

Date: September 19, 2014
Subject: Public and Redacted Version of Request for Confidential Treatment and Complementary Exhibits
FCC File Number: 0842-EX-ST-2014

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 Special Temporary Authority (STA 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 the following information that has been redacted from the STA Application and complementary exhibits. Google does not seek to withhold from public inspection information in the STA Application necessary for interference mitigation, including applicant name, contact information, test location, frequency, output power, effective radiated power, emission characteristics and modulation.

Exhibit A - STA Application Justification:

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 5.61 of the Federal Communications Commission's (FCC's or Commission's) Rules, 47 C.F.R. § 5.61, Google Inc. (Google) requests Special Temporary Authority (STA) to conduct demonstrations of experimental transmitters. The STA is sought for a period of 180 days beginning on October 20, 2014. Google outlines below its need for the requested STA and the reasons why the STA should be granted expeditiously.

Google requests the STA to test the performance of [REDACTED].¹
[REDACTED].

[REDACTED]. [REDACTED]. [REDACTED]. [REDACTED] will automatically disable any transmitter [REDACTED] under the STA if [REDACTED] exits the test area covered by the STA.

Google plans to test [REDACTED]. [REDACTED]. [REDACTED].
[REDACTED]. [REDACTED]. [REDACTED].

Grant of this STA will not adversely impact any authorized user of RF spectrum. An interference study to assess the risk of harmful interference associated with Google's proposed test operations is attached as Exhibit C.²

Antenna Specifications: [REDACTED].³ [REDACTED].⁴ [REDACTED].⁵
[REDACTED]. [REDACTED].⁶

Protection of specific users: As fully explained in Exhibit C, Google's proposed operations will not cause harmful interference to other users of the millimeter wave bands. We discuss each set of users below.

Commercial millimeter wave band users: In assessing the potential for harmful interference to other U.S. commercial millimeter wave bands users, an analysis of proposed operations under the requested STA was conducted.⁷ The analysis draws upon a database maintained by an FCC-approved frequency coordinator for the millimeter wave bands for information regarding other millimeter wave links in the vicinity of the test sites.⁸ The analysis also uses assumptions [REDACTED] that are generally consistent with the Google's proposed operations.⁹ Where assumptions deviated from the actual proposed test operations, parameters were made more conservative than the test plan. The conservative analysis concludes that neither [REDACTED], nor [REDACTED] communications posed a

¹ [REDACTED].

² See generally Exhibit C, Technical Declaration.

³ In general, the minimum antenna gain required is 50 dBi. 47 C.F.R. §101.115. However, antenna gains of as low as 43 dBi are permitted if the operator employs a proportional reduction in power. See 47 C.F.R. §101.115 n.15. ("Antenna gain less than 50 dBi (but greater than or equal to 43 dBi) is permitted only with a proportional reduction in maximum authorized EIRP in a ratio of 2 dB of power per 1 dB of gain, so that the maximum allowable EIRP (in dBW) for antennas of less than 50 dBi gain becomes $+55-2(50-G)$, where G is the antenna gain in dBi.")

⁴ See *id.*

⁵ See Technical Declaration at ¶ 5.

⁶ See *id.* at ¶ 14.

⁷ See *id.* at ¶¶ 5, 12-15, 17-37, Appendix 1.

⁸ See *id.* at ¶ 18.

