

Appendix B: Claim Chart for U.S. Patent No. 8,400,358

Claim No.	Claim Language	Accused Instrumentality ^{1,2}
1[a]	A method for determining a location of a mobile station, comprising:	To the extent that the claim's preamble is determined to be a limitation or otherwise limiting, the Accused Instrumentality performs a method for determining the location of a mobile station, such as Google and Third Party Devices,³ comprising the steps in the subsequent limitations. On most Android devices, Google, as the network location provider, provides a location service called Google Location Services (GLS), known in Android 9 and above as Google Location Accuracy. This service aims to provide a more accurate device location and generally improve location accuracy. Most mobile phones are equipped with GPS, which uses signals from satellites to determine a device's location – however, with Google Location Services, additional information from nearby Wi-Fi, mobile networks, and device sensors can be collected to determine your device's location. It does this by periodically collecting location data from your device and using it in an anonymous way to improve location accuracy. (GEOSCOPE-G-013632 at 13634)

¹ Accused Instrumentality, as used herein, means Google Location Services, including the comprising hardware and software components and associated APIs and frameworks such as Fused Location Provider, Network Location Provider, and Geolocation API. As set forth in the cover document to Geoscope's Preliminary Infringement Contentions, this is based on Geoscope's present understanding without the benefit of discovery.

² The citations in this Claim Chart are exemplary and illustrative. Geoscope reserves the right to amend and/or supplement these Contentions, including this Claim Chart, in any manner and for any of the reasons set forth in the cover document to Geoscope's Preliminary Infringement Contentions, including after a complete production of relevant source code and other non-public technical information and claim construction.

³ Google and Third Party Devices, as used herein, means all devices, whether or not manufactured, sold, offered for sale, or otherwise provided by Google, that incorporate, use, interact with, or allow access to or use of the Accused Instrumentality, including but not limited to Google Pixel phones and third party Android phones.

		When you have Google Location Accuracy turned on, your phone uses these sources to get the most accurate location: • GPS • Wi-Fi • Mobile networks • Sensors (such as accelerometer) Google may collect location data periodically and use this data in an anonymous way to improve location accuracy and location-based services. (GEOSCOPE-G-013647 at 13650) The Geolocation API returns a location and accuracy radius based on information about cell towers and WiFi nodes that the mobile client can detect. This document describes the protocol used to send this data to the server and to return a response to the client. (GEOSCOPE-G-013036 at 13036) Apps can take advantage of the signals provided by multiple sensors in the device to determine device location. However, choosing the right combination of signals for a specific task in different conditions is not simple. Finding a solution that is also battery-efficient is even more complicated. The fused location provider is a location API in Google Play services that intelligently combines different signals to provide the location information that your app needs. (GEOSCOPE-G-013728 at 13728)
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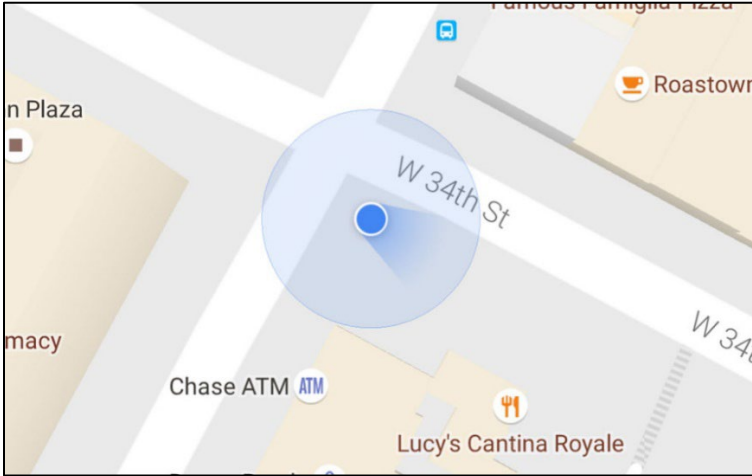
1[b]	providing a database of previously-gathered calibration data for a predetermined region in a wireless network;	The Accused Instrumentality provides a database of previously-gathered calibration data for a predetermined region in a wireless network. As part of the Accused Instrumentality, Google and Third Party Devices collect information comprising, <i>inter alia</i>, the geo-tagged locations of nearby Wi-Fi hotspots and cell towers as well as the strengths of signals and other characteristics received from each of those at various locations. This information is stored as, and/or processed to generate, calibration data stored in a database maintained by Google. When a request for the location of a Google or Third Party Device is made by the device, this previously-gathered calibration data is used to determine the location of the device. When you have Google Location Accuracy turned on, your phone uses these sources to get the most accurate location: • GPS • Wi-Fi • Mobile networks • Sensors (such as accelerometer) Google may collect location data periodically and use this data in an anonymous way to improve location accuracy and location-based services. (GEOSCOPE-G-013647 at 13650) To improve Location services and estimate the location of a device, Google uses publicly broadcast Wi-Fi information from wireless access points and GPS, cell tower, and sensor data. This data is limited to information about the wireless access point itself, including its location. (GEOSCOPE-G-013688 at 13688)
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		To provide this functionality, Google collects MAC addresses, signal strength information, and radio channel information from these access points. Google also collects the name (also referred to as a “service set identifier” or “SSID”) associated with these networks, in order to identify and remove access points that network administrators have chosen to opt out of this collection through instructions provided by Google. SSIDs are discarded after being processed for this purpose. (GEOSCOPE-G-013637 at 13642) To the extent this limitation is not literally met by the Accused Instrumentality because the database of calibration data maintained by Google does not include the information previously gathered by Google and Third Party Devices but, rather, includes data generated from or related to the information previously gathered by Google and Third Party Devices, the Accused Instrumentality’s database of calibration data is insubstantially different from, and equivalent to, this limitation. The database of calibration data in the Accused Instrumentality performs substantially the same function (<i>i.e.</i>, maintaining information regarding, <i>inter alia</i>, the locations and characteristics of signal transmitters as reference points for use in locating device), in substantially the same way (<i>i.e.</i>, storing such information in a database), to achieve substantially the same result (<i>i.e.</i>, enabling the comparison of observed network measurement data to the calibration data for purposes of locating devices) as the claimed database of calibration data.
1[c]	collecting observed network measurement data;	The Accused Instrumentality collects network measurement data comprising, <i>inter alia</i>, data regarding the strengths of signals from Wi-Fi hotspots and cell towers observed by Google and Third Party Devices at the time that a device is making a request for its location. The observed network measurement data collected by Google and Third Party Devices, including as part of a particular location request, may also become part of, or processed to generate, calibration data used in connection with future location requests.

