

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Amendment of Parts 1 and 22 of the Commission's)	WT Docket No. 12-40
Rules with Regard to the Cellular Service,)	
Including Changes in Licensing of Unserved Area)	RM No. 11510

COMMENTS OF VERIZON

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I. SUMMARY

Having recently adopted rule changes to convert cellular licenses from site-based licenses to geographic licensing, the Commission now proposes or seeks comment on a number of additional cellular rule changes designed to facilitate broadband deployment in the cellular bands, update outdated rules, or eliminate unnecessary requirements.

Verizon supports many of the proposals in the *Further Notice*.² In particular, the Commission should amend the cellular radiated power rules to allow licensees the option to determine power using a power spectral density (“PSD”) model. To facilitate broadband deployment in the cellular bands and ensure that broadband deployed in cellular is as robust as broadband services deployed in other commercial wireless bands, the Commission should adopt the same PSD and power flux density (“PFD”) limits for cellular that apply to licensees in the

¹ In addition to Verizon Wireless, the Verizon companies participating in this filing are the regulated, wholly owned subsidiaries of Verizon Communications Inc.

² *Amendment of Parts 1 and 22 of the Commission’s Rules with Regard to the Cellular Service, Including Changes in Licensing of Unserved Area*, Report and Order and Further Notice of Proposed Rulemaking, WT Docket No. 12-40, RM No. 11510 (Nov. 10, 2014) (“*Cellular Report and Order*” or “*Further Notice*” as appropriate).

upper 700 MHz spectrum bands. The Commission should also adopt its proposal to revise the cellular discontinuance rule to provide additional flexibility to carriers when changing equipment to upgrade technology. The Commission should not, however, adopt its proposal to require cellular licensees to use frequency coordinators to review cellular applications. This proposal, unlike the others in the *Further Notice*, would increase carrier costs, delay broadband deployment in the cellular bands, and disserve the Commission's goal of harmonizing the rules applicable to commercial wireless services licensees.

II. THE PSD AND PFD LIMITS THAT APPLY TO THE UPPER 700 MHz SPECTRUM BANDS SHOULD BE ADOPTED AS AN OPTION FOR CELLULAR LICENSEES.

A. The PSD Limits that Apply to the Upper 700 MHz Bands Should Be Adopted for Cellular Licensees.

The Commission should adopt its proposal to permit measurement of cellular transmitter and repeater power using a power spectral density ("PSD") model. The limits applicable to licensees in the upper 700 MHz bands – 1000 W/MHz ERP in non-rural areas and 2000 W/MHz in rural areas -- are the appropriate limits for cellular licensees.³ Adopting the upper 700 MHz PSD limits would result in significantly greater coverage range and area and significantly increased downlink capacity and throughput speeds for broadband services. The upper 700 MHz PSD limits are appropriate for cellular since the propagation characteristics of the cellular bands are similar to, but slightly less than those of the upper 700 MHz bands, licensees are familiar with the 700 MHz rules and their application, and the 700 MHz limits have been used

³ See *Amendment of the Commission's Rules Governing Radiated Power Limits in the Cellular Radio Service Frequency Bands*, RM-11660, Reply Comments of Verizon Wireless (filed June 18, 2012) ("Verizon PSD Comments"); *Further Notice*, ¶ 118.

successfully without issue.⁴ The upper 700 MHz PSD limits would also avoid putting licensees deploying broadband technologies in the cellular bands at a disadvantage compared to licensees deploying the same technologies in other commercial wireless bands.⁵

Verizon supports applying PSD limits on a per-transmitter basis rather than on a per-channel or per-sector basis. Applying PSD limits on a per-transmitter basis would prevent requiring licensees deploying MIMO configurations⁶ from having to decrease power at each transmitter when deploying multiple transmitters at a base station location. If licensees were required to reduce power at transmitters so that the sum of the power of all transmitters deployed at a base station did not exceed the PSD limit, then the benefits of deploying MIMO would be lost.

