UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION

TRAXCELL TECHNOLOGIES, LLC., **Plaintiff,**	)	
	)	**Civil Action No. 6:21-cv-01312-ADA**
v.	)	
GOOGLE LLC **Defendant.**	)	**Jury Trial Demanded**

PLAINTIFF'S AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Traxcell Technologies, LLC. ("Traxcell") files this Amended Complaint, and demand for jury trial seeking relief from patent infringement by Google LLC ("Defendant" or "Google"), alleging infringement of the claims of U.S. Pat. No. 10,820,147 (referred to as "Patent-in-Suit"), as follows:

I. THE PARTIES

1. Plaintiff Traxcell is a Texas Limited Liability Company, with its principal place of business located at 103 Country Club Drive. #508, Marshall, Texas 75672.

2. Defendant Google LLC is a Delaware corporation with a principal place of business located at 1600 Amphitheater Parkway, Mountain View, California 94043. Google designs, manufactures, uses, imports into the United States, sells, and/or offers for sale in the United States smartphones, tablets, iPods, desktop computers, and notebook computers that use Google Maps. Googlemarkets, sells, and offers to sell its products and/or services, including those accused herein of infringement, to actual and potential customers and end-users located in Texas and in the judicialWestern District of Texas such as at the Google maintains a permanent physical presence within the Western District of Texas, conducting business from at least its locations at: 9606 North Mo- Pac Expressway, Suite 700, Austin, Texas 78759; 500 West 2nd Street, Suite 2000, Austin, Texas

78701; 4100 Smith School Road, Austin, Texas 78744; as well as other locations in and around the Austin area.

3. Google is registered to do business in Texas and can be served via its registered agent, Corporation Service Company dba CSC – Lawyers Incorporating Service Company at 211 East 7th Street, Suite 620, Austin, Texas 78701-3218.

4. Google has placed or contributed to placing infringing products like the Google Maps for use on a computing device connected to a wireless network into the stream of commerce via an established distribution channel knowing or understanding that such products would be sold and used in the United States, including in the Western District of Texas. On information and belief, Google also has derived substantial revenues from infringing acts, including but not limited to advertising, business APIs, private usage, OEM usage, and/or the like.

II. JURISDICTION AND VENUE

5. This is an action for patent infringement arising under the patent laws of the U.S., 35 U.S.C. §§ 1 et. seq. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331, 1332(a) and 1338(a).

6. This Court has personal jurisdiction over Defendants because: Defendants are present within or has minimum contacts within the State of Texas and this judicial district; Defendants have purposefully availed itself of the privileges of conducting business in the State of Texas and in this judicial district; Defendants regularly conducts business within the State of Texas and within this judicial district; and Plaintiff's cause of action arises directly from Defendants' business contacts and other activities in the State of Texas and in this judicial district. The amount in controversy is more than $75,000.00.

7. Venue is proper in this judicial district per 28 U.S.C. §§ 1391 and 1400(b). Google has committed acts of infringement in this judicial district and maintains regular and established places of business in this district, as set forth above. Google has continuous and systematic business contacts with the State of Texas. Google, directly or through subsidiaries or intermediaries (including distributors, retailers, contract manufacturers, and others), conducts its business extensively throughout Texas, by shipping, manufacturing, distributing, offering for sale, selling, and advertising (including the provision of interactive web pages) its products and services in the State of Texas and the Western District of Texas. Google, directly or through subsidiaries or intermediaries (including distributors, retailers, contract manufacturers, and others), has purposefully and voluntarily placed its infringing products and services into this District and into the stream of commerce with the intention and expectation that they will be purchased and used by consumers in this District.

III. INFRINGEMENT ('147 Patent (Attached and incorporated by reference))

8. On October 27, 2020, U.S. Patent No. 10,820,147 ("the '147 patent") entitled "Mobile wireless device providing off-line and on-line geographic navigation information" (attached as Exhibit C) was duly and legally issued by the U.S. Patent and Trademark Office. Traxcell owns the '147 patent by assignment.

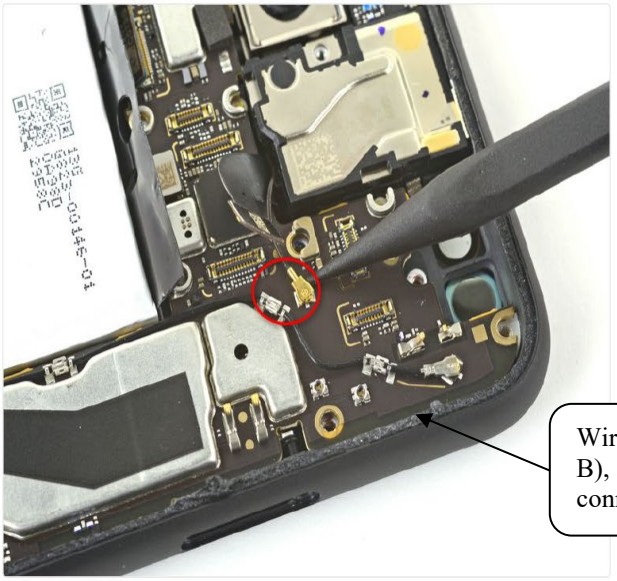
9. The '147 Patent's Abstract states, "A mobile device, wireless network and their method of operation provide both on-line (connected) navigation operation, as well as off-line navigation from a local database within the mobile device. Routing according to the navigation system can be controlled by traffic congestion measurements made by the wireless network that allow the navigation system to select the optimum route based on expected trip duration."