		When you have Google Location Accuracy turned on, your phone uses these sources to get the most accurate location: • GPS • Wi-Fi • Mobile networks • Sensors (such as accelerometer) Google may collect location data periodically and use this data in an anonymous way to improve location accuracy and location-based services. (GEOSCOPE-G-013647 at 13650) How Maps finds your current location Maps estimates where you are from sources like: • GPS: Maps uses satellites to know your location up to around 20 meters. When you're inside buildings or underground, the GPS is sometimes inaccurate. • Wi-Fi: The location of nearby Wi-Fi networks helps Maps know where you are. • Cell tower: Your connection to mobile data can be accurate up to a few thousand meters. (GEOSCOPE-G-013784 at 13784) Information about the location of WiFi networks improves the accuracy of the location-based services, such as Google Maps or driving directions, that Google provides to consumers. For example, a user of Google Maps for mobile phones can turn on a smart phone's "My Location" feature to identify his or her approximate location based on GPS signals (where available) and signals from the cell towers and WiFi networks visible to the device. Because GPS and cell tower location data can be unreliable or inaccurate, in some cases using the location of WiFi access points can enable a smart phone to pinpoint its own location more quickly and accurately. (GEOSCOPE-G-013790 at 13790)
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		Apps can take advantage of the signals provided by multiple sensors in the device to determine device location. However, choosing the right combination of signals for a specific task in different conditions is not simple. Finding a solution that is also battery-efficient is even more complicated. The fused location provider is a location API in Google Play services that intelligently combines different signals to provide the location information that your app needs. (GEOSCOPE-G-013728 at 13728) (See also Claim 1[b])
1[d]	modifying said observed network measurement data; and	The Accused Instrumentality modifies the observed network measurement data comprising, <i>inter alia</i>, the strengths of signals from Wi-Fi hotspots and cell towers in a region in determining the location of a Google or Third Party Device. To perform geolocation, the Accused Instrumentality collects and utilizes information from numerous different sources including from a multitude of different Wi-Fi hotspots and cell towers that are in distinct locations and diverse environments and conditions (<i>e.g.</i>, indoors versus outdoors, differing numbers and types of obstructions, different weather conditions), and transmit different types of signals. In order to provide accurate geolocation and an estimate of the accuracy, the Accused Instrumentality performs steps to validate and process observed network measurement data from a wide array of sources. These steps of validating and processing the observed network measurement data, as well as estimating the accuracy of the geolocation, involve modifying the data by, for example, normalizing and/or averaging the collected observed network measurement data. This includes modifying the observed network measurement data based on or using other data collected from sensors on Google and Third Party Devices including, <i>inter alia</i>, the barometer, accelerometer, and magnetometer.

