in 47 CFR 22.913(a)(2) states that the ERP of Cellular mobile and auxiliary test transmitters must not exceed 7 W. Given that the Commission is 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, a commenter's argument for a "corresponding increase" in the mobile station ERP limit is moot. Moreover, 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. Accordingly, and in the absence of comments on the record concerning all the other issues raised in the Cellular Further Notice related to mobile and auxiliary test transmitters, the Commission finds that it serves the public interest to retain the existing provision, including the existing 7 W limit, but creates a new paragraph of the rule (§ 22.913(a)(5)) for this provision.

3. Frequency Coordinators

53. Although one commenter expressly supported the Commission's proposal to establish frequency coordinators to perform the first-line review of Cellular applications for CGSA expansions and new Cellular systems, and two parties expressed preliminary non-binding interest in serving as frequency coordinators for the Cellular Service, the Commission declines to adopt the use of frequency coordinators for the Cellular Service at this time. While the total number of CGSA-expansion (major modification) applications in 2013 was 565 (908 if amendments are included), for calendar year 2015, Commission data show that only 42 CGSA-expansion applications were filed (60 if amendments are included). This represents a decrease of more than 90 percent since 2013, and the trend is further downward, as only 23 CGSA-expansion 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. 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. Thereafter, the certified coordinators and Commission staff would need to collaborate on a file format incorporating the frequency coordination process. The Commission concludes that the requisite Commission outlay of resources to introduce frequency coordination into the Cellular Service would not be justified, but it will monitor the application volume and, if the data show a significant upward trend, it will revisit establishing frequency coordinators for the Cellular Service.

4. Definition of "Rural" for Purposes of 47 CFR 22.913

54. Revising the definition of a rural area under 47 CFR 22.913 (or any other part 22 rule) was not raised by any commenter prior to release of the Cellular Further Notice, nor did the Commission mention it in that release. Although one commenter subsequently argued that the definition should be automatically adjusted after each completed U.S. Census, the Commission is not persuaded by the record that it should revisit the longstanding definition of "rural" for the purpose of rule 22.913, and it makes no change to the definition in the Cellular Second R&O.

5. 47 CFR 22.355 (Frequency Tolerance)

55. Although the Cellular Further Notice proposed to correct a ministerial error that appeared in the third-column heading of the table in 47 CFR 22.355, the Commission notes 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.

II. REPORT AND ORDER (WRS REFORM PROCEEDING, WT DOCKET NO. 10-112)

A. Background

56. In the WRS Reform proceeding (WT Docket No. 10-112), on May 25, 2010 the Commission released a Notice of Proposed Rulemaking (WRS NPRM) and a companion Order (2010 WRS Order). The WRS NPRM proposed to revise and harmonize numerous rules applicable to WRS, which include the Cellular Service. Among other issues addressed in the WRS NPRM, the Commission generally proposed to establish a uniform license renewal process modeled after the 700 MHz Service rules, and specifically proposed to adopt a three-part approach to renewal for all WRS, including Cellular licensees, 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. Specifically with respect to Cellular licensees, the Commission proposed to delete all five existing part 22 rules governing Cellular comparative renewal proceedings—47 CFR 22.935, 22.936, 22.939, 22.940, and 22.943—and sought comment on its proposal. The Commission's companion 2010 WRS 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.

57. In response to the WRS NPRM, interested parties submitted comments, reply comments, and ex parte letters, addressing, among other issues, the proposed deletion of the five rules noted above governing Cellular comparative renewal proceedings. The specific reforms adopted by the Commission in the WRS R&O are described below.

B. Deletion of 47 CFR 22.935, 22.936, 22.939, 22.940, and 22.943

58. These five 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. They require an administrative law judge (ALJ) to conduct a threshold hearing to determine whether a Cellular renewal applicant is entitled to a renewal expectancy. 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. If, on the other hand, the ALJ determines that a renewal expectancy is not warranted, all mutually exclusive applications in the renewal filing group are considered in a full comparative hearing. The rules also establish certain specific requirements for the filing of competing applications, and procedures governing their withdrawal during the hearing.

