

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

In the Matter of)	
)	
Amendment of the Commission's Rules with)	GN Docket No. 12-354
Regard to Commercial Operations in the)	
3550-3650 MHz Band)	

VERIZON REPLY COMMENTS

ON FURTHER NOTICE OF PROPOSED RULEMAKING

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SUMMARY

The Commission has made commendable progress toward realizing the sharing vision set forth in the PCAST Report, but changes to the rules as currently proposed are needed if the 3.5 GHz band is to achieve its full potential. All of the commenters that deploy LTE networks – along with the vendors that build equipment for their networks – raise concerns that the FNPRM’s current proposal does not provide incentives to promptly deploy networks using existing technologies. As they explain, adopting an unproven and untested multi-tier sharing regime for the entire band, and coupling that novel framework with a novel licensing model, would compromise the ability of users to deploy in the band. Instead, the record confirms that the best way to promote successful sharing is to dedicate a portion of the band, for a transitional period, to a proven two-tier framework that permits LTE network providers to kick-start investment with proven and already-tested technologies.

There is also overwhelming consensus among diverse parties that the FNPRM’s proposal for very large “exclusion” zones – which are identical to those proposed in the initial NPRM in 2012 – represents a major obstacle to meaningful investment and innovation. Apart from modifying the proposed rules to reduce the size of the zones, the Commission should confirm that they are in fact coordination zones where licensees may operate to the extent they have successfully coordinated with the government incumbents.

It is also clear that power limits higher than those proposed in the FNPRM are necessary to avoid precluding important use cases, including outdoor small cell LTE. The proposed power levels, combined with the proposed noise floor, would limit deployments to very small indoor picocells, which might make sense for certain GAA uses (such as WiFi hotspots) but would effectively make it impossible for network operators to achieve cost-effective outdoor coverage.

The Commission should increase the power levels – while still keeping them below macro cell levels – in order to adhere to its stated policy of supporting flexible use cases for the 3.5 GHz spectrum.

The Commission should also reject proposals to permit the SAS manager to dynamically adjust Priority Licensees’ power limits because such a policy would reduce the attractiveness of the spectrum to LTE operators by precluding important use cases. Such a policy might, however, make sense for GAA users, whose primary uses cases (e.g., WiFi hotspots) may remain viable when a SAS manager directs operators to reduce transmit powers. Indeed, authorizing the SAS managers to adjust GAA users’ power levels could go hand in hand with a policy of permitting GAA users to transmit at higher maximum power levels.

The record does not support the FNPRM’s proposals to establish a 30 MHz aggregation cap for 3.5 GHz spectrum and to set aside spectrum for Contained Access Facilities (“CAFs”), and neither should be adopted. Those rules would reverse decades of sound spectrum management policy and would harm consumers by preventing the market from determining the best uses of the spectrum. There is no evidence supporting the FNPRM’s apparent presumption that the acquisition of more than three 10 MHz licenses would be anticompetitive, and there is no basis for the Commission to conclude that the next generation of wireless services – which this proceeding is explicitly seeking to promote – will not involve at least some licensees needing to aggregate more than 30 MHz of spectrum. Nor is there any basis to find that the entities proposed to be eligible for subsidized spectrum as CAFs need such spectrum or would put it to a higher or better use than other entities.

Finally, the Commission should redouble its efforts to coordinate with government incumbents. Various issues teed up in the FNPRM, including the use of dynamic channel

assignment and the structure of the Spectrum Access System (SAS), will depend on the government-private sharing arrangement. That sharing arrangement in turn depends on information about incumbent operations that is currently unavailable, such as how often incumbents may render assigned channels unusable and how many channels will become unusable during periods of incumbent activity. Rather than issue vague rules that do not address such issues, the Commission should issue rules that reflect the nature of the sharing arrangement that makes sense for incumbents.

I. The Record Confirms that a Transitional Framework Would Best Achieve the Investment and Innovation Needed to Realize the PCAST Vision.

A. A Two-Tiered Framework With a Proven Licensing Model Would Promote Prompter Investment than the Novel Three-Tier Proposal.

