

Date: September 1, 2015  
Subject: Public and Redacted Version of Request for Confidential Treatment and Complementary Exhibits  
File Number: 0970-EX-ST-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 for Special Temporary Authority (STA) 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 STA and Exhibits A and B. Google does not seek to withhold from public inspection information in the STA 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 - Special Temporary Authority Justification:**

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 5.61 of the Federal Communications Commission's (Commission's) Rules, 47 C.F.R. § 5.61, Google Inc. (Google) requests Special Temporary Authority (STA) to conduct demonstrations of [REDACTED] experimental transmitters in Kansas City, Kansas. Operations under the STA would be generally consistent with the terms of Google's current

Experimental Radio Service License for call sign WH2XNF (Experimental License).<sup>1</sup> The STA is sought for a period of 180 days beginning on September 30, 2015. Google outlines below its need for the requested STA and the reasons that the STA should be granted expeditiously.

The STA is needed to expand testing in the 3.5 GHz band, which the Commission has designated for broader commercial use. The STA will allow Google to continue its experimentation with [REDACTED], under conditions that are consistent with the Commission's Part 96 rules.<sup>2</sup> As discussed further below, operations under the STA will protect incumbent operators from harmful interference. There have been no reports of interference from Google's similar experimental operations under call sign WH2XNF.

In Kansas City, Google requests authorization to operate on the frequencies between 3550 and 3700 MHz, which have been opened for innovative small-cell spectrum sharing in connection with the new Citizens Broadband Radio Service (CBRS). Operations across the proposed frequencies will be consistent with the rules for CBRS devices (CBSDs) set forth in Part 96 of the Commission's rules. As described below, Google will avoid harmful interference to incumbent operations throughout the band, and with operations in adjacent bands.

The proposed experimentation will allow Google to [REDACTED]. [REDACTED]. Together with testing under call sign WH2XNF and other research, the proposed testing will assist in enabling: (1) [REDACTED]; (2) [REDACTED]; and (3) [REDACTED]. [REDACTED]. [REDACTED].

### **Planned Operations**

Google anticipates performing the following tests under the requested STA. As described in the next section, the proposed experimental operations in the 3.5 GHz band will be conducted without harmful interference to other authorized users.

- **[REDACTED]:** Google will use both a simple continuous wave (CW) tone and a broadband signal to understand the effects of [REDACTED]. Google will equip [REDACTED]. Google may also position [REDACTED]. Google will generally operate only [REDACTED].
- **[REDACTED]:** Google will test [REDACTED]. Google will [REDACTED].
- **[REDACTED]:** Google will investigate [REDACTED]. When conducting these tests, Google expects to operate [REDACTED] at any one time.

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<sup>1</sup> See File Nos. 0722-EX-PL-2014 and 0004-EX-ML-2015.

<sup>2</sup> See 47 C.F.R. Part 96.

### Non-Interference Analysis

Operations under the STA will not adversely impact any authorized user of RF spectrum.

- **Radar Protection.** The U.S. military operates radars in the 3500-3700 MHz band. These radars are predominantly but not exclusively shipborne, and none is located at an inland location. Kansas City is more than 900 km from the nearest coastal exclusion zone established by the Commission to protect these radars.<sup>3</sup> It is also more than 140 km from the nearest inland exclusion zone established by the Commission to protect adjacent-band radars,<sup>4</sup> and more than 1,000 km from the nearest international border. Therefore, no interference to incumbent operations is expected.
- **In-Band FSS Protection.** The Commission has identified in-band fixed-satellite service (FSS) operations in 3600-3700 MHz that require protection under Part 96.<sup>5</sup> For the 3650-3700 MHz range, Part 96 requires coordination with any in-band FSS operators within a 150 km coordination contour. Kansas City, however, is more than 700 km from the nearest in-band FSS site and thus, while Google will coordinate in accordance with the Part 96 rules, coordination with in-band FSS operators should not be required in practice.
- **Adjacent-Band FSS Protection.** The Commission has not yet established rules for protecting adjacent-band FSS operations. In the absence of detailed rules, Google proposes to use the following worst-case assumptions and parameters to determine when coordination is necessary:
  - Experimental Equipment OOBE: -13 dBm/MHz
  - FSS system temperature: 142.8 K<sup>6</sup>
  - Propagation Model: ITU-R Recommendation P.452<sup>7</sup>

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<sup>3</sup> See 47 C.F.R. §§ 96.15(a)(1), 96.15(a)(3), 96.15(b).

<sup>4</sup> See *id.*

<sup>5</sup> See *3.5 GHz Band - Protected Fixed Satellite Service(FSS) Earth Stations*, available at <http://www.fcc.gov/cbrs-protected-fss-sites>.

