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

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

Austin C. Schlick
Director, Communications Law
Aparna Sridhar
Counsel
GOOGLE INC.
25 Massachusetts Avenue NW
Ninth Floor
Washington, DC 20001

December 28, 2015

Introduction and Summary

In its April 2015 *Report and Order* adopting rules for expanded commercial use of the 3550-3700 MHz band (the 3.5 GHz band), the Commission reasonably decided to protect existing terrestrial wireless operations between 3650-3700 MHz, outside the new Part 96 framework, for a finite period of time.[1] These existing Part 90 licensees offer broadband connectivity and support utility infrastructure, and the wireless Internet service providers (WISPs) using this band often serve otherwise unserved or underserved areas. Given the importance of their services, the Commission should adopt an approach that effectively protects Part 90 licensees from harmful interference, while generally maximizing the availability of spectrum for new Citizens Broadband Radio Service devices (CBSDs). The Commission's transitional approach should also encourage current terrestrial wireless licensees to conform their operations as soon as possible to the Commission's new Part 96 framework, thereby smoothing the transition to full compliance at the end of the grandfathering period.

To achieve these objectives, the Commission should (1) protect the discrete locations where existing, registered base stations and their associated customer premises equipment (CPE) and the end-points of existing point-to-point links (collectively, "devices") are installed by establishing an aggregate received signal strength limit of -95 dBm/MHz (or -85 dBm/10 MHz) at those locations, rather than creating inefficient protection zones; and (2) require operators in the 3650-3700 MHz

[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, ¶ 4 (2015) (*Report and Order*).

band to identify and register through a multistakeholder process those devices that require protection, and to promptly update their records if operational parameters change or registered devices go out of service.

To account for the existence of unregistered CPE currently in operation and new CPE served by grandfathered base stations, the Commission should permit Part 90 licensees to register new CPE during the pendency of the grandfathering period. New base stations could also be registered, but pursuant to the Commission's *Report and Order*, they would not be entitled to grandfathering protection.[2] Establishing an aggregate protection limit for equipment actually deployed and requiring registration to take advantage of that protection conforms with the Commission's broader approach to interference protection in the 3.5 GHz band, will best ensure that valuable existing operations are appropriately protected while unused spectrum is made available for CBSDs, and will ease the transition of Part 90 operations into Part 96.

Discussion

I. The Commission's methodology for establishing protection should maximize spectrum availability for CBSDs and smooth the transition from Part 90 to Part 96.

In establishing transitional protections for Part 90 licensees, the Commission should protect specific base station locations, CPE locations, and link end-points, rather than establishing protection boundaries or broad protection zones around presumed Part 90 operations.[3] As much as possible, moreover, protection limits should track the

[2] *Id.* at. ¶ 402.
[3] 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 does not explicitly propose to protect the area inside the boundary. *See* Public Notice, *Wireless*

ones established for Priority Access licensees (PALs) in the Commission's *Report and Order*.

The Commission should protect Part 90 devices by establishing a received signal strength limitation at the precise registered location of the base station antenna or CPE installation, or at the locations of each end of a point-to-point link. The Commission should not establish boundary-, sector-, or zone-based protections that rely on the locations of CPE.[4] Under the approach proposed here, a SAS could authorize CBSDs to operate in the vicinity of a Part 90 licensee if it determines that operation would not result in received signals exceeding the prescribed signal strength limits at individually protected Part 90 locations.

This approach has several benefits. First, developing protections based on the known locations of fixed transceivers establishes an easy way for Part 90 licensees to document their use of the spectrum. Indeed, most Part 90 facilities are already registered in the FCC's Universal Licensing System (ULS), so it should be straightforward for Part 90 licensees to assemble the required site information. Second, the registration approach proposed here accommodates services that do not rely on typical base-station/CPE architecture, such as supervisory control and data acquisition (SCADA) operations and other applications used by utilities. By contrast, such atypical architectures are difficult to protect properly if protection is based on

---

Telecommunications Bureau Seeks Comment on an Appropriate Method for Determining the Protected Contours for Grandfathered 3650-3700 MHz Band Licensees, GN Docket No. 12-354, , at 2-3 (rel. Oct. 23, 2015) (*Notice*). As Google explains in greater detail below, neither boundary protection nor zone protection is effective in this case.