Numerous commenters explain that the complexity associated with the FNPRM's proposed three-tiered sharing regime, coupled with its untested highly innovative licensing model, would create too much uncertainty to support substantial innovation and investment.¹ Another hurdle to an effective three-tiered framework is the need to develop "channel use surety" techniques to prevent unauthorized channel use by rogue standalone GAA operators.² By contrast, prompt investment can occur under a two-tiered sharing regime because the necessary equipment and techniques, including security protocols and air interfaces, already exist. Similarly, a licensing model including reasonably-sized service areas and reasonably long terms would create the certainty needed to support investment.³

¹ See, e.g., T-Mobile FNPRM Comments at 8-11; Alcatel-Lucent FNPRM Comments at 3-6; Ericsson FNPRM Comments at 9-10; Nokia FNPRM Comments at 11-13; Qualcomm FNPRM Comments at 4-5.

² See, e.g., Verizon FNPRM Comments at 17-18.

³ See, e.g., Qualcomm FNPRM Comments at 6-12; T-Mobile FNPRM Comments at 8-11; AT&T FNPRM Comments at 20-29; Alcatel-Lucent FNPRM Comments at 3-6; Ericsson FNPRM Comments at 9-10; Nokia FNPRM Comments at 13-16.

Verizon recognizes, however, that the Commission views the 3.5 GHz band as an “innovation band” in which novel spectrum sharing paradigms can be explored. Rather than abandon the FNPRM’s proposal, a transitional approach would promote the ultimate goal of the FNPRM – a three-tiered regime with a new licensing model – by leveraging the investments and innovation that can be deployed promptly (with existing and proven LTE technology) under the more recognizable framework.

B. A Transitional Framework Will Promote the Emergence of a Three-Tiered Ecosystem in a Single Unified Band.

No commenter provides analysis supporting the concern expressed in the FNPRM that a transitional approach might “Balkanize” the 3.5 GHz band.⁴ As Verizon and others explain, a transitional approach would not fragment the 3.5 GHz band because the transitional portion would be subject to a sunset condition and because, starting from the outset, device and equipment manufacturers would manufacture devices that can tune across the entire band.⁵ To the contrary, by kick-starting investment in 3.5 GHz technologies and investments, a transitional approach would promote – not delay – the emergence of the three-tiered sharing paradigm throughout the band.⁶ In fact, it is the proposed imposition of a three-tiered framework throughout the band that would create fragmentation by diverging from the emerging global regime for 3.5 GHz spectrum, which involves two-tiered licensed systems.

InterDigital, the Whitespace Alliance, and the Public Interest Spectrum Coalition suggest that the transitional portion of the band may not use spectrum as efficiently as the novel three-

⁴ FNPRM ¶ 22.

⁵ Verizon FNPRM Comments at 14-15; Ericsson FNPRM Comments at 5-6; Alcatel-Lucent FNPRM Comments at 6; 4G Americas FNPRM Comments at 6.

⁶ *See, e.g.*, Verizon FNPRM Comments at 11-15.

tiered framework.⁷ To the contrary, the worst (and most inefficient) possible outcome would be failure – and the risk of that outcome is substantially increased by a regime that exclusively embraces novel untested concepts, while ignoring the promise the band holds for LTE providers seeking to promptly deploy networks using existing technologies and techniques. As Ericsson explains, the 3.5 GHz band "may remain largely unused in the absence of a transitional approach due to the magnitude of the challenges involved with the proposed dynamic sharing three-tiered approach."⁸

The Wireless Innovation Forum also has it backwards suggesting that a transitional framework might “complicate” the SAS and thereby lead to lower investment and innovation.⁹ The rationale for dedicating some spectrum to a known and proven two-tier framework, and a known and proven licensing model, is to provide a *simpler* framework that will support prompt innovation and investment during the finite transitional period. The record confirms that a transitional framework is readily implementable from a SAS administration point of view.¹⁰

II. The Commission Should Coordinate with Incumbents to Reduce the “Exclusion” Zones and Should Clarify that a Licensee May Operate Inside a Zone if it Has Successfully Coordinated with the Incumbent.