⁹ See *id.* at ¶¶ 19-23.

risk of harmful interference to millimeter wave links.¹⁰

As set forth in greater detail in Exhibit C, Google has chosen a site for testing of its transmitters that is either well off-axis or separated physically and/or spectrally from other millimeter wave facilities.¹¹ Three facilities were studied in detail due to proximity, co-channel operation, or antenna orientation near the edge of the test region.¹²

- The coordination facility nearest to the proposed test site is callsign WQEZ616, located near Sparks, Nevada.¹³ The site is 225 kilometers away from the center of the proposed testing location in Northern Nevada.¹⁴ Because the directional antennas at this location are all aimed away from the proposed test region, they will not be vulnerable to interference from Google's operations.¹⁵ A receiver associated with this callsign uses an antenna aimed northward along a radial that passes approximately 50 kilometers to the west of the proposed test region.¹⁶ But this facility is spectrally separated from Google's operation—the lower sideband of Google's proposed operation will be separated from the upper sideband of this facility by more than 2 GHz at a minimum.¹⁷ As a result, receiver selectivity alone should be sufficient to prevent harmful interference.¹⁸
- The closest co-channel site is callsign WQFU991 at Reno, Nevada.¹⁹ The site is located to the southwest of the test site, more than 200 kilometers from the center of the proposed testing location. The attached technical analysis reveals that this facility would not be vulnerable from transmissions within 100 kilometers from the center of the proposed testing location in Northern Nevada because the closest radial is separated by 13.4 degrees from the test site, and there will be sufficient losses along that radial.²⁰
- A second facility at Reno, Nevada is also spectrally separated from Google's proposed operation by over 1 GHz.²¹ Even discounting

¹⁰ See *id.* at ¶¶ 5, 12-15, 17-37, Appendix 1.

¹¹ See *id.* at Appendix 1.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ See *id.*, Fig. 4.

²¹ *Id.*

this spectral separation, the radials that would potentially be vulnerable to interference at this facility fall outside of Google's test location.²²

Overall, physical and spectral separation reinforces that Google's operations will pose no material risk of harmful interference to other commercial millimeter wave link users and will not create material signal-to-noise loss for other authorized spectrum users.

International users: The proposed test site is more than 700 kilometers away from U.S. borders.²³ As a result, no international coordination is required.

Federal users: Google is prepared to coordinate with the National Telecommunications and Information Administration to ensure that federal operations in the band do not experience harmful interference.

Finally, [REDACTED]. [REDACTED]. [REDACTED]. [REDACTED].

The proposed experimental operations accordingly will be conducted without harmful interference to other authorized users. For these reasons, Google requests approval of this application.

In summary, grant of the requested STA is required for the purpose of allowing Google to test and demonstrate innovative technology with the potential to [REDACTED]. The proposed experimental operations will be conducted without harmful interference to other authorized users. For these reasons, Google requests approval of this application.

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

Legal Contact Details

Name of Contact	Aparna Sridhar
Contact Details	Counsel

²² *Id.*, Fig. 6.

²³ *Id.* at ¶ 39.

	25 Massachusetts Avenue NW, Ninth Floor Washington DC 20001
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Technical Contact Details

Name of Contact	Jeff Gilbert
Contact Details	1600 Amphitheatre Parkway Mountain View, CA 94043 Phone: (650) 933-7471 Email: jegilbert@google.com

[REDACTED]

Equipment Manuf / PN	[REDACTED]
Number of Airborne Terminals	[REDACTED]
Areas of Operation	Operation not to exceed 100 km from the following geographic centerpoint: <ul style="list-style-type: none"> • 40° 53' 55" N, 117° 48' 16" W

Frequency Range / Tolerance	High (MHz)	Low (MHz)
[REDACTED]	75790.0000	75210.0000
[REDACTED]	84790.0000	84210.0000
[REDACTED]	85790.0000	85210.0000

Radio	Modulation	Emission Designator	Bandwidth	Maximum Power Out	Maximum EIRP
[REDACTED]	Digital	580MD1D	580 MHz	0.631 W with 43 dBi antenna 0.200 W with 38 dBi antenna	41 dBW with 43 dBi antenna 31 dBW with 38d Bi antenna
[REDACTED] ^a	Digital	60M0D1D	60 MHz	0.631 W with 43 dBi antenna	41 dBW with 43 dBi antenna

				0.200 W with 38 dBi antenna	31 dBW with 38 dBi antenna
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^a This transmitter will operate within the broader frequency ranges described above in the “Frequency Range/Tolerance” table.