		As another example, the Accused Instrumentality calculates an “accuracy radius” and displays this in Google Maps via a blue circle that changes in size depending on the estimated accuracy. This estimation of accuracy necessarily involves modification of the observed network measurement data because it depends on assessing how closely the observed data tracks the normalized and/or averaged network measurement data that is used to determine a device’s location. Apps can take advantage of the signals provided by multiple sensors in the device to determine device location. However, choosing the right combination of signals for a specific task in different conditions is not simple. Finding a solution that is also battery-efficient is even more complicated. The fused location provider is a location API in Google Play services that intelligently combines different signals to provide the location information that your app needs. (GEOSCOPE-G-013728 at 13728) Android application developers, including Google, can use the accelerometer and barometer sensors, along with the gyrometer and magnetometer sensors, to more precisely determine a device’s location. Google uses the accelerometer readings to help determining the device’s orientation and direction, the gyrometer helps determine if a user is turning, and the barometer can help determine the user’s elevation. (GEOSCOPE-G-013637 at 13643) (GEOSCOPE-G-013662 at 25:19-26:10, 30:06-31:05) (GEOSCOPE-G-013675 at 11:00-27:00)
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		The Geolocation API returns a location and accuracy radius based on information about cell towers and WiFi nodes that the mobile client can detect. This document describes the protocol used to send this data to the server and to return a response to the client. (GEOSCOPE-G-013036 at 13036)  (Screenshot from Google Maps depicting “blue circle” that shows estimate of accuracy)
1[e]	comparing said modified network measurement data with said database of calibration data by positioning determining equipment to thereby determine the location of the mobile station.	The Accused Instrumentality compares the modified network measurement data with the database of calibration data by positioning determining equipment to thereby determine the location of the mobile station (<i>e.g.</i>, Google and Third Party Devices). The modified network measurement data is compared to related data from the calibration database (<i>e.g.</i>, signal strength and location information for the same Wi-Fi hotspots or cell towers currently being detected by the Google or Third Party Device requesting its location). Google and Third Party Devices and/or Google servers (or other backend infrastructure) include software and hardware components comprising positioning determining equipment that perform a comparison of the modified network measurement data with the calibration data to calculate the device’s location.

		For example, the positioning determining equipment compares information in the calibration data (<i>e.g.</i>, information regarding the location of particular Wi-Fi hotspots or cell towers and their signal strengths in various area) with information in the modified network measurement data (<i>e.g.</i>, information regarding what Wi-Fi hotspots or cell towers are being detected and the signal strengths being detected). Based on the comparison, the Google or Third Party Device's location can be determined. This type of comparison is done for numerous different Wi-Fi hotspots or cell towers that are detected in an area when a Google or Third Party Device makes a request for its location to more accurately locate the device. When you have Google Location Accuracy turned on, your phone uses these sources to get the most accurate location: • GPS • Wi-Fi • Mobile networks • Sensors (such as accelerometer) Google may collect location data periodically and use this data in an anonymous way to improve location accuracy and location-based services. (GEOSCOPE-G-013647 at 13650)
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		Questions 5(a)-(c) are describing the GLS we provide as a network location provider on Android devices, which uses sources like Wi-Fi and mobile networks to give location information faster and more accurately. When setting up their device or using apps or services that can use location services, a user may enable GLS to take advantage of these features. GLS uses publicly broadcast Wi-Fi data from wireless access points in range of the device to help determine its location. This may include any Wi-Fi access points in range of the device, and not just networks to which the device has previously connected. These access points are stored and used to build models that estimate where each access point is located. This data is de-identified and only associated with a temporary, rotating device identifier, and no payload data/data packets are collected. As noted above, only publicly broadcast Wi-Fi information is used to estimate the location of a device. (GEOSCOPE-G-013637 at 13642) (GEOSCOPE-G-013797 at 6:45-7:45)
4	The method of claim 1 wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.	The Accused Instrumentality performs the method of claim 1 wherein the database comprises previously-gathered calibration data for one or more non-uniform grid points within the region. For example, the previously-gathered calibration data for known locations (<i>see</i> Claim 1[b]) can be associated with or used to generate non-uniform grid points that constitute locations that are determinable using the calibration data and are associated with the calibration data (or portions thereof). These grid points and the data associated with them can be used as part of locating a user's Google or Third Party Device.

		Questions 5(a)-(c) are describing the GLS we provide as a network location provider on Android devices, which uses sources like Wi-Fi and mobile networks to give location information faster and more accurately. When setting up their device or using apps or services that can use location services, a user may enable GLS to take advantage of these features. GLS uses publicly broadcast Wi-Fi data from wireless access points in range of the device to help determine its location. This may include any Wi-Fi access points in range of the device, and not just networks to which the device has previously connected. These access points are stored and used to build models that estimate where each access point is located. This data is de-identified and only associated with a temporary, rotating device identifier, and no payload data/data packets are collected. As noted above, only publicly broadcast Wi-Fi information is used to estimate the location of a device. (GEOSCOPE-G-013637 at 13642)
5	The method of claim 1 wherein said observed network measurement data includes data collected at the mobile station.	The Accused Instrumentality performs the method of claim 1 wherein the observed network measurement data includes data collected at the mobile station (e.g., Google and Third Party Devices). When you have Google Location Accuracy turned on, your phone uses these sources to get the most accurate location: • GPS • Wi-Fi • Mobile networks • Sensors (such as accelerometer) Google may collect location data periodically and use this data in an anonymous way to improve location accuracy and location-based services. (GEOSCOPE-G-013647 at 13650)

		Apps can take advantage of the signals provided by multiple sensors in the device to determine device location. However, choosing the right combination of signals for a specific task in different conditions is not simple. Finding a solution that is also battery-efficient is even more complicated. The fused location provider is a location API in Google Play services that intelligently combines different signals to provide the location information that your app needs. (GEOSCOPE-G-013728 at 13728) (<i>See also</i> Claim 1[c])
10	The method of claim 1 wherein said previously-gathered calibration data includes information identifying a serving cell of a transmitter transmitting a signal received at a predetermined calibration point within said region.	The Accused Instrumentality performs the method of claim 1 wherein the previously-gathered calibration data includes information identifying a serving cell of a transmitter transmitting a signal received at a predetermined calibration point within the region. For example, Google collects “Cell ID” information, which identifies the serving cell for a particular cell tower, and utilizes it as calibration data.