[4] *See id.*

general assumptions about Part 90 operations. Third, by establishing an aggregate signal strength limitation, the registration approach tracks the Commission's framework for protecting PALs, which also establishes an aggregate protection limit.[5] In addition to being technically and operationally sound, this similar incorporation of aggregate interference information will ease the transition to Part 96 compliance.

By contrast, a boundary- or zone-based approach, as proposed by the Commission,[6] would be at once overprotective and underprotective. It would be overprotective because the Commission proposes to protect sectors based on the mere possibility that unregistered CPE may be operating there.[7] The Commission's approach would be underprotective because it gives little attention to base stations, which can be more vulnerable to harmful interference than the CPE they serve. In general, base stations are sited at higher elevations, giving them better visibility to a broader area but also leaving them more exposed to potential interference. These considerations become highly significant at scale. Because there are over 53,000 registered Part 90 devices in the 3650-3700 MHz spectrum, establishing accurate protection is critical to ensuring existing service delivery is not adversely impacted. Equally important, significant overprotection of Part 90 networks across thousands of devices could be ruinous to the utility of the band for CBSD deployments. Protecting registered base stations, registered CPE, and point-to-point link locations—as opposed to establishing relatively large protection zones covering areas where Part 90 devices may be sparsely

[5] *Report and* Order ¶ 195.
[6] *Notice* at 2-3.
[7] *See Notice* at 2. Based on discussions within the WinnForum 3650 MHz Task Group, Google understands that there is very little, if any, unregistered low-power WISP CPE in operation.

deployed and unregistered devices may or may not be operating—strikes the right balance between potentially competing objectives.

Protection criteria for grandfathered operations should track as much as possible the restrictions imposed on General Authorized Access (GAA) users in protecting PALs. The Commission should revise the field strength limits it has proposed to protect grandfathered Part 90 users. In the *Notice*, the Commission proposed a limit of 44 dBμV/m/MHz, or -95 dBm/10 MHz, at the boundary of a grandfathered licensee's protection zone.[8] This limit applies to the signal strength received from any individual CBSD.[9] But where there is one CBSD, there likely will be others nearby. To address the real-world issue of aggregate interference from all relevant CBSDs, the Commission should establish protection at the level of -95 dBm/MHz—which is equivalent to -85 dBm/10 MHz—from all CBSD transmissions. Such an aggregate approach gives greater certainty to Part 90 users regarding the entire interference environment in which they will operate.

It is reasonable to apply similar aggregate-interference standards to WISPs and Priority Access CBSDs, given that they offer similar wireless broadband services over comparable bandwidth. Although a maximum aggregate interference level of -85 dBm/10 MHz is more protective of Part 90 operations than PAL operations, which receive protection at the level of -80 dBm/10 MHz,[10] moving toward an aggregate-interference framework will smooth the transition from Part 90 operation to

[8] *Id.* at 3.
[9] *Id.*
[10] 47 C.F.R. § 96.41(d)(1); *Report and Order* ¶ 195.

Part 96 operation at the end of the grandfathering period. By contrast, granting substantially more favorable protection to grandfathered Part 90 operations than PAL operations, within a different interference-mitigation framework, would limit the use of CBSDs and could result in implementation challenges and a last-minute flurry of waiver requests if Part 90 operators fail to prepare for expiration of the grandfathering period. A sounder approach is to protect existing operations from aggregate interference at a level equivalent to -85 dBm/10 MHz.

II. The Commission should require Part 90 licensees seeking grandfathering protection to register the parameters of their actual operations.