B. The 700 MHz PSD Limits Enable Better Coverage and Throughput than Alternative Proposals.

The *Further Notice* seeks comment on two alternative PSD limits in addition to the upper 700 MHz PSD limits: AT&T's proposal to adopt limits of 250 W/MHz in non-rural areas and 500 W/MHz in rural areas; and Union Wireless' proposal of 500 W/MHz in non-rural areas and 1000 W/MHz in rural areas.⁷ AT&T chose lower limits that would avoid the risk of new

⁴ Verizon PSD Comments at 8-9.

⁵ *Id.* at 5-6. *See also Further Notice*, ¶ 125.

⁶ Multiple input, multiple output (“MIMO”) is an antenna technology for wireless communications in which multiple antennas are used at both the source (transmitter) and the destination (receiver). The antennas at each end of the communications circuit are combined to minimize errors and optimize data speed. MIMO is a key feature of LTE-Advanced.

⁷ *See Further Notice*, ¶ 113.

interference.⁸ Union proposed higher limits than AT&T out of concern that AT&T's proposed limits would result in reduced coverage as compared to the limits applicable to the PCS and AWS frequency bands. Because cellular frequencies propagate farther than the higher PCS and AWS frequencies, it proposed cellular PSD limits half as high as the PCS and AWS PSD limits to try to equate the coverage attainable in all three bands.⁹

The Commission should adopt the upper 700 MHz PSD levels because the upper 700 MHz PSD limits would enable licensees to achieve coverage benefits similar those achieved using narrower band technologies in the cellular band without risking harmful interference. The 700 MHz PSD limits are four times higher than those proposed by AT&T, which translates into 2.5 times the coverage area in non-rural areas, including improved in building coverage, and three times the coverage area in rural areas. The PSD increase would also result in an increase of at least two times the downlink capacity and throughput speeds for 4G broadband services.¹⁰ While the Union Wireless proposed limits are preferable to AT&T's proposed limits, the Union Wireless proposal would also limit the broadband coverage attainable in the cellular bands to that of higher frequency bands, thus eliminating the superior coverage characteristics afforded by lower-band spectrum. Verizon also notes that neither the AT&T nor Union Wireless proposals

⁸ *Amendment of the Commission's Rules Governing Radiated Power Limits in the Cellular Radio Service Frequency Bands*, Petition for Expedited Rulemaking and Request for Waiver, RM-11660 (AT&T, Feb. 28, 2012) at 12-13 ("AT&T Petition") (concluding that PSD levels set at its requested levels "should exhibit about the same or less interference impacts as existing deployments").

⁹ Joint Comments of Broadpoint, LLC D/B/A Cellular One; Cincinnati Bell Wireless LLC; NE Colorado Cellular, Inc.; Smith Bagley, Inc.; and Union Telephone Company D/B/A Union Wireless, RM-11660 (Jun. 1, 2012) at 8-9 (the PSD proposal made in the comments was attributed only to Union Wireless).

¹⁰ See Verizon PSD Comments at 9-11.

included a PFD limit. As discussed below, adopting PFD limits would allow licensees to operate at higher PSD levels while protecting adjacent users from harmful interference.

C. Licensees Should Be Allowed to Choose to Measure Power Using the PSD Model Only When Deploying Technology Using Emission Bandwidths Greater than 1 MHz.

The Commission proposes to give licensees the option to use either the current cellular power limits (500 W ERP per emission for non-rural areas and 1000 W ERP for rural areas) or the proposed PSD limits without regard to emission bandwidth. In so doing, it raises concerns that if a lower PSD limit – such as the one proposed by AT&T – were adopted, requiring licensees deploying technologies with emission bandwidths greater than 1 MHz (such as CDMA) to use the PSD limits could be forced to reduce power, thus shrinking coverage.¹¹