Cell tower objects

The request body's `cellTowers` array contains zero or more cell tower objects.

Field	JSON type	Description	Notes
<code>cellId</code>	number (uint32)	Unique identifier of the cell.	<i>Required</i> for <code>radioType</code> <code>gsm</code> (default), <code>cdma</code> , <code>wcdma</code> and <code>lte</code> ; <i>rejected</i> for <code>nr</code> . See the Calculating cellId section below, which also lists the valid value ranges for each radio type.
<code>newRadioCellId</code>	number (uint64)	Unique identifier of the NR (5G) cell.	<i>Required</i> for <code>radioType</code> <code>nr</code> ; <i>rejected</i> for other types. See the Calculating newRadioCellId section below, which also lists the valid value range for the field.
<code>locationAreaCode</code>	number (uint32)	The Location Area Code (LAC) for GSM and WCDMA networks. The Network ID (NID) for CDMA networks. The Tracking Area Code (TAC) for LTE and NR networks.	<i>Required</i> for <code>radioType</code> <code>gsm</code> (default) and <code>cdma</code> , optional for other values. Valid range with <code>gsm</code> , <code>cdma</code> , <code>wcdma</code> and <code>lte</code> : 0–65535. Valid range with <code>nr</code> : 0–16777215.
<code>mobileCountryCode</code>	number (uint32)	The cell tower's Mobile Country Code (MCC).	<i>Required</i> for <code>radioType</code> <code>gsm</code> (default), <code>wcdma</code> , <code>lte</code> and <code>nr</code> ; not used for <code>cdma</code> . Valid range: 0–999.
<code>mobileNetworkCode</code>	number (uint32)	The cell tower's Mobile Network Code. This is the MNC for GSM, WCDMA, LTE and NR. CDMA uses the System ID (SID).	<i>Required</i> . Valid range for MNC: 0–999. Valid range for SID: 0–32767.

(GEOSCOPE-G-013036 at 13038-39)