10. The following preliminary exemplary chart provides Traxcell's allegations of infringement.

Claim 1	Corresponding Structure in Accused Systems
1. A wireless communications system including:	The Google Maps online navigation service and the Google Maps server-side or cloud infrastructure needed to provide the service, constitute the "Accused System". Each combination having at least one item listed on Exhibit A, at least one item listed on Exhibit B, and at least one item listed on Exhibit C is a wireless communications system. Because infringement liability is not dependent on ownership, e.g., use of a system can infringe (35 U.S.C. § 271), infringement is not dependent on ownership of all limitations of a claim.
a first radio-frequency transceiver within a wireless mobile communications device and an associated first antenna to which the first radio-frequency transceiver is coupled, wherein the first radio-frequency transceiver is configured for radio-frequency communication with a wireless communications network;	Plaintiff contends each item listed on Exhibit B corresponds to this claim limitation because each Exhibit-B item is a device that provides communicative access to a wireless network by transceivers designed and used for radio-frequency communication and at least one antenna. When a wireless communication device transceivers and antennas are in communication, they are coupled. Further, in addition to being so coupled, the transceiver of each Exhibit-B item is also configured for RF-communication wireless communication networks, such as AT&T, Verizon, T-Mobile, and other US networks (Cellular or WLAN) via Google Maps which comes preloaded on Exhibit-B items. Plaintiff contends each item listed on Exhibit B corresponds to this claim limitation because each Exhibit-B item includes a radio frequency transceiver. Wireless mobile communication device — including but not limited to Google's branded devices such as Google Pixel 5, pixel 4a 5G, pixel 4a, pixel 4 XL, pixel 4, pixel 3a XL, pixel 3a, pixel 3 XL, pixel 3, pixel 2, pixel 2 XL, pixel XL, pixel, pixel C or other (third-parties) branded devices such as Samsung Galaxy S20 Ultra, Galaxy S20 plus, Galaxy S20, Galaxy Z fold, Galaxy S10, Galaxy A series, etc. (refer Exhibit B for complete list) — include radio-frequency transceivers and an associated antenna. When wireless communication device transceivers and antennas are in communication, they are coupled. Further, in addition to being so coupled, the transceiver of each Exhibit-B item is also configured for RF-communication with the wireless communication network. The following exemplifies this limitation's existence in Accused Systems:

Claim 1	Corresponding Structure in Accused Systems

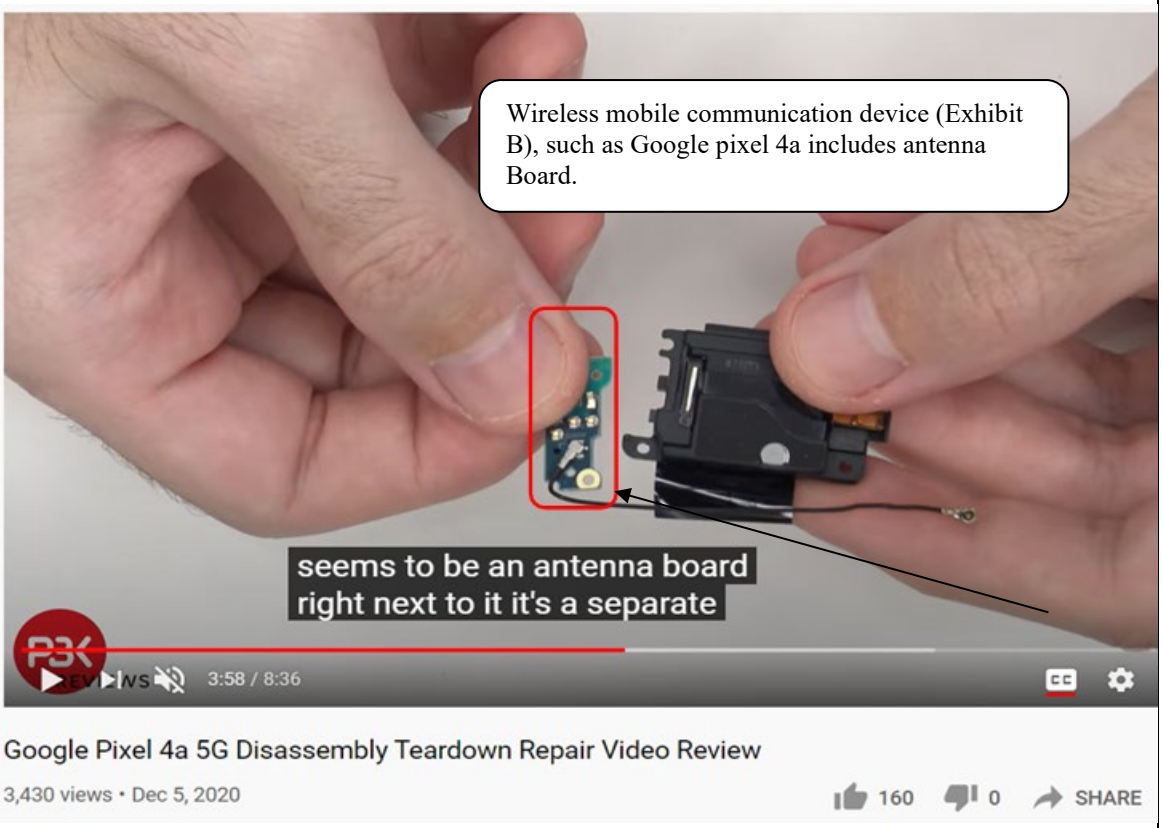
Step 37 Disconnect the antennas



- Use the pointed end of a spudger and pry up gently to unclip the top antenna connector from the motherboard.
- Disconnect the bottom antenna connector.

Wireless mobile communication device (Exhibit B), such as Google pixel 4a includes antenna connector.

Attachment 1 (Google Pixel 4XL showing antenna connector) at 21.