There is near-universal agreement that the very large “exclusion” zones in proposed rule § 96.15 would impede the emergence of a robust ecosystem of networks and devices. Several firms have submitted technical analyses indicating that the amount of geographic separation

⁷ See InterDigital FNPRM Comments at 3 (regarding Rule §96.1); Whitespace Alliance FNPRM Comments at 2; Dynamic Spectrum Alliance, WhiteSpace Alliance, and Public Interest Spectrum Coalition FNPRM Comments at 2.

⁸ Ericsson FNPRM Comments at 5.

⁹ Wireless Innovation Forum FNPRM Comments at 28.

¹⁰ See iconectiv FNPRM Comments at 5 (noting that the SAS administrator can readily accommodate the transitional approach by applying a different set of initial rules for the transitional portion of the band and then changing the rules once the interim period is over).

potentially needed to protect incumbents is substantially smaller,¹¹ and the FNPRM appropriately indicates that the Commission will work expeditiously with NTIA to reduce the size of the zones. It is premature for the Commission to adopt rules until that important project has been completed.

Equally important, the Commission should redesignate the zones as “coordination zones” to clarify that they do not exclude operators that have successfully coordinated with the incumbents. The record confirms the common sense conclusion that there is no basis to exclude any licensee from any zone if the incumbent has determined that the licensee has in place the sharing mechanisms – and the security protocols – needed to protect the incumbent from interference.¹²

III. The Power Limits – At Least for Priority Licensees – Must Be Revised to Adhere to Important Flexible Use Principles.

A. Power Limits Should Support Reasonable Outdoor Small Cell Coverage Scenarios.

There is consensus among diverse parties that higher power limits than the FNPRM proposes are necessary to avoid precluding important use cases, including outdoor small cell LTE.¹³ For example, Google notes that power limits need to be increased because “[t]he success of the CBRS will depend on operators’ ability to deploy usable networks,”¹⁴ and Sprint explains that “the current proposed Part 96 power limits are significantly less than the typical power

¹¹ See, e.g., Google FNPRM Comments, App. A; Nokia FNPRM Comments at 5-9, 23-33; *Ex Parte* Letter from John. W. Kuzin, Qualcomm, to Marlene Dortch, FCC, GN Docket No. 12-354 (Apr. 16, 2014); Qualcomm Comments, GN Docket No. 12-354 (Feb. 20, 2013) at 17, Appendix.

¹² Verizon FNPRM Comments at 6; T-Mobile FNPRM Comments at 7-8; Ericsson FNPRM Comments at 10-12. See also iconnectiv FNPRM Comments at 6 (use of coordination zones “could allow more efficient sharing of this spectrum”).

¹³ Google FNPRM Comments at 25-26; T-Mobile FNPRM Comments at 11-12; Ericsson FNPRM Comments at 10; Qualcomm FNPRM Comments at 13; Nokia FNPRM Comments at 19-20; Alcatel-Lucent FNPRM Comments at 12; Sprint FNPRM Comments at 5 n.14.

¹⁴ Google FNPRM Comments at 25.

levels that are used today for many small cells,” and indeed are “more comparable to typical power levels that apply to unlicensed WiFi routers.”¹⁵

Those commenters understate the problem with the proposed power levels. The FNPRM’s proposed power limits (24 dBm transmit power with antenna gain of 6 dBi – 30 dBm EIRP total) are 6 dB *lower than* the standard 2.4 GHz WiFi power level, which itself only supports very small indoor picocells not suitable for any reasonable outdoor coverage scenario. And the fact that 3.5 GHz spectrum propagates shorter distances than 2.4 GHz spectrum further reduces potential cell sizes achievable at that power level. Those power levels do not support an economical coverage scenario for an LTE network provider seeking to use 3.5 GHz spectrum for part of its network coverage. To promote its goal of supporting “a wide variety of innovative services,”¹⁶ including cells used for “wider area outdoor deployments,”¹⁷ the Commission should increase the power limits so they support a wider array of use cases, including outdoor small cell coverage.

B. The Commission Should Not Impose Low Power Limits Based on Undocumented Concerns About the Size of the “Exclusion Zones.”