11	The method of claim 1 wherein said previously-gathered calibration data includes information identifying a serving sector of a transmitter transmitting a signal received at a predetermined calibration point within said region.	The Accused Instrumentality performs the method of claim 1 wherein the previously-gathered calibration data includes information identifying a serving sector of a transmitter transmitting a signal received at a predetermined calibration point. For example, Google collects “Cell ID” information, which identifies the serving sector for a particular cell tower, and utilizes it as calibration data. Cell tower objects The request body's <code>cellTowers</code> array contains zero or more cell tower objects. <table><tr><th>Field</th><th>JSON type</th><th>Description</th><th>Notes</th></tr><tr><td><code>cellId</code></td><td>number (uint32)</td><td>Unique identifier of the cell.</td><td><i>Required</i> for <code>radioType</code> <code>gsm</code> (default), <code>cdma</code>, <code>wcdma</code> and <code>lte</code>; <i>rejected</i> for <code>nr</code>. See the Calculating cellId section below, which also lists the valid value ranges for each radio type.</td></tr><tr><td><code>newRadioCellId</code></td><td>number (uint64)</td><td>Unique identifier of the NR (5G) cell.</td><td><i>Required</i> for <code>radioType</code> <code>nr</code>; <i>rejected</i> for other types. See the Calculating newRadioCellId section below, which also lists the valid value range for the field.</td></tr><tr><td><code>locationAreaCode</code></td><td>number (uint32)</td><td>The Location Area Code (LAC) for GSM and WCDMA networks. The Network ID (NID) for CDMA networks. The Tracking Area Code (TAC) for LTE and NR networks.</td><td><i>Required</i> for <code>radioType</code> <code>gsm</code> (default) and <code>cdma</code>, optional for other values. Valid range with <code>gsm</code>, <code>cdma</code>, <code>wcdma</code> and <code>lte</code>: 0–65535. Valid range with <code>nr</code>: 0–16777215.</td></tr><tr><td><code>mobileCountryCode</code></td><td>number (uint32)</td><td>The cell tower's Mobile Country Code (MCC).</td><td><i>Required</i> for <code>radioType</code> <code>gsm</code> (default), <code>wcdma</code>, <code>lte</code> and <code>nr</code>; not used for <code>cdma</code>. Valid range: 0–999.</td></tr><tr><td><code>mobileNetworkCode</code></td><td>number (uint32)</td><td>The cell tower's Mobile Network Code. This is the MNC for GSM, WCDMA, LTE and NR. CDMA uses the System ID (SID).</td><td><i>Required</i>. Valid range for MNC: 0–999. Valid range for SID: 0–32767.</td></tr></table> (GEOSCOPE-G-013036 at 13038-39)	Field	JSON type	Description	Notes	<code>cellId</code>	number (uint32)	Unique identifier of the cell.	<i>Required</i> for <code>radioType</code> <code>gsm</code> (default), <code>cdma</code> , <code>wcdma</code> and <code>lte</code> ; <i>rejected</i> for <code>nr</code> . See the Calculating cellId section below, which also lists the valid value ranges for each radio type.	<code>newRadioCellId</code>	number (uint64)	Unique identifier of the NR (5G) cell.	<i>Required</i> for <code>radioType</code> <code>nr</code> ; <i>rejected</i> for other types. See the Calculating newRadioCellId section below, which also lists the valid value range for the field.	<code>locationAreaCode</code>	number (uint32)	The Location Area Code (LAC) for GSM and WCDMA networks. The Network ID (NID) for CDMA networks. The Tracking Area Code (TAC) for LTE and NR networks.	<i>Required</i> for <code>radioType</code> <code>gsm</code> (default) and <code>cdma</code> , optional for other values. Valid range with <code>gsm</code> , <code>cdma</code> , <code>wcdma</code> and <code>lte</code> : 0–65535. Valid range with <code>nr</code> : 0–16777215.	<code>mobileCountryCode</code>	number (uint32)	The cell tower's Mobile Country Code (MCC).	<i>Required</i> for <code>radioType</code> <code>gsm</code> (default), <code>wcdma</code> , <code>lte</code> and <code>nr</code> ; not used for <code>cdma</code> . Valid range: 0–999.	<code>mobileNetworkCode</code>	number (uint32)	The cell tower's Mobile Network Code. This is the MNC for GSM, WCDMA, LTE and NR. CDMA uses the System ID (SID).	<i>Required</i> . Valid range for MNC: 0–999. Valid range for SID: 0–32767.
Field	JSON type	Description	Notes																							
<code>cellId</code>	number (uint32)	Unique identifier of the cell.	<i>Required</i> for <code>radioType</code> <code>gsm</code> (default), <code>cdma</code> , <code>wcdma</code> and <code>lte</code> ; <i>rejected</i> for <code>nr</code> . See the Calculating cellId section below, which also lists the valid value ranges for each radio type.																							
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15[a]	A system for determining a location of a mobile station, comprising:	To the extent that the claim’s preamble is determined to be a limitation or otherwise limiting, the Accused Instrumentality is a system for determining the location of a mobile station, such as Google and Third Party Devices, comprising the comprising the components in the subsequent limitations.																								

		When you have Google Location Accuracy turned on, your phone uses these sources to get the most accurate location: • GPS • Wi-Fi • Mobile networks • Sensors (such as accelerometer) Google may collect location data periodically and use this data in an anonymous way to improve location accuracy and location-based services. (GEOSCOPE-G-013632 at 13634) The Geolocation API returns a location and accuracy radius based on information about cell towers and WiFi nodes that the mobile client can detect. This document describes the protocol used to send this data to the server and to return a response to the client. (GEOSCOPE-G-013036 at 13036) Apps can take advantage of the signals provided by multiple sensors in the device to determine device location. However, choosing the right combination of signals for a specific task in different conditions is not simple. Finding a solution that is also battery-efficient is even more complicated. The fused location provider is a location API in Google Play services that intelligently combines different signals to provide the location information that your app needs. (GEOSCOPE-G-013728 at 13728) (<i>See also</i> Claim 1[a])
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15[b]	a database of previously-gathered calibration data for a predetermined region in a wireless network;	The Accused Instrumentality includes a database of previously-gathered calibration data for a predetermined region in a wireless network. (See Claim 1[b])
15[c]	circuitry for collecting observed network measurement data;	The Accused Instrumentality includes circuitry for collecting observed network measurement data. For example, Google and Third Party Devices include wireless receivers that collect observed network measurement data. Wireless and Location • US (PR), CA, UK, EU, AU: Wi-Fi 6E (802.11ax) with 2.4GHz+5GHz+6GHz, HE160, MIMO • TW, JP, SG, IN: Wi-Fi 6 (802.11ax) with 2.4GHz+5GHz, HE160, MIMO • Bluetooth® v5.2 with dual antennas for enhanced quality and connection • Ultra-Wideband chip for accurate ranging and spatial orientation¹⁴ • NFC • Google Cast Location • US: • Dual Band GNSS • GPS, GLONASS, Galileo, QZSS (See, e.g., GEOSCOPE-G-013798 at 13801) (See also Claim 1[c])
15[d]	circuitry for modifying said observed network measurement data; and	The Accused Instrumentality includes circuitry for modifying said observed network measurement data. This includes, for example, processors in Google and Third Party Devices and/or processors associated with Google’s servers or other backend infrastructure.