59. As part of its efforts to eliminate unnecessary requirements for Cellular licensees and promote comparable treatment of spectrum bands commonly used to provide comparable wireless services, the Commission finds that it serves the public interest to delete—as of the effective date of this WRS R&O—the part 22 rules pertaining to Cellular renewal comparative hearings, as proposed in the WRS NPRM. This action 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 certain AWS (e.g., AWS-3, AWS-4, H-Block) and the 700 MHz Service. Also, 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 WRS NPRM. Accordingly, the revised Cellular Service rules reflect the Commission's deletion of rules 22.935, 22.936, 22.939, 22.940, and 22.943. The Commission defers, however, any decision on the remaining issues raised in the WRS NPRM and the 2010 WRS 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. Pending further action in the WRS Reform proceeding, the freeze imposed on the filing of new competing applications and the procedures established in the 2010 WRS Order will remain in effect for all covered wireless services, including the Cellular Service.

III. PROCEDURAL MATTERS

A. Paperwork Reduction Act Analysis

60. Some of the rule amendments adopted by the Cellular Second R&O – specifically, rules 22.911(a) through (c), 22.913(a), 22.913(c), 22.913(f), 22.947, and 22.953(c) – contain modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. Those rule amendments will be submitted to 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 modified information collection requirements. In addition, the Commission notes that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 USC 3506(c)(4), the Commission previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. The Commission has assessed the effects on small business concerns of the rule changes it is adopting by this Cellular Second R&O and WRS R&O and finds that businesses with fewer than 25 people will benefit from the flexibility afforded by the revised technical rules, including the option of deploying systems using PSD, as well as by the licensing reforms, including elimination of certain filing requirements and the comparative hearing process for license renewals.

B. Congressional Review Act

61. The Commission will send a copy of this Cellular Second R&O and WRS R&O to Congress and the Government Accountability Office pursuant to the Congressional Review Act.

C. Final Regulatory Flexibility Analysis

62. The Regulatory Flexibility Act of 1980 (RFA) requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities." Accordingly, the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA), set forth in Appendix B of the Cellular Second R&O and companion WRS R&O, concerning the possible impact of the rule changes.

D. Ex Parte Presentations

63. Permit-But-Disclose. The Commission 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. Persons making 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).

64. 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 & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

IV. ORDERING CLAUSES

65. 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.

66. 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.

67. IT IS FURTHER ORDERED that the SECOND REPORT AND ORDER and the REPORT AND ORDER SHALL BE EFFECTIVE [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

68. IT IS FURTHER ORDERED that part 22 of the Commission's rules, 47 CFR part 22, IS AMENDED as specified in Appendix A of the SECOND REPORT AND ORDER AND REPORT AND ORDER, effective [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] except as otherwise provided herein.

69. IT IS FURTHER ORDERED that the amendments adopted in the SECOND REPORT AND ORDER, and specified in Appendix A of the SECOND REPORT AND ORDER AND REPORT AND ORDER, to §§ 22.317, 22.911(a) through (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 document in the Federal Register announcing such approval and the relevant effective date.

70. 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.

71. 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.

List of Subjects in 47 CFR Part 22

Communications common carriers, Reporting and recordkeeping requirements.

FEDERAL COMMUNICATIONS COMMISSION.

Marlene H. Dortch,
Secretary.

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR part 22 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 adding, in alphabetical order, the definition of "Power spectral density" 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 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 does not apply to the Cellular Radiotelephone Service (see § 22.947).

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

§ 22.907 Coordination of channel usage.

Licensees 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:

a. Revising the introductory text, paragraph (a) heading and introductory text, paragraph (b) heading, and paragraph (b)(1);

b. Adding paragraph (c);

c. Revising paragraph (d); and

d. Removing and reserving paragraph (e).

The revisions and additions 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 cellular systems are entitled to protection and 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, paragraph (b)) of this section. If the calculation under paragraph (a), (b), or (c) of this section (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 § 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 dBμV/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 § 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 dBμV/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 dBμV/m (i.e., does not exceed 32 dBμV/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 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), (3), and (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 (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—

(A) 1000 watts per emission; or

(B) 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 May 12, 2024, each Cellular base station that operates at the higher ERP limits permitted under paragraphs (a)(3) and (4) of this section must be designed and deployed so as not to exceed a modeled PFD of 3000 microwatts/m^2/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 (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 through 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) 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 paragraph (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.

* * * * *

§§ 22.935 through 22.943 [Removed and Reserved]

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

10. Section 22.947 is added 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), 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) The licensee's authorization for CMA672-A (Chambers, TX) 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.

§§ 22.955 and 22.957 [Removed and Reserved]

12. Sections 22.955 and 22.957 are removed and reserved.

[FR Doc. 2017-07154 Filed: 4/11/2017 8:45 am; Publication Date: 4/12/2017]