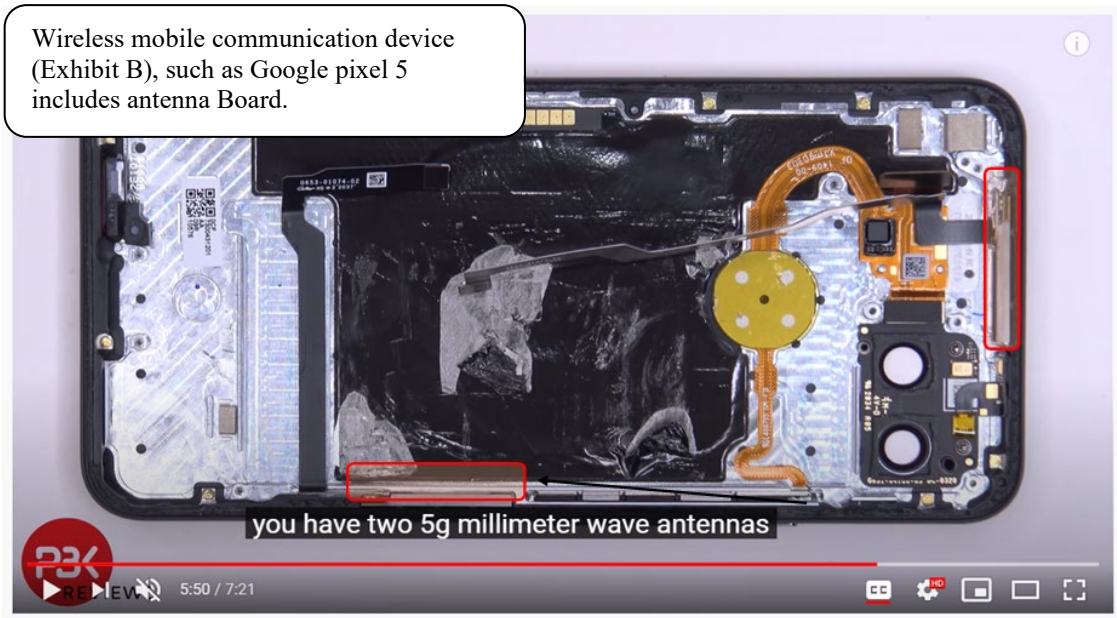


Source: Antenna of Google pixel 4a Teardown by PBKreviews (Time 3:58/8:36)

Link: https://www.youtube.com/watch?v=pTPup76PxNo

Claim 1	Corresponding Structure in Accused Systems

Wireless mobile communication device (Exhibit B), such as Google pixel 5 includes antenna Board.

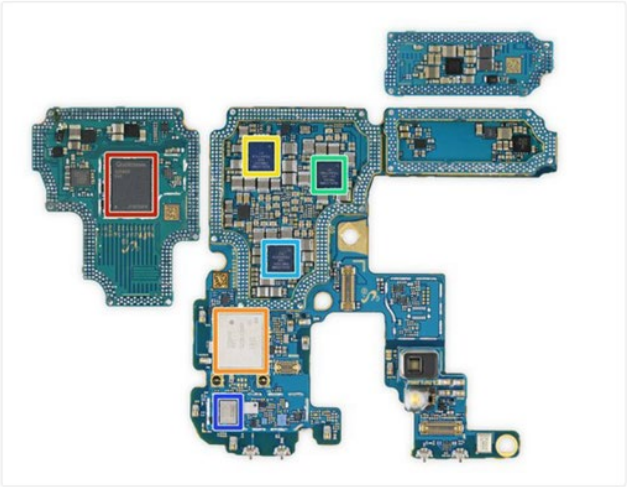


Google Pixel 5 5G Disassembly Teardown Repair Video Review. Screen Gap?

Source: Antenna of Google pixel 5 Teardown by PBKreviews (Time-5:50/7:21)

Link: https://www.youtube.com/watch?v=PPvlSHyok68

Step 9



- But wait! Flippin' the boards over reveals even more flippin' chips:
  - Qualcomm SDR865 RF Tranceiver
  - Murata KM9D19075 Wi-Fi & Bluetooth Module
  - Qualcomm PM8250 power management IC
  - Qualcomm PMX55 power management IC
  - Qualcomm PM8150C power management IC
  - Qualcomm QDM4870 front-end module

Wireless mobile communication device (Exhibit B) such as Samsung Galaxy S20 includes RF transceiver.

Attachment 2 (Teardown of Samsung Galaxy S20 showing RF Transceiver component) at 8.

Claim 1	Corresponding Structure in Accused Systems

Step 5

TOOL USED ON THIS STEP:
Manta Driver Kit - 112 Bit Driver Kit
$64.99

- We continue to raid the toolbag for bigger and beefier tools—like this Manta kit driver, which works equally well for swatting away screws and smashing walnuts. Just don't mix them up.

  ⓘ These screws are all named Phillip. We like Phillip; it's a solid name for a screw.

- With the top layer of antennas, speaker, and charge coils flipped aside, we get a clear look at the internals. It does look a *lot* like a Note10+ 5G in there, if you eliminated the stylus and used that space for more battery.

Stay tuned for our teardown wallpaper post! We'll have your Ultra wallpapers, as well as your Plus and your standard S20.

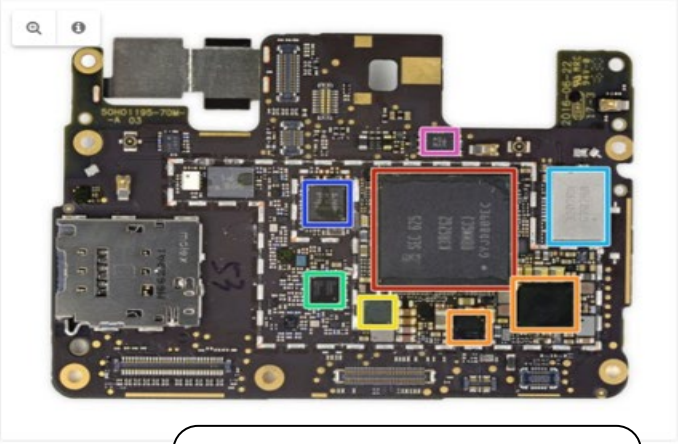
- We waste no time extracting the main board, which comes so laden with cameras, millimeter-wave hardware, and extra board layers that it feels like only half a victory. Time to start chucking things over-board.

