

Date: March 23, 2016
Subject: Public and Redacted Version of Request for Confidential Treatment and Complementary Exhibits
File No: 0211-EX-PL-2016

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 for a New Experimental Radio Service License (Experimental License) 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 the following information that has been redacted from the Experimental License and complementary exhibits. Google does not seek to withhold from public inspection information 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 contains 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 outlines below its need for the requested New Experimental Radio Service License (Experimental License) and the compelling reasons why 0211-EX-PL-2016 should be granted expeditiously.

Google requests that the Experimental License be granted for a period of 24 months. The Experimental License is needed for continued demonstration and testing

of a prototype device (Device), which is intended to [REDACTED], in the 57-64 GHz unlicensed spectrum band (60 GHz band).

Consistent with 0973-EX-ST-2015 and 0195-EX-ST-2016 (Call Sign WJ9XBM), the Device will continue to be [REDACTED], and will continue to operate in a [REDACTED]. The Device's intended operational region will continue to extend only a small distance (less than or equal to 1 m) [REDACTED]. The Device's radiated power will continue to be less than or equal to 10 dBm EIRP, which is below the limits in the FCC's rules for most devices operating in the 60 GHz band.

The Device will continue to consist of a [REDACTED]. [REDACTED]. Compared to existing optical-based systems [REDACTED] that provide similar functionality, the Device's system design and software algorithms will continue to use significantly lower computational resources, lower power levels, and (consistent with FCC goals) less spectrum.

The continued testing does not create a material risk of harmful interference to other authorized users. The FCC's rules permit communications devices that are not field disturbance sensors to operate in the 60 GHz band at 43 dBm peak and 40 dBm average EIRP. See 47 C.F.R. § 15.255(b). Fixed field disturbance sensors in the 60 GHz band are permitted to transmit only at or below 10 dBm, a level that the Commission has determined does not cause any significant interference to communications devices. *Id.* The Device likewise will continue to operate at 10 dBm peak EIRP—an output power 30 dB lower than that permitted for 60 GHz-band devices other than field disturbance sensors. Stated differently, the Device will continue to operate at less than one one-thousandth of the power of many other 60 GHz devices.

Transmission of signals within the 60 GHz band predominantly occurs via line-of-sight means. Obstacles to the signals—be they walls, furniture, or people—can disrupt these transmissions. Communications devices compensate for this disruption by employing dynamic beam-forming via beam-refining requests. Through a beam-training scheme between the transmission/reception pair, a stable link (via line of sight or single reflection) can be established.

The Device's field of influence will continue to be similar to that of Commission-authorized fixed field disturbance sensors. Its movement in the continued testing will be guided by, and consistent with, the movement of a human operator. Thus, should a point-to-point communications device encounter the Device, the point-to-point device would adjust using the same beam-training schemes as are employed to compensate for a human obstacle or pet, for example. The Device's slow movement (matching any motions of its human operator) accordingly ensures its presence is consistent with an ordinary operating environment for other 60 GHz band devices, making the Device no more of an interference threat than a fixed field disturbance sensor operating at the same, low power level.

The Device's minimal potential for harmful interference also is demonstrated by comparing it to devices using WiGig, the most prominent communication standard

adopted in the 60 GHz band. WiGig devices have receiver sensitivities of approximately -64 dBm (assuming MCS index=4 for > 1Gbps throughput). See, e.g., Rohde & Schwartz, *802.11ad - WLAN at 60 GHz: A Technology Introduction*, Section 4.3, available at http://cdn.rohde-schwarz.com/pws/dl_downloads/dl_application/application_notes/1ma220/1MA220_1e_WLAN_11ad_WP.pdf. With Pt(EIRP)=10 dBm and considering the free-space path loss equation, Device emissions at a distance of 2.09 m match the minimum receiver sensitivity, and drop below the receiver sensitivity with greater separation. Thus, a WiGig receiver would not experience harmful interference from the Device beyond a distance of approximately 2 m.

Google will continue to distribute the Device to members of the application developer community in the United States. The most qualified invited members of the application developer community, however, may not be in close geographic proximity to one another. Therefore, Google seeks flexibility to continue to distribute the Device to those developers who are most qualified and likely to generate the greatest benefits from the experimentation in collaboration with Google, regardless of their geographic location. For the reasons stated above, Google does not believe that there is a significant chance of harmful interference at any location from the continued testing, nor has Google received any indications to date that its testing of the Device has caused any harmful interference.

Google continues to seek authority broad enough to allow testing of different chips, form factors, signal processing mechanisms, operating systems, and user interfaces and experiences for the Device and its new technology. Devices that differ in these respects would continue to have similar power and radiofrequency radiation characteristics, and would continue not exceed any of the parameters within the Commission's Experimental License grant. One "version" of the Device may be being returned to Google while other "versions" may be sent out to application developers for experimentation. To allow for the most efficient testing of these slight variations, and to engage a critical mass of interested application developers to advance the technology to commercial viability, Google seeks continued Commission authority for the number of devices stated in Exhibit B.