Antenna Details	[REDACTED]
Type	[REDACTED]
Quantity	[REDACTED] ^b
Gain	43 dBi
Beam Width at Half-Power Point	1.2 degrees
Orientation in Horizontal Plane	N/A
Orientation in Vertical Plane	N/A

Antenna Details	[REDACTED]
Type	[REDACTED]
Quantity	[REDACTED] ^b
Gain	38 dBi
Beam Width at Half-Power Point	2 degrees
Orientation in Horizontal Plane	N/A
Orientation in Vertical Plane	N/A

Antenna Details	[REDACTED]
Type	[REDACTED]
Quantity	[REDACTED] ^b
Gain	43 dBi
Beam Width at Half-Power Point	1.2 degrees
Orientation in Horizontal Plane	N/A
Orientation in Vertical Plane	N/A

^b [REDACTED]

[REDACTED]

Equipment Manuf / PN	[REDACTED]
Number of Terrestrial Terminals	[REDACTED]
Areas of Operation	Not to exceed 100 km from the following geographic centerpoint: <ul style="list-style-type: none"> • 40° 53' 55" N, 117° 48' 16" W

Frequency Range / Tolerance	High (MHz)	Low (MHz)
[REDACTED]	75790.0000	75210.0000
[REDACTED]	84790.0000	84210.0000
[REDACTED]	85790.0000	85210.0000

Radio	Modulation	Emission Designator	Bandwidth	Maximum Power Out	Maximum EIRP
[REDACTED]	Digital	580MD1D	580 MHz	1.585 W	55 dBW
[REDACTED] [°]	Digital	60M0D1D	60 MHz	1.585 W	55 dBW

[°] This transmitter will operate within the broader frequency ranges described above in the "Frequency Range/Tolerance" table.

Antenna Details	[REDACTED]
Type	[REDACTED]
Quantity	[REDACTED]
Gain	53 dBi
Beam Width at Half-Power Point	0.37 degrees
Orientation in Horizontal Plane	N/A
Orientation in Vertical Plane	N/A

[REDACTED]

[REDACTED]

Exhibit C - Technical Declaration:

Google requests confidential treatment of the declaration in its entirety.

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 STA Application. These Exhibits were filed with the Office of Engineering and Technology on September 19, 2014. For additional information, please see File No. 0842-EX-ST-2014.

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 STA Application tests/experiments may include trade secret information. The Commission has clarified that confidential treatment should be afforded to trade secrets.²⁴ 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 the 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 STA 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.

²⁴ *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).

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 by requiring that all third parties involved in the 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 has only been 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 STA 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)(1), 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

EXHIBIT A – SPECIAL TEMPORARY AUTHORITY JUSTIFICATION

Consistent with the standards set forth in Section 5.61 of the Federal Communications Commission's (FCC's or Commission's) Rules, 47 C.F.R. § 5.61, Google Inc. (Google) requests Special Temporary Authority (STA) to conduct demonstrations of experimental transmitters. The STA is sought for a period of 180 days beginning on October 20, 2014. Google outlines below its need for the requested STA and the reasons why the STA should be granted expeditiously.

Google requests the STA to test the performance of [REDACTED].¹ [REDACTED].

[REDACTED]. [REDACTED]. [REDACTED]. [REDACTED] will automatically disable any transmitter [REDACTED] under the STA if [REDACTED] exits the test area covered by the STA.

Google plans to test [REDACTED]. [REDACTED]. [REDACTED]. [REDACTED]. [REDACTED]. [REDACTED].

Grant of this STA will not adversely impact any authorized user of RF spectrum. An interference study to assess the risk of harmful interference associated with Google's proposed test operations is attached as Exhibit C.²

Antenna Specifications: [REDACTED].³ [REDACTED].⁴ [REDACTED].⁵ [REDACTED]. [REDACTED].⁶

Protection of specific users: As fully explained in Exhibit C, Google's proposed operations will not cause harmful interference to other users of the millimeter wave bands. We discuss each set of users below.