Verizon agrees with the Commission’s concern that coverage areas could shrink if licensees deploying technologies with emission bandwidths greater than 1 MHz were required to use a PSD model, but notes that the concern only exists if the Commission adopts a PSD limit that is too low. If the Commission adopts the upper 700 MHz PSD limit, this problem would not exist because the PSD power limit would be higher than the power limit in the current rule. Verizon proposed a 1 MHz bandwidth dividing line – whereby the PSD limits would only be an option for licensees deploying technologies with bandwidths greater than 1 MHz, because if licensees were able to choose to operate under either the existing rule or the new PSD limit regardless of bandwidth, narrower bandwidth technologies, such as GSM which uses a 0.2 MHz bandwidth, would be able to increase power substantially by choosing the PSD model. Thus, for example, if the upper 700 MHz PSD limits are adopted, a GSM licensee could increase its

¹¹ *Further Notice*, ¶¶ 122-123.

current ERP by a factor of 10 (from 500 W under the current rule to 5000 W using the non-rural PSD limit of 1000 W/MHz), thus increasing the risk of interference to licensees in adjacent markets.

To ensure that the PSD power measurement option neither unnecessarily restricts coverage nor increases the risk of interference, the Commission should adopt a 1 MHz bandwidth dividing line, but allow licensees deploying technologies with bandwidths greater than 1 MHz the option of using the PSD limit or the current ERP limit. Licensees deploying technologies with bandwidths equal to or less than 1 MHz should be required to continue to use the existing cellular ERP limits.

D. The Commission Should Adopt PFD Limits.

The Commission should adopt the same power flux density (“PFD”) rule for cellular that applies to the upper 700 MHz band. This PFD limit will protect adjacent public safety and other licensees from harmful interference while enabling the Commission to adopt higher PSD limits for the cellular band, provide cellular licensees with greater flexibility to design their systems, and harmonize the cellular rules with the upper 700 MHz bands.¹² To confirm that the upper 700 MHz PFD limit will protect public safety radios from harmful interference, Verizon asked V-COMM, a wireless engineering consulting firm, to evaluate and test public safety radios operating in the 851-861 MHz band to determine their ability to withstand high power signals from various wideband and narrowband commercial technology signal sources in the cellular bands.¹³ The test results demonstrated that cellular signals operating within the upper 700 MHz

¹² Verizon PSD Comments at 6-11.

¹³ See Verizon PSD Comments, Attachment, “Public Safety 800 MHz Band Interference Test Results,” (Jun. 18, 2012) (“V-COMM Test Results”).

PFD limits produce desired signal levels that do not exceed the Section 22.970 requirements¹⁴ for unacceptable interference to non-cellular part 90 licensees in the 800 MHz band.¹⁵

Again, the upper 700 MHz PFD limit is appropriate for cellular since the propagation characteristics of the cellular bands are similar to, but slightly less than those of the upper 700 MHz bands, licensees are familiar with the 700 MHz rules and their application, and the 700 MHz rule has been used successfully without issue.¹⁶ The PFD limit adopted should be measured on a per-transmitter basis, whereby the measurement bandwidth would be equal to the channel bandwidth. Measuring PFD in this manner would make both field measurement and prediction using a radio planning tool straightforward.

III. CELLULAR LICENSEES SHOULD BE ALLOWED TO DISCONTINUE SERVICE FOR UP TO 180 DAYS.

The Commission should adopt its proposal to add a new Section 22.947 to the cellular rules to define permanent discontinuance as 180 consecutive days during which the licensee does not operate, and to apply the new rule to the entire geographic license area rather than to individual cell sites.¹⁷ This rule change is necessary to facilitate upgrading technologies deployed in the cellular bands, without triggering the sanctions that may result from permanent discontinuance. When such upgrades are made, licensees must replace or add antennas at each of their cell site locations and upgrade equipment throughout the network in the license area. Doing so requires that the licensee discontinue service for up to six months as the equipment changes are made. Discontinuing service on some frequency bands, however, does not disrupt

¹⁴ 22 C.F.R. § 22.970.

¹⁵ V-COMM Test Results at 2-8.

¹⁶ Verizon PSD Comments at 8-9.