Attachment 2 (ifixit Teardown of Samsung Galaxy S20 showing antenna) at 05.

Wireless mobile communication device (Exhibit B), such as Samsung Galaxy S20 includes antenna cables.

Claim 1	Corresponding Structure in Accused Systems

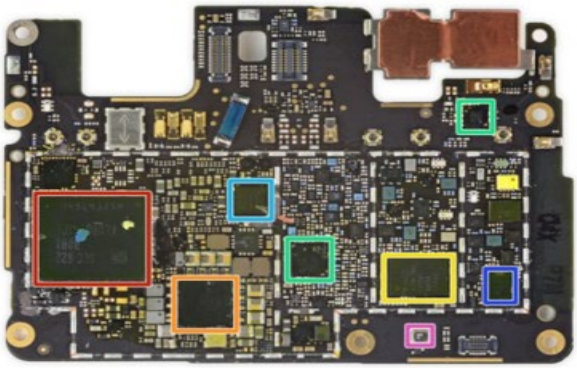
Step 10



- Chips on the front of the motherboard:
  - Samsung K3RG2G20BM-MGCJ 4 GB LPDDR4 mobile DRAM with a quad-core Qualcomm Snapdragon 821 processor layered underneath (two cores clocked at 2.15 GHz and two cores clocked at 1.6 Ghz)
  - Qualcomm PMI8996 power management IC, and Qualcomm SMB1350 Quick Charge 3.0 IC
  - NXP TFA9891 smart audio amplifier
  - Qualcomm WTR4905 LTE RF transceiver
  - 3207RA G707A (looks like Wi-Fi)
  - NXP 55102 1807 S0622 (likely NFC controller)
  - Bosch Sensortec BMI160 low power IMU

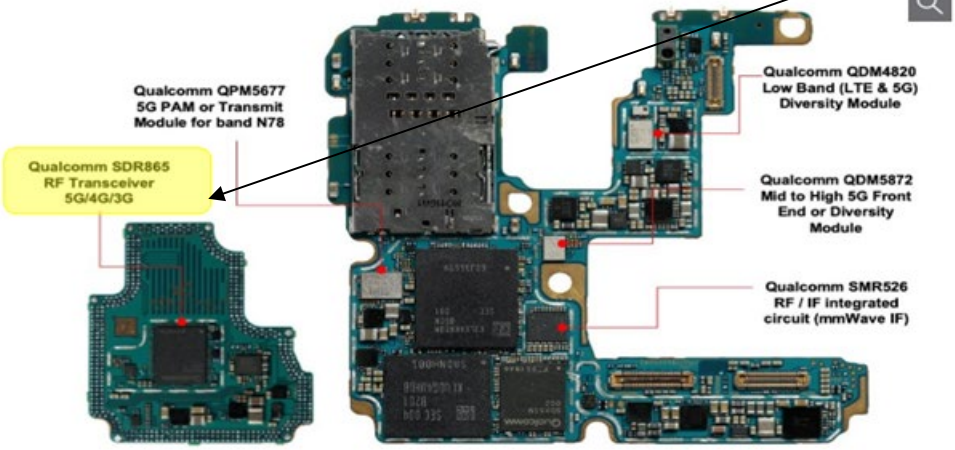
Wireless mobile communication device (Exhibit B) such as Google Pixel includes RF transceiver.