<sup>6</sup> See *In the Matter of Wireless Operations in the 3650-3700 MHz Band, et al.*, Report and Order and Memorandum Opinion and Order, 20 FCC Rcd. 6502 at Appendix D (A Methodology For Locating Fixed Stations Within The FSS Earth Station Protection Zone).

<sup>7</sup> See Reply Comments of the Satellite Industry Association, 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 (Aug. 18, 2014) (SIA Reply Comments) at 5.

- FSS Interference Criterion: I/N = 1%<sup>8</sup>

Whenever these assumptions result in a predicted interference level of greater than 1% of the FSS noise level, Google will coordinate with the potentially affected FSS operators before beginning any operations in the 3650-3700 MHz band segment. For operations below 3650 MHz (i.e., more than 50 MHz away from the adjacent FSS band), spectral separation definitively protects adjacent-band FSS operations.

- **Part 90 Protection.** To protect existing Part 90 operations in the 3650-3700 MHz band segment, Google will coordinate its transmissions in this band with all Part 90 licensees in the Commission's ULS database that are within 25 km of an intended Google transmitter location. Because there are a large number of Part 90 systems operating in this band segment, and because of additional requirements to coordinate with numerous adjacent-band FSS sites, Google will generally avoid using the 3650-3700 MHz band except when necessary to meet stated objectives, which may include [REDACTED].

The proposed experimental operations in Kansas City, Kansas, accordingly will be conducted without harmful interference to other authorized users. For the foregoing 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

<b>Name of Contact</b>	Stephanie Selmer
<b>Contact Details</b>	Associate Corporate Counsel 25 Massachusetts Avenue NW, Ninth Floor Washington, DC 20001

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<sup>8</sup> See ITU-R Recommendation S.1432 (Apportionment of the allowable error performance degradations to fixed-satellite service (FSS) hypothetical reference digital paths arising from time invariant inference for systems operating below 30 GHz); SIA Reply Comments at 5.

**Technical Contact Details**

<b>Name of Contact</b>	Andrew Clegg
<b>Contact Details</b>	1875 Explorer Street, Tenth Floor Reston, VA 20190 Phone: (202) 370-5644 Email: aclegg@google.com

**Kansas City, KS: Transmitter Equipment and Station Details**

*Radio Information*

<b>Equipment</b>	[REDACTED]
<b>Quantity</b>	[REDACTED]
<b>Area of Operation</b>	Operation not to exceed 30 km from the following geographic centerpoint: <ul style="list-style-type: none"> <li>• 39° 02' 45" N, 94° 39' 37" W</li> </ul>

<b>Frequency</b>	<b>High (MHz)</b>	<b>Low (MHz)</b>
[REDACTED]	3700	3550

*Amplifier Information*

<b>Equipment</b>	[REDACTED]
<b>Quantity</b>	[REDACTED]
<b>Area of Operation</b>	Operation not to exceed 30 km from the following geographic centerpoint: <ul style="list-style-type: none"> <li>• 39° 02' 45" N, 94° 39' 37" W</li> </ul>

*Antenna Details*

<b>Antennas</b>	[REDACTED]
<b>Type</b>	Both directional and omnidirectional antennas will be used
<b>Quantity</b>	[REDACTED]
<b>Gain</b>	16 dBi max; -4 dBi min
<b>Beam Width at Half-Power Point</b>	Various (90° to 360° Horizontal; 7° to 180° Vertical)
<b>Orientation in Horizontal Plane</b>	Various (0° to 360°)
<b>Orientation in Vertical Plane</b>	10° to -30°

<b>Radio</b>	<b>Modulation</b>	<b>Emission Designator</b>	<b>Bandwidth</b>	<b>Maximum Power Out</b>	<b>Maximum EIRP</b>
[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)
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[REDACTED]	Digital	20M0G7D	20 MHz	3 W	21 dBW (with 16 dBi antenna)
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[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 STA. The Exhibits were filed with the Office of Engineering and Technology on September 1, 2015. For additional information, please see File No. 0970-EX-ST-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 STA discuss tests/experiments that include trade secret information. The Commission has clarified that confidential treatment should be afforded to trade secrets.<sup>9</sup> Google's tests/experiments and proprietary wireless applications using particular radio

<sup>9</sup> *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).

frequency equipment represent a “secret commercially valuable plan” within the meaning of a trade secret as recognized by the Commission.

**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 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 by requiring that any 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 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 STA 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,

A handwritten signature in blue ink, appearing to read 'Step Selmer', is written over the typed name.