Finally, because the Commission's rules currently do not permit use of portable field disturbance sensors in the 60 GHz band, the requested Experimental License is necessary to continue with testing. Finally, as noted, Google already has been conducting similar tests under a grant of Special Temporary Authority, and no disruptions have been noted.

Exhibit B - Technical Information:

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

Applicant Name: Google Inc.
Applicant FRN: 0016069502

Legal Contact Details

Name of Contact	Megan Anne Stull
Contact Details	Counsel 25 Massachusetts Avenue NW, Ninth Floor Washington DC 20001

Technical Contact Details

Name of Contact	Hakim Raja
Contact Details	1600 Amphitheatre Parkway Mountain View, CA 94043 Phone: 415-355-4667 Email: huckym@google.com

Alternative Technical Contact Details

Name of Contact	Emre Karagozler
Contact Details	1600 Amphitheatre Parkway Mountain View, CA 94043 Phone: 650-215-0630 Email: karagozler@google.com

Transmitter Information

Equipment	[REDACTED]
Quantity	[REDACTED]
Area of Operation	Nationwide

Frequency Range / Tolerance	Low (GHz)	High (GHz)
In lieu of frequency tolerance, the occupied bandwidth of test emissions shall not extend beyond the following band limits.	57.0000	64.0000

Antenna	Modulation	Emission Designator	Bandwidth (MHz)	Power Out (W)	ERP (W)	EIRP (dBW)
1	Analog	7G00F3X	7000	0.00316	0.00767	-19
2	Analog	7G00F3X	7000	0.00316	0.00767	-19

Antenna 1

Type	[REDACTED]
Quantity	[REDACTED]
Gain	6 dBi
Beam Width at Half-Power Point	62 degrees (E-plane) 78 degrees (H-plane)
Orientation in Horizontal Plane	linearly-polarized in the horizontal plane
Orientation in Vertical Plane	negligible cross polarization

Antenna 2

Type	[REDACTED]
Quantity	[REDACTED]
Gain	6 dBi
Beam Width at Half-Power Point	62 degrees (E-plane) 78 degrees (H-plane)
Orientation in Horizontal Plane	linearly-polarized in the horizontal plane
Orientation in Vertical Plane	negligible cross polarization

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

The above-referenced Exhibits were submitted to the Commission in support of the Experimental License. These Exhibits were filed with the Office of Engineering and Technology on March 23, 2016. For additional information, please see File No. 0211-EX-PL-2016.

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 details of the Experimental License tests/experiments may include trade secret information. The Commission has clarified that confidential treatment should be afforded to trade secrets.¹ 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.

In addition, agreements entered into between Google and any parties that provided equipment for testing or will provide analysis of test results require that confidential information of the parties be held in strict confidence, and that such information not be disclosed to any third party (with limited exceptions not applicable to this request). The manufacturer name and model number constitutes confidential trade secrets, technical information, and business information under the agreements.

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 Experimental License 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

¹ *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).

"need to know" basis, and by requiring any third parties involved in the testing process to 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 has only been disclosed to third parties pursuant to restrictive safeguards.

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 the Experimental License.

Moreover, public disclosure of the sensitive information in the confidential exhibits to the Experimental License 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,



Megan Anne Stull

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 outlines below its need for the requested New Experimental Radio Service License (Experimental License) and the compelling reasons why 0211-EX-PL-2016 should be granted expeditiously.

Google requests that the Experimental License be granted for a period of 24 months. The Experimental License is needed for continued demonstration and testing of a prototype device (Device), which is intended to [REDACTED], in the 57-64 GHz unlicensed spectrum band (60 GHz band).

Consistent with 0973-EX-ST-2015 and 0195-EX-ST-2016 (Call Sign WJ9XBM), the Device will continue to be [REDACTED], and will continue to operate in a [REDACTED]. The Device's intended operational region will continue to extend only a small distance (less than or equal to 1 m) [REDACTED]. The Device's radiated power will continue to be less than or equal to 10 dBm EIRP, which is below the limits in the FCC's rules for most devices operating in the 60 GHz band.

The Device will continue to consist of a [REDACTED]. [REDACTED]. Compared to existing optical-based systems [REDACTED] that provide similar functionality, the Device's system design and software algorithms will continue to use significantly lower computational resources, lower power levels, and (consistent with FCC goals) less spectrum.

The continued testing does not create a material risk of harmful interference to other authorized users. The FCC's rules permit communications devices that are not field disturbance sensors to operate in the 60 GHz band at 43 dBm peak and 40 dBm average EIRP. See 47 C.F.R. § 15.255(b). Fixed field disturbance sensors in the 60 GHz band are permitted to transmit only at or below 10 dBm, a level that the Commission has determined does not cause any significant interference to communications devices. *Id.* The Device likewise will continue to operate at 10 dBm peak EIRP—an output power 30 dB lower than that permitted for 60 GHz-band devices other than field disturbance sensors. Stated differently, the Device will continue to operate at less than one one-thousandth of the power of many other 60 GHz devices.