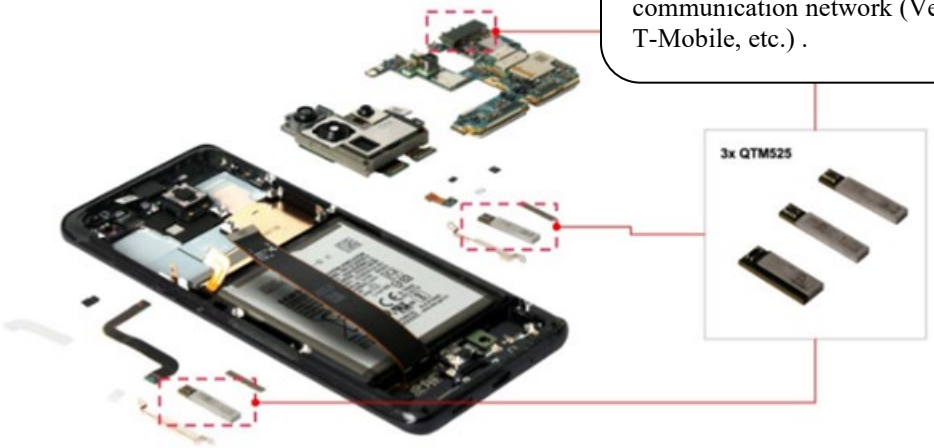
Step 11



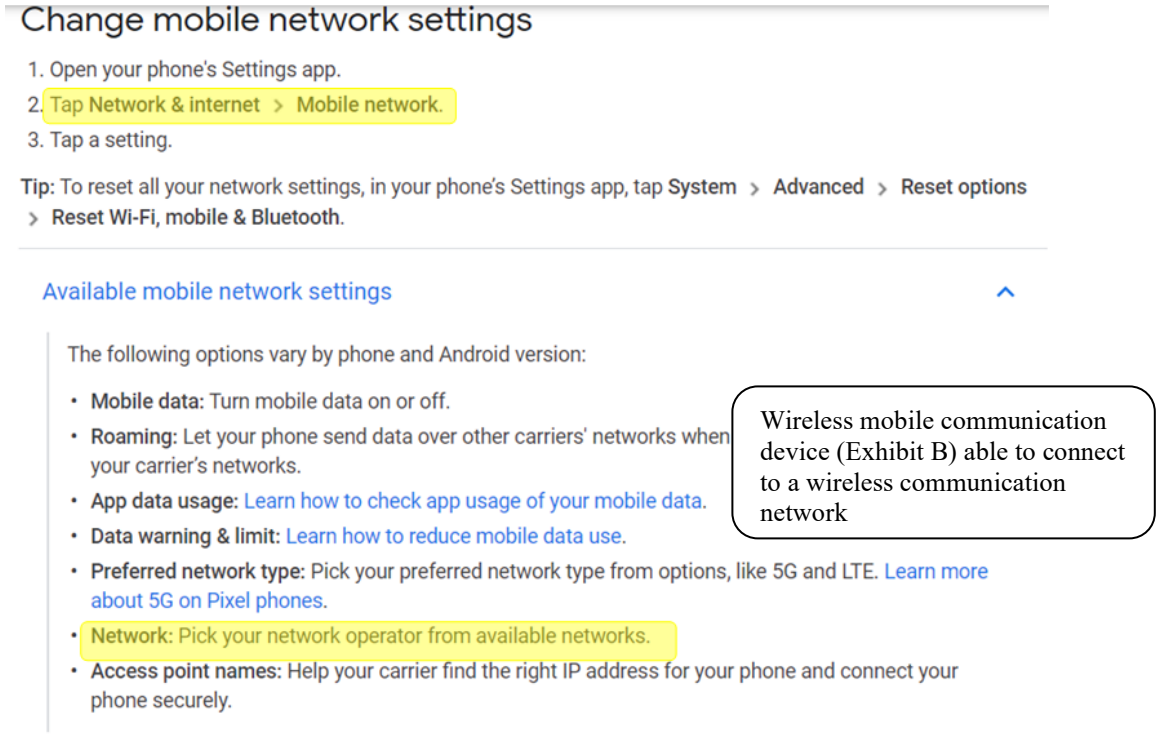
- And on the back:
  - Samsung KLUBG4G1CE-B0B1 32 GB Universal Flash Storage (UFS) 2.0
  - Qualcomm PM8996 Power Management IC
  - Avago ACPM-7800 power amplifier
  - Qualcomm WTR3925 LTE RF transceiver, and Qualcomm RF360 Dynamic Antenna Matching Tuner (QFE2550)
  - Qualcomm WCD9335 audio codec
  - Skyworks SKY77807 Quad-Band Power Amplifier Module (PAM)
  - Bosch Sensortec BMP280-series barometric pressure sensor

Attachment 13 (Google Pixel showing RF Transceiver component) at 9&10.

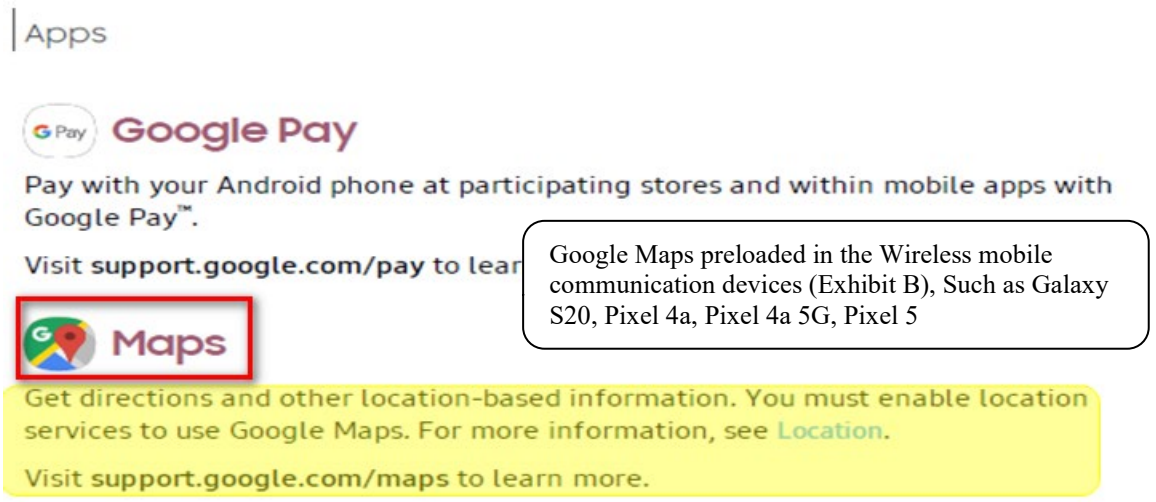
Claim 1	Corresponding Structure in Accused Systems
	While the 1st Gen 5G smartphone supported only single or dual band 5G, the 2nd Gen designs like the Samsung Galaxy S20 now support much more. The Galaxy S20 Ultra under review here is model number SM-G988U1 for the North American market which supports low band FDD 5G like n5 (850MHz) and n71 (600MHz) as well as mid-to-high bands like n2, n41 and n66. For 5G global roaming, the Galaxy S20 Ultra also included the common Ultra-High Frequency (UHF) 5G band n78. Further, the Galaxy S20 Ultra has millimeter wave (mmWave) antenna modules in addition to the Sub-6GHz RFFE. The new Qualcomm QTM0525 antenna modules in the Galaxy S20 Ultra support an additional four ultra-wide 5G bands (n258, n257, n260 and n261). So how do all these RF capabilities come together inside the Galaxy S20? Let's dive in for a closer 5g-modem-to-rf-integration-rf Wireless mobile communication device (Exhibit B) such as Samsung Galaxy S20 Ultra includes RF transceiver.  **Attachment 3 (RF-Transceiver and antenna of Galaxy S20 device coupled with communication network) at 7.**