Pixel 7 Pro

Operating system	Android 13
Display	• Full-screen 6.7-inch (170 mm)¹ display • 19.5:9 aspect ratio • QHD+ (1440 x 3120) LTPO OLED at 512 PPI • Smooth Display (up to 120 Hz²) • Always-on display • At a Glance • Now Playing
Dimensions and Weight³	Dimensions • 6.4 height x 3.0 width x 0.3 depth (inches) • 162.9 height x 76.6 width x 8.9 depth (mm) Weight • 212 g • 7.5 oz
Battery	• Beyond 24-hour battery life⁴ • Up to 72-hour battery life with Extreme Battery Saver⁴ • Minimum 4926 mAh • Typical 5000 mAh⁵
Memory and Storage	Memory • 12 GB LPDDR5 RAM Storage • 128 GB / 256 GB / 512 GB UFS 3.1 storage⁹
Processors	• Google Tensor G2 • Titan M2™ security coprocessor

(See, e.g., GEOSCOPE-G-013798 at 13798-99)

(See also Claim 1[d])

15[e]	circuitry for comparing said modified network measurement data with said database of calibration data to thereby determine the location of the mobile station.	The Accused Instrumentality includes circuitry for comparing the modified network measurement data with the database of calibration data to thereby determine the location of the mobile station (<i>e.g.</i>, Google and Third Party Devices). This includes, for example, processors Google and Third Party Devices and/or processors associated with Google's servers or other backend infrastructure.  (<i>See, e.g.</i>, GEOSCOPE-G-013798 at 13799) (<i>See also</i> Claim 1[e])
18	The system of claim 15 wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.	The Accused Instrumentality is a system of claim 15 wherein the database comprises previously-gathered calibration data for one or more non-uniform grid points within said region. (<i>See</i> Claim 4)
19	The system of claim 15 wherein said mobile station includes said circuitry for collecting observed network measurement data.	The Accused Instrumentality is a system of claim 15 wherein the mobile station (<i>e.g.</i>, Google and Third Party Devices) includes the circuitry for collecting observed network measurement data (<i>e.g.</i>, wireless receiver in said device).

		Wireless and Location • US (PR), CA, UK, EU, AU: Wi-Fi 6E (802.11ax) with 2.4GHz+5GHz+6GHz, HE160, MIMO • TW, JP, SG, IN: Wi-Fi 6 (802.11ax) with 2.4GHz+5GHz, HE160, MIMO • Bluetooth® v5.2 with dual antennas for enhanced quality and connection • Ultra-Wideband chip for accurate ranging and spatial orientation¹⁴ • NFC • Google Cast Location • US: • Dual Band GNSS • GPS, GLONASS, Galileo, QZSS (See, e.g., GEOSCOPE-G-013798 at 13801) (See also Claim 5)
24	The system of claim 15 further comprising circuitry for identifying a serving cell of a transmitter transmitting a signal received at a predetermined calibration point within said region.	The Accused Instrumentality is a system of claim 15 further comprising circuitry for identifying a serving cell of a transmitter transmitting a signal received at a predetermined calibration point within the region. For example, Google and Third Party Devices include wireless receivers that collect information identifying a serving cell for a transmitter.

		Wireless and Location • US (PR), CA, UK, EU, AU: Wi-Fi 6E (802.11ax) with 2.4GHz+5GHz+6GHz, HE160, MIMO • TW, JP, SG, IN: Wi-Fi 6 (802.11ax) with 2.4GHz+5GHz, HE160, MIMO • Bluetooth® v5.2 with dual antennas for enhanced quality and connection • Ultra-Wideband chip for accurate ranging and spatial orientation¹⁴ • NFC • Google Cast Location • US: • Dual Band GNSS • GPS, GLONASS, Galileo, QZSS (See, e.g., GEOSCOPE-G-013798 at 13801) (See also Claim 10)
25	The system of claim 15 further comprising circuitry for identifying a serving sector of a transmitter transmitting a signal received at a predetermined calibration point within said region.	The Accused Instrumentality is a system of claim 15 further comprising circuitry for identifying a serving sector of a transmitter transmitting a signal received at a predetermined calibration point within the region. For example, Google and Third Party Devices include wireless receivers that collect information identifying a serving sector for a transmitter.