Transmission of signals within the 60 GHz band predominantly occurs via line-of-sight means. Obstacles to the signals—be they walls, furniture, or people—can disrupt these transmissions. Communications devices compensate for this disruption by employing dynamic beam-forming via beam-refining requests. Through a beam-training scheme between the transmission/reception pair, a stable link (via line of sight or single reflection) can be established.

The Device's field of influence will continue to be similar to that of Commission-authorized fixed field disturbance sensors. Its movement in the continued testing will be guided by, and consistent with, the movement of a human operator. Thus, should a point-to-point communications device encounter the Device, the point-to-point device would adjust using the same beam-training schemes as are employed to compensate for a human obstacle or pet, for example. The Device's slow movement (matching any motions of its human

operator) accordingly ensures its presence is consistent with an ordinary operating environment for other 60 GHz band devices, making the Device no more of an interference threat than a fixed field disturbance sensor operating at the same, low power level.

The Device's minimal potential for harmful interference also is demonstrated by comparing it to devices using WiGig, the most prominent communication standard adopted in the 60 GHz band. WiGig devices have receiver sensitivities of approximately -64 dBm (assuming MCS index=4 for > 1Gbps throughput). See, e.g., Rohde & Schwartz, *802.11ad - WLAN at 60 GHz: A Technology Introduction*, Section 4.3, available at http://cdn.rohde-schwarz.com/pws/dl_downloads/dl_application/application_notes/1ma220/1MA220_1e_WLAN_11ad_WP.pdf. With Pt(EIRP)=10 dBm and considering the free-space path loss equation, Device emissions at a distance of 2.09 m match the minimum receiver sensitivity, and drop below the receiver sensitivity with greater separation. Thus, a WiGig receiver would not experience harmful interference from the Device beyond a distance of approximately 2m.

Google will continue to distribute the Device to members of the application developer community in the United States. The most qualified invited members of the application developer community, however, may not be in close geographic proximity to one another. Therefore, Google seeks flexibility to continue to distribute the Device to those developers who are most qualified and likely to generate the greatest benefits from the experimentation in collaboration with Google, regardless of their geographic location. For the reasons stated above, Google does not believe that there is a significant chance of harmful interference at any location from the continued testing, nor has Google received any indications to date that its testing of the Device has caused any harmful interference.

Google continues to seek authority broad enough to allow testing of different chips, form factors, signal processing mechanisms, operating systems, and user interfaces and experiences for the Device and its new technology. Devices that differ in these respects would continue to have similar power and radiofrequency radiation characteristics, and would continue not exceed any of the parameters within the Commission's Experimental License grant. One "version" of the Device may be being returned to Google while other "versions" may be sent out to application developers for experimentation. To allow for the most efficient testing of these slight variations, and to engage a critical mass of interested application developers to advance the technology to commercial viability, Google seeks continued Commission authority for the number of devices stated in Exhibit B.

Finally, because the Commission's rules currently do not permit use of portable field disturbance sensors in the 60 GHz band, the requested Experimental License is necessary to continue with testing. Finally, as noted, Google already has been conducting similar tests under a grant of Special Temporary Authority, and no disruptions have been noted.

EXHIBIT B - TECHNICAL INFORMATION

Applicant Name: Google Inc.
Applicant FRN: 0016069502

Legal Contact Details

Name of Contact	Megan Anne Stull
Contact Details	Counsel 25 Massachusetts Avenue NW, Ninth Floor Washington DC 20001

Technical Contact Details

Name of Contact	Hakim Raja
Contact Details	1600 Amphitheatre Parkway Mountain View, CA 94043 Phone: 415-355-4667 Email: huckym@google.com

Alternative Technical Contact Details

Name of Contact	Emre Karagozler
Contact Details	1600 Amphitheatre Parkway Mountain View, CA 94043 Phone: 650-215-0630 Email: karagozler@google.com

Transmitter Information

Equipment	[REDACTED]
Quantity	[REDACTED]
Area of Operation	Nationwide

Frequency Range / Tolerance	Low (GHz)	High (GHz)
In lieu of frequency tolerance, the occupied bandwidth of test emissions shall not extend beyond the following band limits.	57.0000	64.0000

Antenna	Modulation	Emission Designator	Bandwidth (MHz)	Power Out (W)	ERP (W)	EIRP (dBW)
1	Analog	7G00F3X	7000	0.00316	0.00767	-19
2	Analog	7G00F3X	7000	0.00316	0.00767	-19

Antenna 1

Type	[REDACTED]
Quantity	[REDACTED]
Gain	6 dBi
Beam Width at Half-Power Point	62 degrees (E-plane) 78 degrees (H-plane)
Orientation in Horizontal Plane	linearly-polarized in the horizontal plane
Orientation in Vertical Plane	negligible cross polarization

Antenna 2

Type	[REDACTED]
Quantity	[REDACTED]
Gain	6 dBi
Beam Width at Half-Power Point	62 degrees (E-plane) 78 degrees (H-plane)
Orientation in Horizontal Plane	linearly-polarized in the horizontal plane
Orientation in Vertical Plane	negligible cross polarization