Claim 1	Corresponding Structure in Accused Systems
	The first 5G devices in the US were based on mmWave technology. The 1st generation 5G devices were either using Qualcomm's mmWave antenna module design for mmWave networks (Verizon, AT&T, T-Mobile) or a more conventional RFFE design for sub-6 GHz 5G networks (Sprint). However, that represented a design compromise since each variant would be shut out from other 5G network. With the 2nd Gen 5G designs like the Galaxy S20 Ultra, OEMs are adding mmWave capabilities along with Sub-6 GHz 5G RFFE on the same device. This dual RFFE design allows flagship devices to be network agnostic, opening up many more 5G network and also benefits Samsung by reducing 5G SKUs. 5g-modem-to-rf-integration-mmwave Wireless mobile communication device (Exhibit B) such as Samsung Galaxy S20 Ultra includes RF transceiver antenna (mmwave) designed to connect wireless communication network (Verizon, AT&T, T-Mobile, etc.) .  **Attachment 3 (RF-Transceiver and antenna of Galaxy S20 device coupled with communication network) at 10.**

Claim 1	Corresponding Structure in Accused Systems

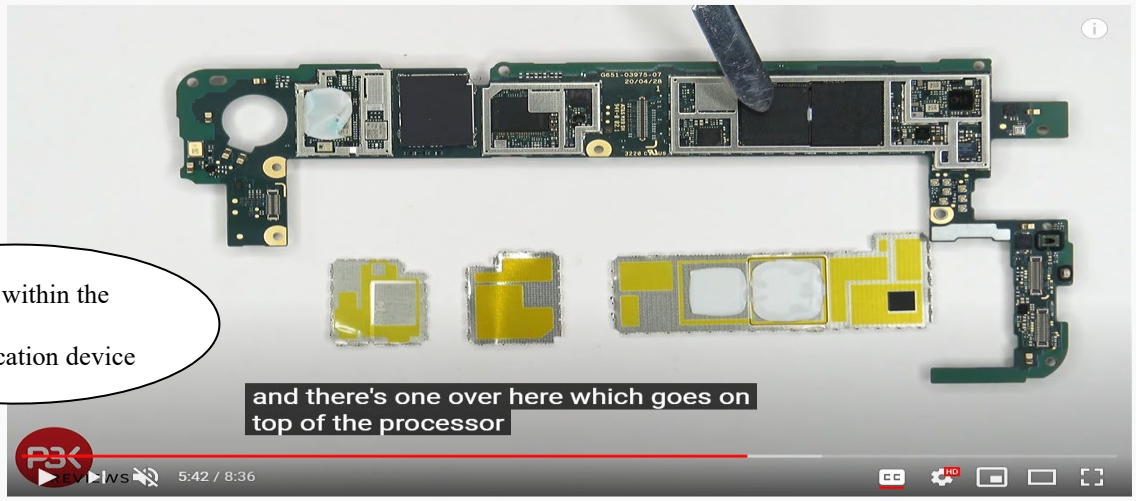
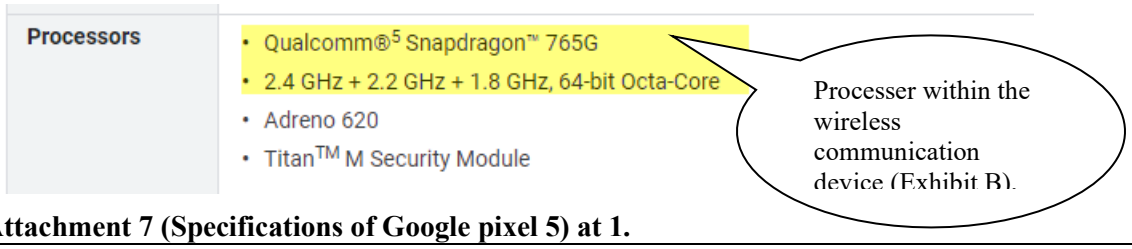


Attachment 14 (Method to connect a wireless communication network via Google pixel 4a device) at 1.

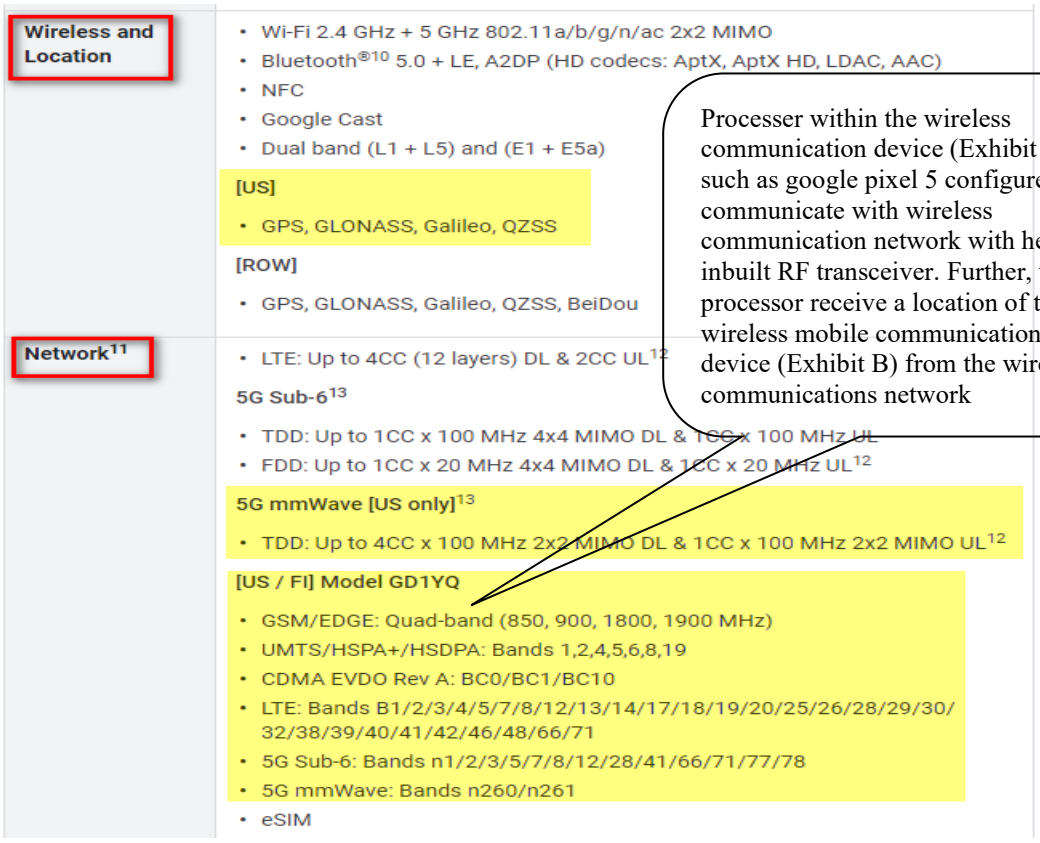


Attachment 15 (Google Maps application preloaded on Samsung Galaxy S20) at 113.