Some parties are hesitant about authorizing higher power levels because of concerns that such a policy might make it more difficult to shrink the “exclusion” zones.¹⁸ Those concerns are not based on any factual analysis given that there still is virtually no information available about the nature of incumbents’ operations or their protection needs. In any event, even if higher power levels do necessitate somewhat larger zones, that would not constitute a reason to prohibit such power levels *outside* the zones. And assuming the Commission confirms that the zones are

¹⁵ Sprint FNPRM Comments at 5 n.14.

¹⁶ FNPRM ¶ 74.

¹⁷ See Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Docket No. 12-354, *Notice of Proposed Rulemaking and Order*, 27 FCC Rcd. 15594, ¶ 31 (2012).

¹⁸ See, e.g., Sprint FNPRM Comments at 5, n. 14.

coordination zones that do not automatically exclude any operations, the ability of any operator to transmit at any power level inside the zones would be conditioned on its having successfully coordinated with the incumbent. If successful coordination requires an operator to operate at lower power levels within a zone (or within a portion of it), it will reduce its power levels regardless of the maximum power levels set forth the Commission's technical rules. Conversely, if the operator is able to successfully coordinate higher power levels with the incumbent, there is obviously no reason for the Commission to prevent it from operating at those levels.

C. There Is No Basis to Handicap Priority Licensees by Subjecting Them to Restrictions Relevant to GAA Operations that Do Not Make Sense in the Priority Context.

Verizon does not oppose also increasing the power limits for GAA operators. However, if policy considerations that are specific to GAA operators drive the Commission to retain the low power limits for GAA operations, that decision should not cause the Commission to apply similarly low limits on Priority Licensees. For example, given that GAA users are not required to avoid causing interference to one another, the Commission might reasonably determine that requiring them to operate at lower power levels will promote more GAA deployment because it would facilitate “packing” together GAA more tightly. Whatever the Commission decides are the right power levels for GAA, it should make an independent decision about the levels that are appropriate for Priority Licensees. The PCAST Report supports making different policy determinations for GAA and Priority operations, indicating that the GAA tier “allows for only low power transmission” whereas Priority users “can transmit with high power.”¹⁹

Similarly, the policy considerations for GAA and Priority users may be different with respect to the proposal to authorize SAS managers to dynamically adjust users' power levels.

¹⁹ PCAST Report at 24.

The Commission should not require Priority Licensees to submit to power throttling because it would create dead zones between cells, thereby reducing the 3.5 GHz service to merely an augmentation of some other primary band and precluding deployment of LTE networks without anchored licensed frequency support.²⁰ However, those same concerns may not apply in the case of GAA operations because the primary use case in that portion of the band may involve operators providing “islands of coverage,” such as a series of isolated WiFi hot spots, whose utility may not be substantially impaired by the proposal. One possible approach to GAA power levels may be to authorize the same maximum power levels for GAA and Priority uses, but to require GAA (but not Priority) users to accept throttling of power levels in order to avoid causing interference to other users. In any event, the Commission needs to separately and independently develop the right policy framework for GAA and Priority operations and should reject calls to automatically apply the same policies on all types of users.

IV. There Is No Basis to Impose a Spectrum Aggregation Cap or to Set Aside Spectrum for Particular Entities.

Verizon has explained that not only would a band-specific spectrum aggregation cap not address any valid public policy objective, but it would risk causing substantial consumer harm by precluding certain wideband operations that may well be needed in order to maximize the utility of this spectrum.²¹ No party submitted any evidence supporting a finding that optimal future uses of the 3.5 GHz will be achievable with bandwidths of 30 MHz or less. Nor did any party submit any analysis identifying any basis to find that there is a risk of competitive harm if no spectrum aggregation cap is imposed.

²⁰ See Verizon FNPRM Comments at 9-10; T-Mobile FNPRM Comments at 14.

²¹ Verizon FNPRM Comments at 21-22.

