Date: January 7, 2015

Subject: Public and Redacted Version of Request for Confidential Treatment and Complementary Exhibits

Call Sign: WH2XNF (File No. 0722-EX-PL-2014)

File Number: File No. 0004-EX-ML-2015

To Whom It May Concern:

Google Inc. (Google), pursuant to 5 U.S.C. § 552 and Sections 0.457 and 0.459 of the Commission's Rules, 47 C.F.R. §§ 0.457, 0.459, hereby requests that certain information complementary to its above-referenced application to modify its Experimental Radio Service License for call sign WH2XNF (File No. 0722-EX-PL-2014) (Modification Application) be treated as confidential and not subject to public inspection. The designated information constitutes confidential and proprietary information that, if subject to public disclosure, would cause significant commercial, economic, and competitive harm. As described below, Google's request satisfies the standards for grant of such requests set forth in Sections 0.457 and 0.459 of the Commission's Rules.

In accordance with Section 0.459(b) and in support of this request, Google provides the following information:

1. Identification of the Information for Which Confidential Treatment is Sought:

Google's request for confidential treatment is limited to information that has been redacted from the Modification Application and Exhibits A and B. Google does not seek to withhold from public inspection information in the Modification Application and associated exhibits necessary for interference mitigation, including applicant name, contact information, test location, frequency, output power, effective radiated power, emission characteristics, and modulation.

Exhibit A - Narrative Statement:

Google requests confidential treatment of the following underlined text from Exhibit A that contain confidential and proprietary information regarding the proposed tests/experiments:

> Consistent with the standards set forth in Section 5.63 of the Federal Communications Commission's (FCC's or Commission's) Rules, 47 C.F.R. § 5.63, Google Inc. (Google) seeks modification its Experimental Radio Service License for

call sign WH2XNF (File No. 0722-EX-PL-2014). Below, Google outlines the reasons that the modification should be granted expeditiously.

The requested modification is needed to expand testing and measuring of propagation losses in the 3.5 GHz band, a band which the Commission is now assessing for broader commercial use. The specific modifications requested include additional emission designators [REDACTED]. [REDACTED], under conditions that are consistent with the Commission's proposed Part 96 rules.[1] The requested modification also includes a greater antenna height limit at the Mountain View, California, site [REDACTED]. As discussed further below, operations under the modified license will continue to protect incumbent operators from interference.

No modifications of the license terms are requested at the Arlington and Reston, Virginia, locations. Deployments using the modified license terms will be limited to the Mountain View, California, site.

Propagation testing: During propagation testing, [REDACTED] continuous waveform (CW) signal will be transmitted.

SAS testing: During testing, [REDACTED], serving as prototypical Citizen Broadband Radio Service Devices (CBSDs), will be deployed, and [REDACTED]. A full list of potential equipment manufacturers is set forth in Exhibit B. [REDACTED]. [REDACTED]. The conducted power generated by each transmitter will be limited to 3 Watts. A variety of antennas will be used, ranging from high-gain (16 dBi, 90 deg beamwidth) [REDACTED] to low-gain (-4 dBi) [REDACTED]. The maximum EIRP [REDACTED] will be 51 dBm, which does not reflect a change from the existing experimental license. The antennas will generally be located at a height ranging from 2 meters (ground level) to 8 meters (atop a single-story building), but Google is requesting authorization for heights up to 23 meters at the Mountain View location [REDACTED]. All installations in Mountain View [REDACTED], and antennas that are not at ground level will be mounted on existing buildings and will not extend more than 1.8 meters above those buildings.

Grant of this modification will not adversely impact any authorized user of RF spectrum for the reasons stated below.

- **Fixed-Satellite Earth Station Licenses:** Based on a query of the FCC's IBFS licensing system, there are no active or pending U.S.-based earth station licenses in the 3550-3575 MHz band. A search of current licensees for the 3550-3575 MHz band returns one result, FCC call sign E050348, but the license reveals that the licensee is not in fact

[1] *See generally Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band,* GN Docket No. 12-354, Further Notice of Proposed Rulemaking (rel. April 23, 2014).

authorized to receive on these frequencies in the United States, and that reception on these frequencies is limited to the Netherlands and Italy.