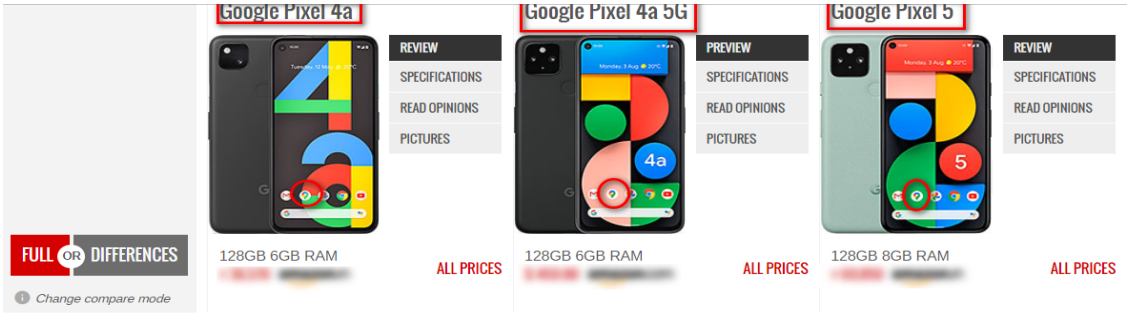
Claim 1	Corresponding Structure in Accused Systems
Wireless mobile communication device (Exhibit B) able to connect to a wireless communication network	 **Attachment 4 (Google Maps application preloaded on Pixel 4a, Pixel 4a 5G, and Pixel 5) at 1.** Network[8] • LTE: Up to 4CC (12 layers) DL & 2CC UL[9] 5G Sub-6[10] • TDD: Up to 1CC x 100 MHz 4x4 MIMO DL & 1CC x 100 MHz UL • FDD: Up to 1CC x 20 MHz 4x4 MIMO DL & 1CC x 20 MHz UL[9] 5G mmWave [US only][10, 11] • TDD: Up to 4CC x 100 MHz 2x2 MIMO DL & 1CC x 100 MHz 2x2 M [US / FI / CA / TW] Model G025E • GSM/EDGE: Quad-band (850, 900, 1800, 1900 MHz) • UMTS/HSPA+/HSDPA: Bands 1/2/4/5/8 • CDMA EVDO Rev A: BC0/BC1/BC10 • LTE: Bands B1/2/3/4/5/7/8/12/13/14/17/18/19/20/25/26/28/29/30/32/38/39/40/41/42/46/48/66/71 • 5G Sub-6: Bands n1/2/5/12/25/28/41/66/71/78 • eSIM [Verizon] Model G6QU3 • GSM/EDGE: Quad-band (850, 900, 1800, 1900 MHz) • UMTS/HSPA+/HSDPA: Bands 1/2/4/5/8 • CDMA EVDO Rev A: BC0/BC1/BC10 • LTE: Bands B1/2/3/4/5/7/8/12/13/14/17/18/19/20/25/26/28/29/30/32/38/39/40/41/42/46/48/66/71 • 5G Sub-6: Bands n2/5/12/25/66/71 • 5G mmWave: Bands n260/261 • eSIM **Attachment 7 (Pixel phone hardware tech specs) at 6.**

Claim 1	Corresponding Structure in Accused Systems
a first processor within the wireless mobile communications device coupled to the at least one first radio-frequency transceiver	Plaintiff contends each item listed on Exhibit B corresponds to this claim limitation because each Exhibit-B item includes a processor. Wireless mobile communication device- including but not limited to Google's branded devices such as Google Pixel 5, pixel 4a 5G, pixel 4a, pixel 4 XL, pixel 4, pixel 3a XL, pixel 3a, pixel 3 XL, pixel 3, pixel 2, pixel 2 XL, pixel XL, pixel, pixel C or other (third-parties) branded devices such as Samsung Galaxy S20 Ultra, Galaxy S20 plus, Galaxy S20, Galaxy Z fold, Galaxy S10, Galaxy A series, etc. (refer Exhibit B for complete list) has a processor, for example, Quad-Core/ Octa-core processor. Each Exhibit-B-listed mobile wireless communications device's motherboard processor is programmed to process location-service information; i.e., to receive a location of the device from the wireless communications network (which is communicated to the device from the first RF transceiver) and generate an indication of the device's location with respect to geographic features according to mapping information stored within the device. For example, the motherboard processor may use Google Maps to view and find places around the globe. The processor and base station transceivers communicate by RF communication and, thus, when doing so are communicatively coupled. The following exemplifies the existence of this limitation in Accused Systems:  Google Pixel 4a 5G Disassembly Teardown Repair Video Review **Source**: Processor of Google pixel 4a Teardown by PBKreviews (Time-5:42/8:36) **Link**: https://www.youtube.com/watch?v=pTPup76PxNo&ab_channel=PBKreviews  **Attachment 7 (Specifications of Google pixel 5) at 1.**

Claim 1	Corresponding Structure in Accused Systems



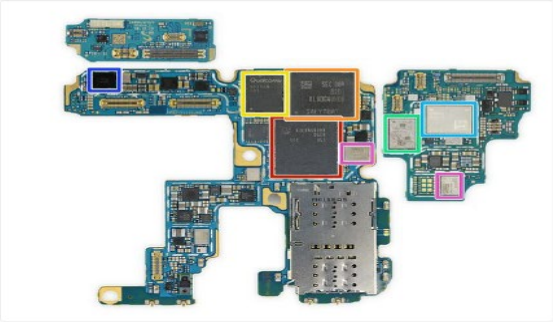
Attachment 7 (Specifications of Google pixel 5) at 2.