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¹ [REDACTED].

² See generally Exhibit C, Technical Declaration.

³ In general, the minimum antenna gain required is 50 dBi. 47 C.F.R. §101.115. However, antenna gains of as low as 43 dBi are permitted if the operator employs a proportional reduction in power. See 47 C.F.R. §101.115 n.15. ("Antenna gain less than 50 dBi (but greater than or equal to 43 dBi) is permitted only with a proportional reduction in maximum authorized EIRP in a ratio of 2 dB of power per 1 dB of gain, so that the maximum allowable EIRP (in dBW) for antennas of less than 50 dBi gain becomes $+55-2(50-G)$, where G is the antenna gain in dBi.")

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⁵ See Technical Declaration at ¶ 5.

⁶ See *id.* at ¶ 14.

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information regarding other millimeter wave links in the vicinity of the test sites.⁸ The analysis also uses assumptions [REDACTED] that are generally consistent with the Google's proposed operations.⁹ Where assumptions deviated from the actual proposed test operations, parameters were made more conservative than the test plan. The conservative analysis concludes that neither [REDACTED], nor [REDACTED] communications posed a risk of harmful interference to millimeter wave links.¹⁰

As set forth in greater detail in Exhibit C, Google has chosen a site for testing of its transmitters that is either well off-axis or separated physically and/or spectrally from other millimeter wave facilities.¹¹ Three facilities were studied in detail due to proximity, co-channel operation, or antenna orientation near the edge of the test region.¹²

- The coordination facility nearest to the proposed test site is callsign WQEZ616, located near Sparks, Nevada.¹³ The site is 225 kilometers away from the center of the proposed testing location in Northern Nevada.¹⁴ Because the directional antennas at this location are all aimed away from the proposed test region, they will not be vulnerable to interference from Google's operations.¹⁵ A receiver associated with this callsign uses an antenna aimed northward along a radial that passes approximately 50 kilometers to the west of the proposed test region.¹⁶ But this facility is spectrally separated from Google's operation—the lower sideband of Google's proposed operation will be separated from the upper sideband of this facility by more than 2 GHz at a minimum.¹⁷ As a result, receiver selectivity alone should be sufficient to prevent harmful interference.¹⁸
- The closest co-channel site is callsign WQFU991 at Reno, Nevada.¹⁹ The site is located to the southwest of the test site, more than 200 kilometers from the center of the proposed testing location. The attached technical analysis reveals that this facility would not be vulnerable from transmissions within 100 kilometers from the center of the proposed testing location in Northern Nevada because the closest radial is separated by 13.4 degrees from the test site, and there will be sufficient losses along that radial.²⁰

⁸ See *id.* at ¶ 18.

⁹ See *id.* at ¶¶ 19-23.

¹⁰ See *id.* at ¶¶ 5, 12-15, 17-37, Appendix 1.

¹¹ See *id.* at Appendix 1.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ See *id.*, Fig. 4.

- A second facility at Reno, Nevada is also spectrally separated from Google's proposed operation by over 1 GHz.²¹ Even discounting this spectral separation, the radials that would potentially be vulnerable to interference at this facility fall outside of Google's test location.²²

Overall, physical and spectral separation reinforces that Google's operations will pose no material risk of harmful interference to other commercial millimeter wave link users and will not create material signal-to-noise loss for other authorized spectrum users.

International users: The proposed test site is more than 700 kilometers away from U.S. borders.²³ As a result, no international coordination is required.

Federal users: Google is prepared to coordinate with the National Telecommunications and Information Administration to ensure that federal operations in the band do not experience harmful interference.

Finally, [REDACTED]. [REDACTED]. [REDACTED]. [REDACTED].