- **Land Mobile Radiolocation Licensees:** Based on a query of the FCC's universal licensing system, there are three active land mobile radiolocation licenses in the 3550-3575 MHz band. Call signs WQLW310 and WQLX454 are limited to a radius of 113 kilometers around a centerpoint near Boulder, Colorado. Because they are far removed from the Mountain View test site, there is no risk of harmful interference to these operations. The third license, call sign WQHK852, is a nationwide license covering a total of two units. There are no specific locations associated with the license. Google e-mailed the licensee, Mobile Data Solutions Ltd., on September 30, 2014, to request any additional information necessary to ensure that harmful interference is avoided. To date, Google has received no response. Google continues to be prepared to coordinate as necessary with Mobile Data Solutions Ltd. to avoid harmful interference to call sign WQHK852.

- **Federal Operations:** The principal federal incumbent in this band is the Department of Defense, which uses the band for radars aboard Navy ships and at two land-based locations.

  According to ITU Recommendation M.1465 and a 2010 report by the National Telecommunications and Information Administration, these radars can tolerate a maximum interfering signal level of -115 dBm, assuming a -10 dB interference-to-noise ratio, a 0 dB noise figure (which corresponds to a -105 dBm noise level), and an effective receive bandwidth of 8 MHz.[2]

  The Navy's Southern California Operations Area is 32 kilometers away from the Mountain View test site, but separated by a mountain range. Using the terrain-based Longley-Rice propagation model to determine the propagation loss associated with proposed transmissions from the Mountain View test site to the Navy's site, the experimental signal will be at least 30 dB below the radar's interference objective. This analysis

[2] International Telecommunication Union, Recommendation ITU-R M.1465, *Characteristics of and protection criteria for radars operating in the radiodetermination service in the frequency band 3 100-3 700 MHz*, at Table 1 (2007) (noting receiver sensitivity of -112 dBm for ship system A), *available at* https://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.1465-1-200703-I!!PDF-E.pdf; National Telecommunications and Information Administration, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz, 4380-4400 MHz Bands*, at Table 4-5 (2010) (noting interference threshold of -114 dBm for Shipborne radar -1), *available at* http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf. Because these numbers are not fully consistent, Google has adopted a conservative interference threshold of -115 dBm for this analysis.

accounts for the fact that the antennas may be as high as 23 meters above ground level and could point in any direction in the horizontal plane.

Nevertheless, Google is prepared to coordinate as necessary with the Department of Defense and the National Telecommunications and Information Administration to ensure that harmful interference to federal operations is avoided.

The proposed experimental operations in the 3.5 GHz band accordingly will be conducted without harmful interference to other authorized users. For these reasons, Google requests approval of this modification.

Exhibit B - Technical Information:

Google requests confidential treatment of the following underlined text from Exhibit B that contain confidential and proprietary information regarding the proposed tests/experiments:

Applicant Name: Google Inc.
Applicant FRN: 0016069502
Call Sign: WH2XNF (File No. 0722-EX-PL-2014)

Legal Contact Details

Name of Contact	Aparna Sridhar
Contact Details	Counsel 25 Massachusetts Avenue NW, Ninth Floor Washington DC 20001

Technical Contact Details

Name of Contact	Andrew Clegg
Contact Details	1818 Library Street, Suite 400 Reston, VA 20190 Phone: (202) 370-5644 Email: aclegg@google.com

Mountain View, CA: Transmitter Equipment and Station Details

Radio Information

Equipment Manuf / PN	[REDACTED]
Number of Units	[REDACTED]
Area of Operation	Operation not to exceed 10 km from the following geographic centerpoint: ● 37° 25’ 16” N, 122° 04’ 14” W

Frequency Range	**High (MHz)**	**Low (MHz)**
[REDACTED]	3575	3550

Amplifier Information

Equipment Manuf / PN	[REDACTED]
Number of Units	[REDACTED]
Area of Operation	Operation not to exceed 10 km from the following geographic centerpoint: ● 37° 25’ 16” N, 122° 04’ 14” W