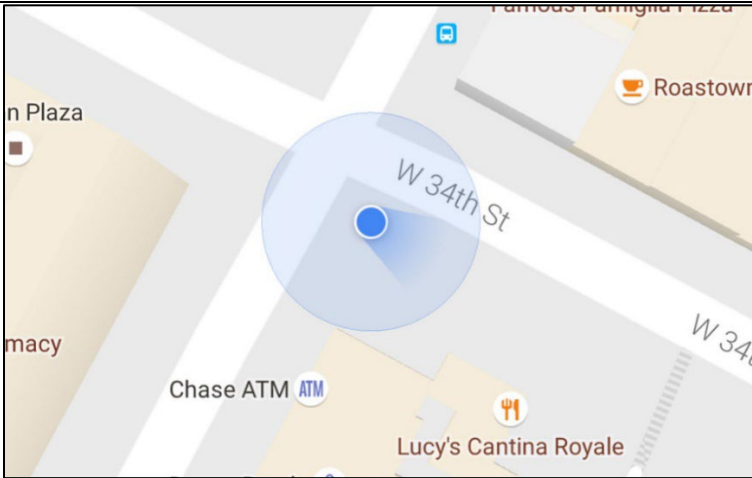
		Wireless and Location • US (PR), CA, UK, EU, AU: Wi-Fi 6E (802.11ax) with 2.4GHz+5GHz+6GHz, HE160, MIMO • TW, JP, SG, IN: Wi-Fi 6 (802.11ax) with 2.4GHz+5GHz, HE160, MIMO • Bluetooth® v5.2 with dual antennas for enhanced quality and connection • Ultra-Wideband chip for accurate ranging and spatial orientation¹⁴ • NFC • Google Cast Location • US: • Dual Band GNSS • GPS, GLONASS, Galileo, QZSS (See, e.g., GEOSCOPE-G-013798 at 13801) (See also Claim 11)
41[a]	A method for determining a location of a mobile station, comprising:	(See identical Claim 1[a])
41[b]	providing a database of previously-gathered calibration data for a predetermined region in a wireless network;	(See identical Claim 1[b])
41[c]	collecting observed network measurement data from each of a plurality of transmitters including a signal characteristic from each one of said plural transmitters;	The Accused Instrumentality collects network measurement data comprising, <i>inter alia</i> , data regarding the strengths of signals from a plurality of Wi-Fi hotspots and cell towers observed by Google and Third Party Devices at the time that a device is making a request for its location. Google and Third Party Devices collect at least one signal characteristic from each of these transmitters including, for example, signal strength. The observed network measurement data collected by Google and Third Party Devices, including as part of a particular location request, may also become

		part of, or processed to generate, calibration data used in connection with future location requests. When you have Google Location Accuracy turned on, your phone uses these sources to get the most accurate location: • GPS • Wi-Fi • Mobile networks • Sensors (such as accelerometer) Google may collect location data periodically and use this data in an anonymous way to improve location accuracy and location-based services. (GEOSCOPE-G-013632 at 13634) Apps can take advantage of the signals provided by multiple sensors in the device to determine device location. However, choosing the right combination of signals for a specific task in different conditions is not simple. Finding a solution that is also battery-efficient is even more complicated. The fused location provider is a location API in Google Play services that intelligently combines different signals to provide the location information that your app needs. (GEOSCOPE-G-013728 at 13728) (<i>See also</i> Claim 1[c])
41[d]	determining an average value for select ones of said signal characteristics;	The Accused Instrumentality determines an average value for select signal characteristics of observed network measurement data. The Accused Instrumentality performs steps to validate and process information from a wide array of sources (<i>e.g.</i>, multitude of different Wi-Fi hotspots and cell towers) in order to provide accurate