¹⁷ *Further Notice*, ¶¶ 77-82.

service to customers. Customer devices are designed to operate on multiple frequency bands and will continue to receive uninterrupted service on those other bands. Allowing licensees to discontinue service for a longer period of time than allowed in the current rule (90 days) will help facilitate these technology upgrades without putting licenses at risk or disrupting service to customers.

IV. FREQUENCY COORDINATORS SHOULD NOT BE REQUIRED.

The Commission should not adopt its proposal to require the use of frequency coordinators to perform initial reviews and make recommendations to the Commission for applications to make major modifications and applications for new systems in the cellular bands.¹⁸ This proposal is unnecessary in light of the switch to geographic area licensing, and would introduce new costly and confusing requirements for cellular licensees that are not imposed on other bands. As such, requiring frequency coordinator review is inconsistent with one of the primary goals of this proceeding: making the cellular rules more consistent with the rules governing other geographically-licensed commercial wireless services.¹⁹

Requiring licensees to submit applications proposing major modifications and new cellular systems to frequency coordinators for initial review would create significant new obligations for cellular licensees. The requirement would also impose additional delays in gaining approval of such applications, add significant costs to the application process by requiring licensees to pay fees to frequency coordinators in addition to Commission application fees, and create confusion for licensees in determining which process applies to different application types.

¹⁸ *Id.*, ¶¶ 83-104.

¹⁹ *Cellular Report and Order*, ¶ 1.

The burdens associated with requiring frequency coordinator review are not warranted. In proposing the requirement, the Commission suggests that frequency coordinator review would ease burdens on Commission staff in correcting errors and inaccuracies in filed applications.²⁰ But the actions taken by the Commission in the *Cellular Report and Order* will themselves substantially reduce those burdens. For example, the Commission stated that the rule change limiting CGSA expansions to those that propose expansions of at least 50 square miles will reduce the volume of major modification applications and associated amendments by at least 60 percent.²¹ In addition, the *Cellular Report and Order* eliminated a number of exhibits that previously were required to be filed with cellular applications.²² In so doing, the Commission not only reduced the burdens on cellular licensees in preparing and submitting applications, but also reduced the chances for application errors and eased the burdens on FCC staff in reviewing applications. There is thus no reason to create a new review process with additional requirements for cellular licensees – requirements that do not exist for licensees in the PCS, AWS, 700 MHz and 600 MHz bands. At minimum, the Commission should allow cellular licensees and Commission staff to gain experience under the newly revised cellular rules before considering whether frequency coordinator review may be warranted.

V. VERIZON SUPPORTS A NUMBER OF OTHER PROPOSED RULE CHANGES TO MODERNIZE THE CELLULAR RULES.

The Commission seeks comment on a number of other rule changes designed to update the cellular rules. Verizon comments on many of these issues below:

²⁰ *Further Notice*, ¶83.

²¹ *Cellular Report and Order*, ¶ 36.

²² *Id.*, ¶ 50.

Technological Neutrality for Field Strength Measurement. The Commission notes that the varying bandwidths of technologies deployed in the cellular bands may produce varied results when the 40 dBu V/m field strength limit adopted in the *Cellular Report and Order* is applied. To promote technological neutrality in its rules and ensure consistent field strength measurement results, it asks whether it should adopt a specific measurement bandwidth for field strength measurements or some other technologically neutral limit or metric.²³

The Commission should change the field strength rules (for all bands) to the methodology currently used in the international border agreements between the United States and Canada and Mexico, which specify border field strength levels in terms of power flux density measured as dBW/m²/MHz.²⁴ This methodology, which calculates field strength at the license boundary on a per-MHz basis, is both technologically neutral and familiar to licensees operating near International borders.

Height-Power Limit. Noting that Section 22.913 of the cellular rules limits the height of antennas so as to limit the service area boundary (“SAB”) of antennas, and that other rule parts treat height limitations differently (some have no limits, while others require scaled down power levels for antennas over certain heights), the Commission asks whether it should amend the cellular height/power limit rules to adopt scaled height/power requirements similar to those in effect for the 700 MHz bands or delete them altogether.²⁵

²³ *Cellular Report and Order*, ¶¶ 135-136.

