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

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

REPLY COMMENTS OF GOOGLE INC. IN RESPONSE TO PUBLIC NOTICE ON PROTECTION FOR GRANDFATHERED 3650-3700 MHZ BAND LICENSEES

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Introduction and Summary

In establishing new rules for commercial use of the 3550-3700 MHz band (the 3.5 GHz band), the Commission sought to increase spectrum utilization dramatically while recognizing the legitimate interests of existing users.[1] In the specific case of existing wireless users of the 3650-3700 MHz frequencies, the Commission struck an appropriate balance: Installations already deployed by these Part 90 users are protected for a finite period of time, after which the providers may operate under the new Part 96 framework.[2]

As Google has explained, grandfathering provisions for these existing users should both protect valuable Part 90 services in the near term *and* smooth the transition from Part 90 to Part 96 operation at the end of the grandfathered period. An approach that protects individual locations and frequencies where Part 90 equipment is installed, rather than a boundary-, sector-, or zone-based approach, will best protect existing users without unnecessarily constraining the availability of spectrum for new offerings. A location-based approach will also allow the Commission to tailor protection to individual Part 90 operations, rather than making worst-case assumptions regarding interference. Finally, the Commission should set its maximum received interference level for protected locations at a level that begins the transition to Part 96 requirements

[1] *In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd. 3959, ¶¶ 1, 4 (2015) (*Report and Order*).
[2] *Id.* at ¶¶ 4, 401, 408. Of course, these operators are also free to deploy new operations under the Part 96 rules during the pendency of the grandfathering period.

and thus eases the eventual conversion of grandfathered operations to the new framework.[3]

Discussion

I. Instead of protecting broad boundaries, sectors, or zones around grandfathered operations, the Commission should adopt an approach that protects specific installation locations and frequencies.

A broad cross-section of commenters, including Google, the Wireless Internet Service Providers Association (WISPA), and the Wireless Innovation Forum (WinnForum), favor a protection framework that establishes maximum aggregate received power levels at individual Part 90 installation locations.[4] As explained by the WinnForum, since Part 90 operations are "fixed, not mobile, device protection based on a fixed location, rather than a zone of potential operation, is appropriate."[5]

Area- or boundary-based protections may be both overprotective and underprotective. The Commission's own proposal reflects this. In its *Public Notice* addressing grandfathering protections, the Commission proposed to establish protection criteria to be measured at the boundary of a particular polygon, but did not clearly propose to protect the area inside the boundary, even though it consistently referred to "zones" of protection.[6] For their part, many commenters referenced

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[3] *See* Response of Google Inc. to Public Notice on Protection for Grandfathered 3650-3700 MHz Band Licensees, GN Docket No. 12-354 (filed Dec. 28, 2015) (Google Comments). All comments cited below were filed in GN Docket No. 12-354.
[4] *See id.* at 4, 6-7; Comments of WISPA at 2 (filed Dec. 28, 2015) (WISPA Comments); Comments of the WinnForum at 3, 5-6 (filed Dec. 28, 2015) (WinnForum Comments).
[5] WinnForum Comments at 3.
[6] *See Wireless Telecommunications Bureau Seeks Comment on an Appropriate Method for Determining the Protected Contours for Grandfathered 3650-3700 MHz Band Licensees*, Public Notice, 30 FCC Rcd. 11557 at 2-3 (2015) (*Notice*).

zone-based protection, but it is not clear from context whether they support area-based, rather than boundary-based, protection, or simply intend to echo the language of the *Notice*.[7] Regardless of whether such commenters advocate for zone-based or boundary-based protection, a number of them raise concerns about specific instances where a zone- or boundary-based approach may be underprotective.[8] Some of these commenters, though, alternatively propose a blanket extension of the perimeter of protection, either for all Part 90 operations or specifically for the commenter's own operations. That approach would be overprotective in many cases and unnecessarily limit spectrum availability by new users. For example, some commenters suggest protection radii of at least 6 and up to 24 kilometers around their current operations, regardless of the directionality of their antennas or the presence of CPE in all sectors surrounding a base station.[9] Establishing such indiscriminate protection zones will leave spectrum underutilized.

A sounder approach is to protect installed operations, based on their actual location and other reported characteristics. To that end, Google agrees that it is appropriate to protect new CPE serving grandfathered base stations during the

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[7] *See, e.g.*, Comments of the American Petroleum Institute at 1 (filed Dec. 28, 2015) (API Comments) (referring to contours and zones interchangeably); Comments of CenterPoint Energy Houston Electric, LLC, at 3 (filed Dec. 28, 2015) (CenterPoint Comments) (referring to the "zone proposed" by the Commission).

[8] *See, e.g.*, API Comments at 3-4; CenterPoint Comments at 3; Comments of Exelon Corporation at 4 (filed Dec. 28, 2015) (Exelon Comments).