The proposed experimental operations accordingly will be conducted without harmful interference to other authorized users. For these reasons, Google requests approval of this application.

²¹ *Id.*

²² *Id.*, Fig. 6.

²³ *Id.* at ¶ 39.

EXHIBIT B - TECHNICAL INFORMATION

Applicant Name: Google Inc.
Applicant FRN: 0016069502

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	Jeff Gilbert
Contact Details	1600 Amphitheatre Parkway Mountain View, CA 94043 Phone: (650) 933-7471 Email: jegilbert@google.com

[REDACTED]

Equipment Manuf / PN	[REDACTED]
Number of Airborne Terminals	[REDACTED]
Areas of Operation	Operation not to exceed 100 km from the following geographic centerpoint: <ul style="list-style-type: none"> • 40° 53' 55" N, 117° 48' 16" W

Frequency Range / Tolerance	High (MHz)	Low (MHz)
[REDACTED]	75790.0000	75210.0000
[REDACTED]	84790.0000	84210.0000
[REDACTED]	85790.0000	85210.0000

Radio	Modulation	Emission Designator	Bandwidth	Maximum Power Out	Maximum EIRP
[REDACTED]	Digital	580MD1D	580 MHz	0.631 W with 43 dBi antenna 0.200 W with 38 dBi antenna	41 dBW with 43 dBi antenna 31 dBW with 38d Bi antenna
[REDACTED] ^a	Digital	60M0D1D	60 MHz	0.631 W with 43 dBi antenna 0.200 W with 38 dBi antenna	41 dBW with 43 dBi antenna 31 dBW with 38 dBi antenna

^a This transmitter will operate within the broader frequency ranges described above in the “Frequency Range/Tolerance” table.

Antenna Details	[REDACTED]
Type	[REDACTED]
Quantity	[REDACTED] ^b
Gain	43 dBi
Beam Width at Half-Power Point	1.2 degrees
Orientation in Horizontal Plane	N/A
Orientation in Vertical Plane	N/A

Antenna Details	[REDACTED]
Type	[REDACTED]
Quantity	[REDACTED] ^b
Gain	38 dBi
Beam Width at Half-Power Point	2 degrees
Orientation in Horizontal Plane	N/A
Orientation in Vertical Plane	N/A

Antenna Details	[REDACTED]
Type	[REDACTED]
Quantity	[REDACTED] ^b
Gain	43 dBi
Beam Width at Half-Power Point	1.2 degrees
Orientation in Horizontal Plane	N/A
Orientation in Vertical Plane	N/A

^b [REDACTED]

[REDACTED]

Equipment Manuf / PN	[REDACTED]
Number of Terrestrial Terminals	[REDACTED]
Areas of Operation	Not to exceed 100 km from the following geographic centerpoint: <ul style="list-style-type: none"> • 40° 53' 55" N, 117° 48' 16" W

Frequency Range / Tolerance	High (MHz)	Low (MHz)
[REDACTED]	75790.0000	75210.0000
[REDACTED]	84790.0000	84210.0000
[REDACTED]	85790.0000	85210.0000

Radio	Modulation	Emission Designator	Bandwidth	Maximum Power Out	Maximum EIRP
[REDACTED]	Digital	580MD1D	580 MHz	1.585 W	55 dBW
[REDACTED] ^c	Digital	60M0D1D	60 MHz	1.585 W	55 dBW

^c This transmitter will operate within the broader frequency ranges described above in the "Frequency Range/Tolerance" table.

Antenna Details	[REDACTED]
Type	[REDACTED]

Quantity	[REDACTED]
Gain	53 dBi
Beam Width at Half-Power Point	0.37 degrees
Orientation in Horizontal Plane	N/A
Orientation in Vertical Plane	N/A

[REDACTED]

[REDACTED]

EXHIBIT C - TECHNICAL DECLARATION

[REDACTED]