²⁴ *See, e.g.*, Arrangement O, Sharing Arrangement between the Department of Industry of Canada and the Federal Communications Commission of the United States of America Concerning the Use of the Frequency Bands 698-758 MHz and 776-788 MHz for the Fixed and Mobile (Except Aeronautical Mobile) Services Along the Canada-United States Border (Jul. 18, 2011), available at: http://transition.fcc.gov/bureaus/ib/sand/agree/files/can-nb/700_MHz.pdf.

²⁵ *Id.*, ¶¶ 137-138.

The Commission should delete the height-power limits in the cellular rules. The border field strength limits that it adopted in the *Cellular Report and Order* adequately limit SABs, making height-power limits unnecessary.

Power Measurement. The Commission tentatively concludes that cellular radiated power limits (both the legacy limits and the PSD limits it proposes) should be measured in terms of maximum average power as measured with a root mean square power averaging detector. It also seeks comment on whether it should establish a uniform bandwidth (“resolution bandwidth”) over which power should be measured.²⁶

The Commission should adopt its proposal to measure base station transmitter power using average power as measured with a root mean square power averaging detector. Given that instruments can be configured to directly measure broadband power over the bandwidth deployed (“channel power”), it is neither necessary nor useful to specify a resolution bandwidth beyond simply specifying “channel power.”

Out of Band Emission Limits. The Commission seeks comment on whether it should increase the suppression levels set forth in the Section 22.917 out of band emission (“OOBE”) limits, and whether doing so would facilitate higher PSD limits without increasing the potential for unacceptable interference to legacy public safety operations. If so, it asks what the increased OOBE limits should be and why.²⁷

The Commission should not change the existing OOBE limits. The current Commission rules have worked well and have been adopted by standards bodies such as 3GPP and 3GPP2. There is no need to change those limits.

²⁶ *Id.*, ¶¶ 140-142.

²⁷ *Id.*, ¶¶ 147-148.

Modification of Section 22.911. The Commission seeks comment on how to ensure a technology neutral application of the formula for determining SAB and CGSA contours. It notes that the power figure (P) in the current formula could vary widely depending on the technology chosen by the licensee and could unfairly penalize licensees using narrowband technologies (where the value of P would be lower). It proposes to establish some method to allow P to vary when applying for unserved area to expand a CGSA or when extending an SAB into unserved area on a secondary basis and seeks comment as to how to establish a variable value for power.²⁸

The Commission should not change the definition of P in the SAB and CGSA contour formula. A new definition would not be necessary if the Commission adopts the technologically neutral dBW/m²/MHz PFD field strength measurement (discussed above). This change would result in a dBm/MHz signal value at the contour boundary, which ensures a constant signal-to-noise ratio for any and all bandwidths above 1 MHz. Should the Commission choose not to adopt the proposed field strength changes, then changing the definition of P to Watts/MHz would be an equivalent and necessary means of achieving the same goal. Verizon believes, however, that the proposed change to field strength measurement is the better approach since that change implicitly codifies the measurement technique for field measurements.

Domestic Coordination Requirements. Noting that cellular licensees are required under Section 22.907 of the cellular rules to coordinate channel usage at each transmitter location within 121 km of any transmitter locations that are authorized to other licensees, the

²⁸ *Id.*, ¶¶ 149-152.

Commission seeks comment as to whether, in the event it adopts PSD limits, the current coordination requirements are sufficient or need to be enhanced.²⁹

The Domestic Coordination Requirements of Section 22.907 are largely, but not entirely, outdated. Where two adjacent systems both deploy technologies like GSM which re-use frequencies by dividing frequencies into channels, it is still important to coordinate specific channel assignments to avoid cross-border interference. This is true even with field strength limits in place. However, for systems not dividing frequencies into channels³⁰ (such as CDMA and certain LTE deployments), the field strength limits play the role of channel coordination and any further coordination is irrelevant. Verizon proposes therefore that the current Section 22.907 language be amended by adding a sentence to the end of the introductory paragraph reading: “Licensees utilizing systems employing a frequency reuse factor of 1 (universal reuse) are exempt from this requirement.”