In its *Notice*, the Commission proposes to determine WISP protection by relying on existing data in its ULS system and supplementing that data with additional information to be collected from WISPs.[11] This approach is sound in concept, although grandfathered WISPs seeking protection should be required to affirmatively register their operations. In addition, to ensure that SAS providers have accurate information regarding devices in the field, Part 90 licensees should be required to confirm annually that registered devices remain in service. The Commission has adopted a similar approach for incumbent satellite earth stations seeking interference protection,[12] and the Wireless Internet Service Providers Association (WISPA) has endorsed annual registration requirements as reasonable.[13]

---

[11] *Notice* at 3-4.
[12] 47 C.F.R. § 96.17(d).
[13] Comments of WISPA at 20, GN Docket No. 12-354 (filed July 14, 2014) (WISPA Comments); *see also Report and Order* ¶ 279 (citing this argument). WISPA specifically requested that fixed satellite services seeking interference protection be required register annually with the Commission. It is no more burdensome to impose the same obligation on Part 90 licensees.

To reduce the administrative burden on licensees and the Commission, a third-party industry group could develop and populate a database based on current ULS data and create a simplified framework for confirming, editing, appending, or deleting existing records. For example, a list of existing devices could be made available in a central repository, such as GitHub,[14] and Part 90 operators could be supplied a script to access the data registered under their own FCC Registration Numbers. Operators could then edit the data in a static spreadsheet to indicate which devices are base stations, which are CPE, which are end-points of a registered point-to-point link, and which are no longer in operation. The database of protected locations would then be made available to all SAS providers for use in calculating interference protection. Thereafter, operators would be required to (1) amend base station registrations or point-to-point link registrations to reflect accurate operational parameters (for example, if a different transmitter or antenna model is put into service) and (2) make timely updates to the database if devices go out of service.[15]

A multi-stakeholder industry group could support the small effort needed to conduct this registration, identification, and confirmation process. In particular, the annual confirmation process should involve merely review and return of a spreadsheet.

While all of the information contained in ULS will be valuable for assessing interference protection, the following information is particularly important and should be required for all Part 90 operations:

---

[14] *See* https://github.com/.

[15] As noted above, operators should be permitted to register new CPE entitled to protection on the basis that such CPE communicates with grandfathered base stations.

- Locations of base stations,[16] CPE, or end points of point-to-point links;
- Transmitter characteristics, including FCC ID, unique manufacturer's serial number*, and operating frequencies*, maximum power, emission designators, and bandwidths* used for each sector;
- Antenna make and model;
- Antenna gain, azimuth, downtilt, beamwidth, and height above ground level;
- Type of operation (base station, CPE, end-point of a point-to-point link, or other)*;
- The base station with which registered CPE communicates*; and
- Call sign and user contact information.

Requiring registration and confirmation of the location of existing Part 90 operations is a reasonable way to ensure that actual operations are protected while limiting the possibility that stale or otherwise inaccurate license information constrains spectrum availability. Indeed, most of this information is already collected in ULS; the few elements not captured in ULS today are marked with an asterisk.

Given the volume of grandfathered devices in the band, having accurate, current information about each device is crucial to ensuring that CBSD operations can flourish. Equally important, updated and specific information will allow the Commission to

[16] ULS today reflects both the locations of base stations and the locations of registered CPE, but the system provides no mechanism for distinguishing between base stations and registered CPE. As set forth above, Google proposes that protections be limited to base stations and point-to-point links. As a result, operators should be required to specify whether registered locations are (1) base stations, (2) CPE, or (3) end-points of a point-to-point link.

establish appropriate protections for WISPs that reflect actual deployments. Without current, real-world information, the Commission would likely make a series of worst-case estimates about what Part 90 operations may need protection, and to what extent—an overly restrictive approach the Commission has rightly rejected in other contexts.[17]

Conclusion

In developing a method for accommodating grandfathered wireless services, the Commission should seek to protect existing services, ease the transition from grandfathered Part 90 operation to the Part 96 framework, and maximize spectrum availability for CBSDs. Offering base stations, registered CPE, and point-to-point links protections that are similar to those accorded to Priority Access licensees will best accomplish these transitional goals.

Respectfully submitted,

Austin C. Schlick
Director, Communications Law
Aparna Sridhar
Counsel
Google Inc.

[17] *See Report and Order* ¶ 288 (rejecting a worst-case approach for protecting satellite operations); *see also* WISPA Comments at 20 (advocating for the establishment of 'real-world' protection zones to protect satellite operations).