		geolocation and an estimate of the accuracy. These steps of validating and processing the observed network measurement data, as well as estimating the accuracy of the geolocation, involve determining an average value of at least one of the signal characteristics of the observed network measurement data, including by calculating a weighted average of one or more signal strength measurements based on, <i>inter alia</i>, other collected or stored location or signal information (<i>e.g.</i>, whether the signal is from a Wi-Fi hotspot or a cell tower) or data collected from sensors on Google and Third Party Devices including, <i>inter alia</i>, the barometer, accelerometer, and magnetometer. When you have Google Location Accuracy turned on, your phone uses these sources to get the most accurate location: • GPS • Wi-Fi • Mobile networks • Sensors (such as accelerometer) Google may collect location data periodically and use this data in an anonymous way to improve location accuracy and location-based services. (GEOSCOPE-G-013647 at 13650) Apps can take advantage of the signals provided by multiple sensors in the device to determine device location. However, choosing the right combination of signals for a specific task in different conditions is not simple. Finding a solution that is also battery-efficient is even more complicated. The fused location provider is a location API in Google Play services that intelligently combines different signals to provide the location information that your app needs. (GEOSCOPE-G-013728 at 13728) (GEOSCOPE-G-013675 at 11:00-27:00)
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41[e]	modifying said observed network measurement data using said average value; and	The Accused Instrumentality modifies the observed network measurement data using the average value of select signal characteristics of the observed network measurement data. To perform geolocation, the Accused Instrumentality collects and utilizes information from numerous different sources including from a multitude of different Wi-Fi hotspots and cell towers that are in distinct locations and diverse environments and conditions (<i>e.g.</i>, indoors versus outdoors, differing numbers and types of obstructions, different weather conditions), and transmit different types of signals. In order to provide accurate geolocation and an estimate of the accuracy, the Accused Instrumentality performs steps to validate and process observed network measurement data from a wide array of sources. These steps of validating and processing the observed network measurement data, as well as estimating the accuracy of the geolocation, involve modifying the data by, for example, using the determined average value as well as other data collected from sensors on Google and Third Party Devices including, <i>inter alia</i>, the barometer, accelerometer, and magnetometer. Furthermore, the Accused Instrumentality calculates an “accuracy radius” and displays this in Google Maps via a blue circle that changes in size depending on the estimated accuracy. This estimation of accuracy necessarily involves modification of the observed network measurement data using a determined average value because it depends on assessing how closely the observed data tracks the normalized and/or averaged network measurement data that is used to determine a device’s location.
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		Apps can take advantage of the signals provided by multiple sensors in the device to determine device location. However, choosing the right combination of signals for a specific task in different conditions is not simple. Finding a solution that is also battery-efficient is even more complicated. The fused location provider is a location API in Google Play services that intelligently combines different signals to provide the location information that your app needs. (GEOSCOPE-G-013728 at 13728) Android application developers, including Google, can use the accelerometer and barometer sensors, along with the gyrometer and magnetometer sensors, to more precisely determine a device's location. Google uses the accelerometer readings to help determining the device's orientation and direction, the gyrometer helps determine if a user is turning, and the barometer can help determine the user's elevation. (GEOSCOPE-G-013637 at 13643) (GEOSCOPE-G-013662 at 25:19-26:10, 30:06-31:05) (GEOSCOPE-G-013675 at 11:00-27:00) The Geolocation API returns a location and accuracy radius based on information about cell towers and WiFi nodes that the mobile client can detect. This document describes the protocol used to send this data to the server and to return a response to the client. (GEOSCOPE-G-013036 at 13036)
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		 (Screenshot from Google Maps depicting “blue circle” that shows estimate of accuracy) (See also Claim 1[d])
41[f]	comparing said modified network measurement data with said database of calibration data by positioning determining equipment to thereby determine the location of the mobile station.	(See identical Claim 1[e])
42	The method of claim 41 wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.	The Accused Instrumentality performs the method of claim 41 wherein the database comprises previously-gathered calibration data for one or more non-uniform grid points within the region. (See Claim 4)

43	The method of claim 41 wherein said observed network measurement data includes data collected at the mobile station.	The Accused Instrumentality performs the method of claim 41 wherein the observed network measurement data includes data collected at the mobile station (<i>e.g.</i>, Google and Third Party Devices). (<i>See</i> Claim 5)
46	The method of claim 41 wherein said signal characteristic is signal strength.	The Accused Instrumentality performs the method of claim 41 wherein the signal characteristic is signal strength. To provide this functionality, Google collects MAC addresses, signal strength information, and radio channel information from these access points. Google also collects the name (also referred to as a “service set identifier” or “SSID”) associated with these networks, in order to identify and remove access points that network administrators have chosen to opt out of this collection through instructions provided by Google. SSIDs are discarded after being processed for this purpose. (GEOSCOPE-G-013637 at 13642) (<i>See also</i> Claim 41[c])
49	The method of claim 41, wherein the observed network measurement data includes received signal strength of said transmitters as said mobile station.	The Accused Instrumentality performs the method of claim 41 wherein the observed network measurement data includes the received signal strength of the transmitters at the mobile station (<i>e.g.</i>, Google and Third Party Devices). To provide this functionality, Google collects MAC addresses, signal strength information, and radio channel information from these access points. Google also collects the name (also referred to as a “service set identifier” or “SSID”) associated with these networks, in order to identify and remove access points that network administrators have chosen to opt out of this collection through instructions provided by Google. SSIDs are discarded after being processed for this purpose. (GEOSCOPE-G-013637 at 13642)

		(See also Claim 41[c])
52	The method of claim 41 wherein at least one of said plurality of transmitters is not a member of said wireless network.	The Accused Instrumentality performs the method of claim 41 wherein at least one of the plurality of transmitters is not a member of the wireless network. For example, the Accused Instrumentality collects network measurement data from a plurality of Wi-Fi hotspots and cell towers (<i>i.e.</i>, transmitters) in a region. Such Wi-Fi hotspots are not members of the same wireless network as the cell towers. How Maps finds your current location Maps estimates where you are from sources like: • GPS: Maps uses satellites to know your location up to around 20 meters. When you're inside buildings or underground, the GPS is sometimes inaccurate. • Wi-Fi: The location of nearby Wi-Fi networks helps Maps know where you are. • Cell tower: Your connection to mobile data can be accurate up to a few thousand meters. (GEOSCOPE-G-013784 at 13784) Information about the location of WiFi networks improves the accuracy of the location-based services, such as Google Maps or driving directions, that Google provides to consumers. For example, a user of Google Maps for mobile phones can turn on a smart phone's "My Location" feature to identify his or her approximate location based on GPS signals (where available) and signals from the cell towers and WiFi networks visible to the device. Because GPS and cell tower location data can be unreliable or inaccurate, in some cases using the location of WiFi access points can enable a smart phone to pinpoint its own location more quickly and accurately. (GEOSCOPE-G-013790 at 13790)