[9] *See* API Comments at 4 (proposing a protection zone with a radius of 6.4 kilometers around base stations serving registered CPE); CenterPoint Comments at 3-4 (proposing zones with a radius of at least 8 kilometers and noting that some of its equipment can operate at a range of 19 kilometers); Exelon Comments at 4 (requesting that the Commission grant Exelon a protection zone of "up to 24 kilometers from each grandfathered base station").

pendency of the grandfathering period,[10] but it is neither necessary nor appropriate to base such protection on generalized, worst-case assumptions. For example, it does not make sense to establish a blanket protection zone of "up to 24 km from each grandfathered base station, regardless of the location of CPE that is currently deployed"[11] because such an approach disregards available information regarding existing Part 90 operations. A registration process that collects basic information regarding CPE will better protect existing deployments and new CPE serving grandfathered base stations. Equally important, establishing a registration-based protection framework will smooth the transition to Part 96 compliance at the end of the grandfathering period, for existing licensees similarly will be required to register their operations with a spectrum access system to operate under the Part 96 framework.[12]

For similar reasons, Part 90 users should be required to register the specific frequencies used in their operations when seeking grandfathering protection.[13] A contrary approach—which would permit Part 90 incumbents to block new uses of the entire 50 MHz between 3650-3700 MHz on the basis that they might want to change their operating frequencies during the grandfathering period[14]—would leave substantial spectrum lying fallow and is not consistent with the careful balancing of new and existing users set forth in the Commission's April 2015 *Report and Order*. Indeed, the

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[10] *See* Exelon Comments at 3-4; Comments of Sacred Wind Communications, Inc. at 6-7 (filed Dec. 28, 2015).
[11] Exelon Comments at 4.
[12] *Report and Order* ¶ 407 (recognizing the importance of registration as a prerequisite to seeking grandfathering protection); 47 C.F.R. § 96.39(c) (requiring registration of Citizens Broadband Radio Service Devices prior to operation).
[13] *See Notice* at 3.
[14] CenterPoint Comments at 4; Exelon Comments at 5; Comments of Utilities Telecom Council at 5-6 (filed Dec. 28, 2015).

Commission has already rejected such an approach, recognizing that "protection should be provided only for the channels and locations where operations currently are deployed, rather than categorically granting incumbents exclusive rights to a full 50 MHz of spectrum they may not be using (and may not be authorized to use)."[15] Advocates for broader protection raise no new points that cast doubt on the Commission's prior finding.

In sum, protecting Part 90 operations based on actual deployment locations and characteristics will allow both new and existing services to coexist successfully and will ease the transition when grandfathering protection sunsets.

II. Establishing an interference protection level of -95 dBm/MHz (or -85 dBm/10 MHz) is appropriate and will ease the transition to Part 96.

As set forth in Google's response to the *Notice*, protection criteria for grandfathered operations should track as closely as possible the rules for General Authorized Access (GAA) users in protecting PA licensees (PALs), so as to facilitate the transition to Part 96 compliance by the end of the grandfathering period.[16] To that end, the Commission should establish protection at the level of -95 dBm/MHz—which is equivalent to -85 dBm/10 MHz—from all Citizens Broadband Radio Service Device (CBSD) transmissions in aggregate.[17] Although a maximum aggregate interference level of -85 dBm/10 MHz is somewhat more protective than the standard of -80 dBm/10

[15] *Report and Order* ¶ 402 (citing Letter from Austin C. Schlick, Director, Communications Law, Google Inc., to Marlene H. Dortch, Secretary, FCC, at 5 (filed Jan. 20, 2015)) (internal quotation marks omitted).
[16] Google Comments at 6-7.
[17] *Id.*

MHz for protecting PAL operations,[18] establishing a generally similar aggregate-interference framework and encouraging Part 90 users to operate in interference environments similar to those that will be present at the end of the grandfathering period, will smooth the eventual transition.

By contrast, granting substantially more favorable protection to Part 90 operations, as proposed by the American Petroleum Institute (API),[19] would retard the integration of Part 90 users. The API's proposed protection level of 37 dBμV/m/MHz is equivalent to -102 dBm per 10 MHz, which is over 150 times more stringent than the protections currently afforded PA licensees, and 50 times more stringent than the protection level proposed by Google, WinnForum, and WISPA.[20] Assuming a free-space-limited interference path, the proposal advanced by API would increase the standoff distance between a CBSD and a grandfathered installation by a factor of about seven over the criterion proposed by Google, WinnForum, and WISPA. For example, a standoff distance of 5 kilometers would grow to roughly 35 kilometers. These overly-generous exclusion zones would provide API's members little incentive to upgrade their equipment in advance of the transition.

Moreover, to the extent that a zone- or boundary-based approach is replaced with a location-based approach that accommodates the particulars of individual installations, the increased protection sought by API would be unnecessary. API bases its request on (1) the particular characteristics of some directional antennas[21] and (2)

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[18] 47 C.F.R. § 96.41(d)(1); *Report and Order* ¶ 195.
[19] *See* API Comments at 4.
[20] *See* Google Comments at 2; WinnForum Comments at 5-6; WISPA Comments at 2.
[21] *Id*. at 2.

the potential for interference from Part 96 devices operating on the "backside" of the base station.[22] Google's recommended approach, however, addresses both of these concerns. It takes into account individual antenna characteristics when calculating protection, and protects individual base stations rather than basing protection contours on the presence or absence of CPE.

Conclusion

The Commission's April 2015 *Report and Order* established a reasonable balance in meeting the needs of existing Part 90 users while encouraging them to migrate to Part 96 operation at the end of a finite grandfathering period.[23] The Commission should continue to implement that sound policy by (1) requiring registration of equipment in use by Part 90 users; (2) establishing location-based protection of these installations; and (3) requiring CBSDs to limit their aggregate emissions at those protected locations.

Respectfully submitted,

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[22] *Id.* at 4.
[23] *Report and Order* ¶¶ 4, 401, 408.