Stephanie Selmer

## EXHIBIT A – SPECIAL TEMPORARY AUTHORITY JUSTIFICATION

Consistent with the standards set forth in Section 5.61 of the Federal Communications Commission's (Commission's) Rules, 47 C.F.R. § 5.61, Google Inc. (Google) requests Special Temporary Authority (STA) to conduct demonstrations of [REDACTED] experimental transmitters in Kansas City, Kansas. Operations under the STA would be generally consistent with the terms of Google's current Experimental Radio Service License for call sign WH2XNF (Experimental License).<sup>1</sup> The STA is sought for a period of 180 days beginning on September 30, 2015. Google outlines below its need for the requested STA and the reasons that the STA should be granted expeditiously.

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### Planned Operations

Google anticipates performing the following tests under the requested STA. As described in the next section, the proposed experimental operations in the 3.5 GHz band will be conducted without harmful interference to other authorized users.

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- **[REDACTED]:** Google will test [REDACTED]. Google will [REDACTED].
- **[REDACTED]:** Google will investigate [REDACTED]. When conducting these tests,

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<sup>1</sup> See File Nos. 0722-EX-PL-2014 and 0004-EX-ML-2015.

<sup>2</sup> See 47 C.F.R. Part 96.

Google expects to operate [REDACTED] at any one time.

### Non-Interference Analysis

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  - Experimental Equipment OOBE: -13 dBm/MHz
  - FSS system temperature: 142.8 K<sup>6</sup>
  - Propagation Model: ITU-R Recommendation P.452<sup>7</sup>
  - FSS Interference Criterion: I/N = 1%<sup>8</sup>

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<sup>3</sup> See 47 C.F.R. §§ 96.15(a)(1), 96.15(a)(3), 96.15(b).

<sup>4</sup> See *id.*

<sup>5</sup> See *3.5 GHz Band - Protected Fixed Satellite Service(FSS) Earth Stations*, available at <http://www.fcc.gov/cbrs-protected-fss-sites>.

<sup>6</sup> See *In the Matter of Wireless Operations in the 3650-3700 MHz Band, et al.*, Report and Order and Memorandum Opinion and Order, 20 FCC Rcd. 6502 at Appendix D (A Methodology For Locating Fixed Stations Within The FSS Earth Station Protection Zone).

<sup>7</sup> See Reply Comments of the Satellite Industry Association, 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 (Aug. 18, 2014) (SIA Reply Comments) at 5.

<sup>8</sup> See ITU-R Recommendation S.1432 (Apportionment of the allowable error performance degradations to fixed-satellite service (FSS) hypothetical reference digital paths arising from time invariant inference for systems operating below 30 GHz); SIA Reply Comments at 5.

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

**EXHIBIT B - TECHNICAL INFORMATION**

Applicant Name: Google Inc.  
Applicant FRN: 0016069502

**Legal Contact Details**

<b>Name of Contact</b>	Stephanie Selmer
<b>Contact Details</b>	Associate Corporate Counsel 25 Massachusetts Avenue NW, Ninth Floor Washington, DC 20001

**Technical Contact Details**

<b>Name of Contact</b>	Andrew Clegg
<b>Contact Details</b>	1875 Explorer Street, Tenth Floor Reston, VA 20190 Phone: (202) 370-5644 Email: aclegg@google.com

**Kansas City, KS: Transmitter Equipment and Station Details**

*Radio Information*

<b>Equipment</b>	[REDACTED]
<b>Quantity</b>	[REDACTED]
<b>Area of Operation</b>	Operation not to exceed 30 km from the following geographic centerpoint: <ul style="list-style-type: none"> <li>• 39° 02' 45" N, 94° 39' 37" W</li> </ul>

<b>Frequency</b>	<b>High (MHz)</b>	<b>Low (MHz)</b>
[REDACTED]	3700	3550

*Amplifier Information*

<b>Equipment</b>	[REDACTED]
<b>Quantity</b>	[REDACTED]
<b>Area of Operation</b>	Operation not to exceed 30 km from the following geographic centerpoint: <ul style="list-style-type: none"> <li>• 39° 02' 45" N, 94° 39' 37" W</li> </ul>

*Antenna Details*

<b>Antennas</b>	[REDACTED]
<b>Type</b>	Both directional and omnidirectional antennas will be used
<b>Quantity</b>	[REDACTED]
<b>Gain</b>	16 dBi max; -4 dBi min
<b>Beam Width at Half-Power Point</b>	Various (90° to 360° Horizontal; 7° to 180° Vertical)
<b>Orientation in Horizontal Plane</b>	Various (0° to 360°)
<b>Orientation in Vertical Plane</b>	10° to -30°

<b>Radio</b>	<b>Modulation</b>	<b>Emission Designator</b>	<b>Bandwidth</b>	<b>Maximum Power Out</b>	<b>Maximum EIRP</b>
[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)

**PUBLIC REDACTED VERSION**

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[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)