International Coordination Requirements. The Commission proposes to eliminate what it deems to be two unnecessary cellular rules regarding international coordination between operators in Canada and Mexico. The FCC proposes to retain the more general Section 22.169 rule, requiring coordination as set forth in applicable treaties and agreements, but eliminate the more specific (Sections 22.955 and 22.957) provisions in the cellular rules and seeks comment on this proposal.³¹ The Commission should adopt these proposed rule changes.

²⁹ *Id.*, ¶ 153.

³⁰ The ability to reuse the same frequencies in adjacent cells (as opposed to dividing the frequency into channels which may not be reused in adjacent cells) is commonly referred to as “a frequency reuse factor of 1” or “universal reuse.”

³¹ *Id.*, ¶¶ 154-155.

VI. CELLULAR LICENSEES SHOULD NOT BE REQUIRED TO RETAIN AND POST INFORMATION ABOUT FCC AUTHORIZATIONS.

Section 22.303 of the Commission's rules requires that Part 22 licensees retain the authorization for each station as a permanent part of the station records. The rule further requires either that a copy of the authorization be available at each regularly attended control point or that the licensee post information at each control point providing the address and location where the authorization and other records may be found.³²

In keeping with the goals of this proceeding to eliminate unnecessary requirements and harmonize the cellular rules with the rules for other commercial wireless services, the Commission should eliminate this requirement for cellular licensees.³³ The requirement to maintain and post information about individual station authorizations is burdensome, outdated and unnecessary. Complying with this rule places significant administrative burdens on cellular (and microwave) licensees. The Commission does not send copies of licenses when minor modifications are granted. Therefore, licensees have to periodically take inventory of their licenses and print copies of licenses once applications are granted to ensure they have the current license in the file. Moreover, the Wireless Bureau recently announced that licensees' official authorizations will be maintained in ULS and will no longer be mailed unless a licensee notifies the Commission otherwise.³⁴ Thus, to comply with the current rule licensees will have to either

³² 47 C.F.R. § 22.303.

³³ Verizon notes that a similar requirement exists for Part 101 microwave licensees. *See* 47 CFR §101.215. That requirement, like the Part 22 requirement, is unnecessary and burdensome and should be eliminated from the Part 101 rules.

³⁴ *See Wireless Telecommunications Bureau Implements Enhancements to the Commission's Universal Licensing System and Antenna Structure Registration System and Adopts Final Procedures for Providing Access to Official Electronic Authorizations*, Public Notice, WT Docket 14-161, DA 14-1846 (Dec. 18, 2014).

request paper copies from the Bureau or print copies from ULS, and continue to do so as changes are made. This change makes complying with the Part 22 rule substantially more difficult.

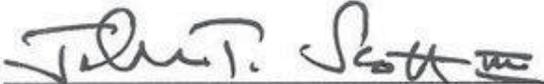
There is no public interest benefit from this rule. Verizon has never had a request for copies of licenses, and such copies are available to the public through ULS. Given the recent amendments to the cellular rules to transition cellular from site-based licenses to geographic licensing, individual station authorizations are no longer relevant. Moreover, this requirement does not exist in the rules for PCS, AWS or 700 MHz licensees. For these reasons, the Commission should eliminate the Section 22.303 requirement.

VII. CONCLUSION

For the reasons stated above, the Commission should revise and amend the cellular rules by (1) adopting PSD and PFD limits; (2) revising the cellular discontinuation rule; (3) making certain other updates to the rules; and (4) eliminating the requirement to retain and post information about authorizations. The Commission should not require licensees to use frequency coordinators to review certain cellular applications before they are filed with the Commission.

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