Antenna Details

Antennas	[REDACTED]
Type	Both directional and omnidirectional antennas will be used
Quantity	[REDACTED]
Gain	16 dBi max; -4 dBi min
Beam Width at Half-Power Point	Various (90-360 deg H; 7-180 deg V)
Orientation in Horizontal Plane	Various (0° to 360°)
Orientation in Vertical Plane	0° to -30°

Radio	Modulation	Emission Designator	Bandwidth	Maximum Power Out	Maximum EIRP
[REDACTED]	Continuous waveform	100HN0N	100 Hz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	20M0W7D	20 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	5M00F9W	5 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	10M0F9W	10 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	20M0F9W	20 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	5M00G7D	5 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	10M0G7D	10 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	20M0G7D	20 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	10M0GXW	10 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	20M0GXW	20 MHz	3 W	21 dBW (with 16 dBi antenna)

[REDACTED]	Continuous waveform	2M00P0N	2 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Continuous waveform	5M00Q7N	5 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Continuous waveform	10M0Q7N	10 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Continuous waveform	20M0Q7N	20 MHz	3 W	21 dBW (with 16 dBi antenna)

2. Identification of the Commission proceeding in which the information was submitted or a description of the circumstances giving rise to the submission.

Exhibits A and B were submitted to the Commission in support of the Modification Application. The Exhibits were filed with the Office of Engineering and Technology on January 7, 2015. For additional information, please see File No. 0004-EX-ML-2015.

3. Explanation of the degree to which the information is commercial or financial or contains a trade secret or is privileged.

The information requested to be kept confidential has significant commercial value. The exhibits supporting the Modification Application discuss tests/experiments that include trade secret information. The Commission has clarified that confidential treatment should be afforded to trade secrets.[3] Google's tests/experiments and proprietary wireless applications using particular radio frequency equipment represent a "secret commercially valuable plan" within the meaning of a trade secret as recognized by the Commission.

[3] *Examination of Current Policy Concerning the Treatment of Confidential Information Submitted to the Commission*, Report and Order, GC Docket No. 96-55, at para. 3, (released Aug. 4, 1998) (defining "trade secrets" for purpose of Commission rules on confidential treatment).

4. Explanation of the degree to which the information concerns a service that is competitive.

The services and technologies that are the subject of this Modification Application have not yet been fully developed but are expected to lead to material developments in markets subject to competition from multiple U.S. and non-U.S. third parties.

5. Explanation of how disclosure of the information could result in substantial competitive harm.

The technology under development is highly sensitive and confidential in nature. The release of such information would provide valuable insight into Google's technology innovations and potential business plans and strategies. Public disclosure would jeopardize the value of the technology under examination by enabling others to utilize Google's information to develop similar products in a similar time frame.

6. Identification of any measures taken by the requesting party to prevent unauthorized disclosure.

Google has taken steps to keep confidential the information set forth in the confidential exhibits by limiting the number of people involved in the tests/experiments to only those on a "need to know" basis, and will require that all third parties involved in any preliminary analysis execute robust nondisclosure agreements.

7. Identification of whether the information is available to the public and the extent of any previous disclosures of the information to any third parties.

The information contained in the confidential exhibits is not available to the public, and will only be disclosed to third parties pursuant to the restrictive safeguards described above.

Google voluntarily provides the information to the Commission at this time with the expectation that it will be treated confidentially in accordance with the Commission's rules. *See Critical Mass Energy Project v. Nuclear Regulatory Comm'n*, 975 F.2d 871, 879 (D.C. Cir. 1992) (commercial information provided on a voluntary basis "is 'confidential' for the purpose of Freedom of Information Act (FOIA) Exemption 4 if it is of a kind that would customarily not be released to the public by the person from whom it was obtained.")

8. Justification of the requested period of confidentiality.

Google expects that confidential treatment will be necessary for the length of the proposed experiment and thereafter in order to protect its evolving business and technology strategies.

9. Any other information that would be useful in assessing whether this request should be submitted.

The information subject to this request for confidentiality should not be made available for public disclosure at any time. There is nothing material that public review of this information would add to the Commission's analysis of Google's request for an experimental authorization.