There also is no analysis in the record supporting the FNPRM’s proposal to set aside spectrum for Contained Access Facilities (“CAFs”). To the contrary, the CAF proposal is unnecessary and it would withhold spectrum from firms that are prepared to deploy it productively.²² The Commission has repeatedly found that open eligibility serves the public interest by putting the spectrum “to its most effective use.”²³ The corollary is that “restricting eligibility for licenses without adequate justification could harm the public interest.”²⁴

Of course, those same bedrock spectrum policy principles require rejecting requests by utility companies to expand the CAF definition so they can receive subsidized spectrum.²⁵ The Commission consistently rejects unsupported requests for favored treatment, including in the AWS-4, 700 MHz, BRS/EBS, 71-76 GHz, 81-86 GHz, 92-95 GHz, MVDDS, 37.0-38.6 GHz and 38.6-40.0 GHz bands.²⁶

V. Input From Incumbents Is Needed on Certain Issues Such as Whether to Employ Dynamic Frequency Assignment.

A number of commenters oppose dynamic frequency assignment because it would substantially increase the complexity of the sharing regime and create challenges for LTE network operators.²⁷ On the other hand, dynamic frequency assignment may promote efficient spectrum use and may offer users the ability to continue operating on new channels if and when

²² See WiFi Alliance FNPRM Comments at 7-8; Sony FNPRM Comments at 2; Verizon FNPRM Comments at 20.

²³ See, e.g., Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Second Report and Order*, 22 FCC Rcd. 15289, ¶ 259 (2007) (“700 MHz Service Rules Order”).

²⁴ *Id.*

²⁵ See, e.g., Ameren FNPRM Comments at 2-3; Utilities Telecom Council FNPRM Comments at 10-11; Siemens FNPRM Comments at 5.

²⁶ Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands, *Docket 12-70, Report and Order and Order of Proposed Modification*, 27 FCC Rcd. 16102, ¶218 (2012); *700 MHz Service Rules Order* at ¶ 253 n.573 (detailing Commission’s history of rejecting requests for special treatment).

²⁷ See AT&T FNPRM Comments at 12-19, T-Mobile FNPRM Comments at 10, Ericsson FNPRM Comments at 6-7; CTIA FNPRM Comments at 8.

incumbent operations require operators to cease operating on certain channels. The Commission needs to balance the known drawbacks of its dynamic channel assignment proposal with the benefits it may potentially convey, but those benefits are currently unknown because the FNPRM does not provide any information about the expected incumbent operations with which to perform a cost-benefit analysis. It is unknown, for example, how often a particular channel assignment might be rendered unusable by a federal incumbent, and how many channels might be rendered unusable at the same time – so it is impossible to evaluate whether or not the utility for the private sector associated with implementing dynamic channel assignment outweighs the complications that a dynamic approach would create.

The static versus dynamic channel assignment question interrelates with other important issues that likewise cannot be resolved absent more information. For example, Verizon has explained that the proposed §96.38(c) would impose a single received signal strength limit on all use cases (-80 dBm measured by a 0 dBi isotropic antenna in a 10 MHz bandwidth) for managing the interference environment, which would preclude a SAS manager from managing different use cases differently.²⁸ The flexible use principle that the Commission seeks to embrace in this band would be advanced by allowing operators to opt into different interference thresholds based on what makes sense for the operations they are deploying. For example, all of the cell sizes achievable could be larger – in many cases more than twice as large – if the operator had the option of managing to a lower noise floor such as -90 dBm. To the extent channel assignments are static, however, it may not be advisable to implement a more flexible interference framework under which SAS managers would manage different uses cases differently because operators would be able to coordinate border issues with adjacent licensees –

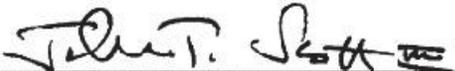
²⁸ Verizon FNPRM Comments at 8-9.

a feature of traditional licensing regimes that would be unavailable under a dynamic channel allocation regime.

It is also impossible at this stage to make final policy decisions about the structure and functionality of the SAS, absent basic information about how government-private sharing will work. For example, various parties speculate that it may make sense to have a “federal” SAS (perhaps with obfuscated data to protect the confidentiality of military operations) that feeds into the “commercial” SAS, whereas other suggest that a sensing system would be preferable. Likewise, the ultimate sharing regime with the incumbent will drive decisions about the SAS’s architecture and its mission. Rather than issue rules that sidestep such issues (e.g., § 96.43, § 96.48), the Commission should continue its efforts to coordinate this proceeding with the government incumbents and should address these issues once it has made progress on that project.

Respectfully submitted,

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