Moreover, public disclosure of the sensitive information in the confidential exhibits to the Modification Application after the Commission has ruled on the Request for Confidentiality is not necessary for the Commission to fulfill its regulatory responsibilities.

Consistent with 47 C.F.R. § 0.459(d)(l), Google requests notification if release of the information subject to this request is requested pursuant to the FOIA or otherwise, so that Google may have an opportunity to oppose grant of any such request.

Sincerely yours,

Aparna Sridhar

Aparna Sridhar

EXHIBIT A – NARRATIVE STATEMENT

Consistent with the standards set forth in Section 5.63 of the Federal Communications Commission's (FCC's or Commission's) Rules, 47 C.F.R. § 5.63, Google Inc. (Google) seeks modification its Experimental Radio Service License for call sign WH2XNF (File No. 0722-EX-PL-2014). Below, Google outlines the reasons that the modification should be granted expeditiously.

The requested modification is needed to expand testing and measuring of propagation losses in the 3.5 GHz band, a band which the Commission is now assessing for broader commercial use. The specific modifications requested include additional emission designators [REDACTED]. [REDACTED], under conditions that are consistent with the Commission's proposed Part 96 rules.[1] The requested modification also includes a greater antenna height limit at the Mountain View, California, site [REDACTED]. As discussed further below, operations under the modified license will continue to protect incumbent operators from interference.

No modifications of the license terms are requested at the Arlington and Reston, Virginia, locations. Deployments using the modified license terms will be limited to the Mountain View, California, site.

Propagation testing: During propagation testing, [REDACTED] continuous waveform (CW) signal will be transmitted.

SAS testing: During testing, [REDACTED], serving as prototypical Citizen Broadband Radio Service Devices (CBSDs), will be deployed, and [REDACTED]. A full list of potential equipment manufacturers is set forth in Exhibit B. [REDACTED]. [REDACTED]. The conducted power generated by each transmitter will be limited to 3 Watts. A variety of antennas will be used, ranging from high-gain (16 dBi, 90 deg beamwidth) [REDACTED] to low-gain (-4 dBi) [REDACTED]. The maximum EIRP [REDACTED] will be 51 dBm, which does not reflect a change from the existing experimental license. The antennas will generally be located at a height ranging from 2 meters (ground level) to 8 meters (atop a single-story building), but Google is requesting authorization for heights up to 23 meters at the Mountain View location [REDACTED]. All installations in Mountain View [REDACTED], and antennas that are not at ground level will be mounted on existing buildings and will not extend more than 1.8 meters above those buildings.

Grant of this modification will not adversely impact any authorized user of RF spectrum for the reasons stated below.

[1] *See generally Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band,* GN Docket No. 12-354, Further Notice of Proposed Rulemaking (rel. April 23, 2014).

- **Fixed-Satellite Earth Station Licenses:** Based on a query of the FCC's IBFS licensing system, there are no active or pending U.S.-based earth station licenses in the 3550-3575 MHz band. A search of current licensees for the 3550-3575 MHz band returns one result, FCC call sign E050348, but the license reveals that the licensee is not in fact authorized to receive on these frequencies in the United States, and that reception on these frequencies is limited to the Netherlands and Italy.

- **Land Mobile Radiolocation Licensees:** Based on a query of the FCC's universal licensing system, there are three active land mobile radiolocation licenses in the 3550-3575 MHz band. Call signs WQLW310 and WQLX454 are limited to a radius of 113 kilometers around a centerpoint near Boulder, Colorado. Because they are far removed from the Mountain View test site, there is no risk of harmful interference to these operations. The third license, call sign WQHK852, is a nationwide license covering a total of two units. There are no specific locations associated with the license. Google e-mailed the licensee, Mobile Data Solutions Ltd., on September 30, 2014, to request any additional information necessary to ensure that harmful interference is avoided. To date, Google has received no response. Google continues to be prepared to coordinate as necessary with Mobile Data Solutions Ltd. to avoid harmful interference to call sign WQHK852.

- **Federal Operations:** The principal federal incumbent in this band is the Department of Defense, which uses the band for radars aboard Navy ships and at two land-based locations.

  According to ITU Recommendation M.1465 and a 2010 report by the National Telecommunications and Information Administration, these radars can tolerate a maximum interfering signal level of -115 dBm, assuming a -10 dB interference-to-noise ratio, a 0 dB noise figure (which corresponds to a -105 dBm noise level), and an effective receive bandwidth of 8 MHz.[2]

  The Navy's Southern California Operations Area is 32 kilometers away from the Mountain View test site, but separated by a mountain range. Using the terrain-based Longley-Rice propagation model to determine the propagation loss associated with proposed transmissions from the Mountain View test site to the

[2] International Telecommunication Union, Recommendation ITU-R M.1465, *Characteristics of and protection criteria for radars operating in the radiodetermination service in the frequency band 3 100-3 700 MHz*, at Table 1 (2007) (noting receiver sensitivity of -112 dBm for ship system A), *available at* https://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.1465-1-200703-I!!PDF-E.pdf; National Telecommunications and Information Administration, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz, 4380-4400 MHz Bands*, at Table 4-5 (2010) (noting interference threshold of -114 dBm for Shipborne radar -1), *available at* http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf. Because these numbers are not fully consistent, Google has adopted a conservative interference threshold of -115 dBm for this analysis.

Navy's site, the experimental signal will be at least 30 dB below the radar's interference objective. This analysis accounts for the fact that the antennas may be as high as 23 meters above ground level and could point in any direction in the horizontal plane.

Nevertheless, Google is prepared to coordinate as necessary with the Department of Defense and the National Telecommunications and Information Administration to ensure that harmful interference to federal operations is avoided.

The proposed experimental operations in the 3.5 GHz band accordingly will be conducted without harmful interference to other authorized users. For these reasons, Google requests approval of this modification.

EXHIBIT B - TECHNICAL INFORMATION

Applicant Name: Google Inc.
Applicant FRN: 0016069502
Call Sign: WH2XNF (File No. 0722-EX-PL-2014)

Legal Contact Details

Name of Contact	Aparna Sridhar
Contact Details	Counsel 25 Massachusetts Avenue NW, Ninth Floor Washington DC 20001

Technical Contact Details

Name of Contact	Andrew Clegg
Contact Details	1818 Library Street, Suite 400 Reston, VA 20190 Phone: (202) 370-5644 Email: aclegg@google.com

Mountain View, CA: Transmitter Equipment and Station Details

Radio Information

Equipment Manuf / PN	[REDACTED]
Number of Units	[REDACTED]
Area of Operation	Operation not to exceed 10 km from the following geographic centerpoint: ● 37° 25’ 16” N, 122° 04’ 14” W

Frequency Range	**High (MHz)**	**Low (MHz)**
[REDACTED]	3575	3550

Amplifier Information

Equipment Manuf / PN	[REDACTED]
Number of Units	[REDACTED]
Area of Operation	Operation not to exceed 10 km from the following geographic centerpoint: ● 37° 25’ 16” N, 122° 04’ 14” W

Antenna Details

Antennas	[REDACTED]
Type	Both directional and omnidirectional antennas will be used
Quantity	[REDACTED]
Gain	16 dBi max; -4 dBi min
Beam Width at Half-Power Point	Various (90-360 deg H; 7-180 deg V)
Orientation in Horizontal Plane	Various (0° to 360°)
Orientation in Vertical Plane	0° to -30°

Radio	Modulation	Emission Designator	Bandwidth	Maximum Power Out	Maximum EIRP
[REDACTED]	Continuous waveform	100HN0N	100 Hz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	20M0W7D	20 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	5M00F9W	5 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	10M0F9W	10 MHz	3 W	21 dBW (with 16 dBi antenna)

[REDACTED]	Digital	20M0F9W	20 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	5M00G7D	5 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	10M0G7D	10 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	20M0G7D	20 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	10M0GXW	10 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Digital	20M0GXW	20 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Continuous waveform	2M00P0N	2 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Continuous waveform	5M00Q7N	5 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Continuous waveform	10M0Q7N	10 MHz	3 W	21 dBW (with 16 dBi antenna)
[REDACTED]	Continuous waveform	20M0Q7N	20 MHz	3 W	21 dBW (with 16 dBi antenna)