Claim 1	Corresponding Structure in Accused Systems
Processer within the wireless communication device (Exhibit B), such as Google Pixel 4a, Pixel 4a 5G and Pixel 5	 **Attachment 4 (Processor of Google Pixel 4a, Pixel 4a 5G and Pixel 5) at 1.**

NETWORK	Technology	GSM / HSPA / LTE	GSM / HSPA / LTE / 5G	GSM / CDMA / HSPA / EVDO / LTE / 5G
LAUNCH	Announced	2020, August 03	2020, September 30	2020, September 30
	Status	Available. Released 2020, August 20	Available. Released 2020, November 05	Available. Released 2020, October 15
BODY	Dimensions	144 x 69.4 x 8.2 mm (5.67 x 2.73 x 0.32 in)	153.9 x 74 x 8.2 mm (Sub-6) or 8.5 mm (Sub-6 and mmWave)	144.7 x 70.4 x 8 mm (5.70 x 2.77 x 0.31 in)
	Weight	143 g (5.04 oz)	168 g (5G Sub-6); 171 g (5G Sub-6 and mmWave) (5.93 oz)	151 g (5.33 oz)
	Build	Glass front (Gorilla Glass 3), plastic back, plastic frame	Glass front (Gorilla Glass 3), plastic back, plastic frame	Glass front (Gorilla Glass 6), aluminum back, aluminum frame
	SIM	Nano-SIM and/or eSIM	Nano-SIM and/or eSIM	Nano-SIM and/or eSIM
				IP68 dust/water resistant (up to 1.5m for 30 mins)
DISPLAY	Type	OLED, HDR	OLED, HDR	OLED, 90Hz, HDR10+
	Size	5.81 inches, 83.2 cm^2 (~83.3% screen-to-body ratio)	6.2 inches, 95.7 cm^2 (~84.1% screen-to-body ratio)	6.0 inches, 87.6 cm^2 (~85.9% screen-to-body ratio)
	Resolution	1080 x 2340 pixels, 19.5:9 ratio (~443 ppi density)	1080 x 2340 pixels, 19.5:9 ratio (~413 ppi density)	1080 x 2340 pixels, 19.5:9 ratio (~432 ppi density)
	Protection	Corning Gorilla Glass 3	Corning Gorilla Glass 3	Corning Gorilla Glass 6
		Always-on display	Always-on display	Always-on display
PLATFORM	OS	Android 10, upgradable to Android 11	Android 11	Android 11
	Chipset	Qualcomm SDM730 Snapdragon 730G (8 nm)	Qualcomm SM7250 Snapdragon 765G (7 nm)	Qualcomm SM7250 Snapdragon 765G (7 nm)
	CPU	Octa-core (2x2.2 GHz Kryo 470 Gold & 6x1.8 GHz Kryo 470 Silver)	Octa-core (1x2.4 GHz Kryo 475 Prime & 1x2.2 GHz Kryo 475 Gold & 6x1.8 GHz Kryo 475 Silver)	Octa-core (1x2.4 GHz Kryo 475 Prime & 1x2.2 GHz Kryo 475 Gold & 6x1.8 GHz Kryo 475 Silver)
	GPU	Adreno 618	Adreno 620	Adreno 620

Claim 1	Corresponding Structure in Accused Systems

Step 8

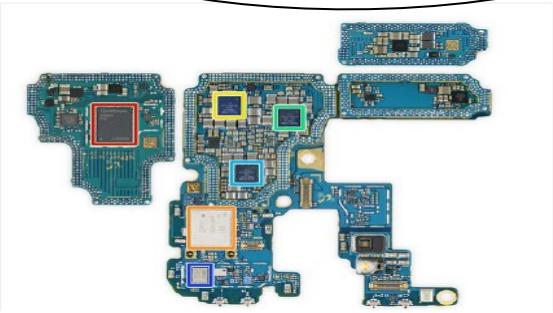


- With all shields down, we can get a better look at the silicon hiding beneath:
  - Samsung K3LK4K40BM-BGCN 12 GB LPDDR5 RAM layered over Qualcomm 865 SoC
  - Samsung KLUDG4UHDB-B2D1 128 GB UFS 3.0 flash storage
  - Qualcomm SDX55M 2nd-gen 5G modem
  - Skyworks SKY58210-11 RF Front-End Module
  - Qorvo QM78092 Front-End Module
  - Maxim MAX77705C power management IC
  - Qualcomm QPM5677 and QPM6585 5G power amplification modules

Add a comment

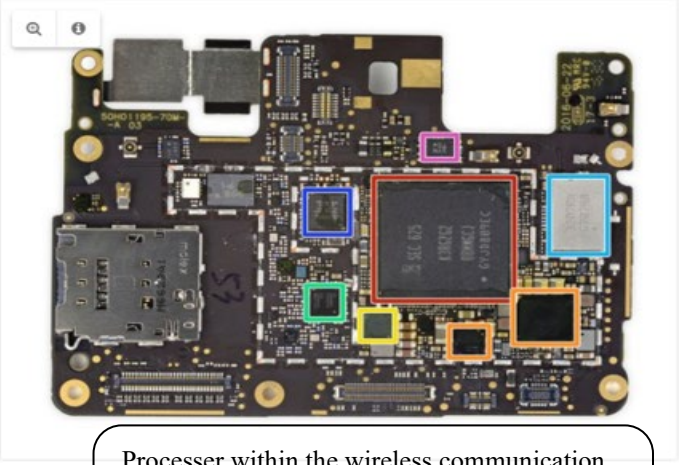
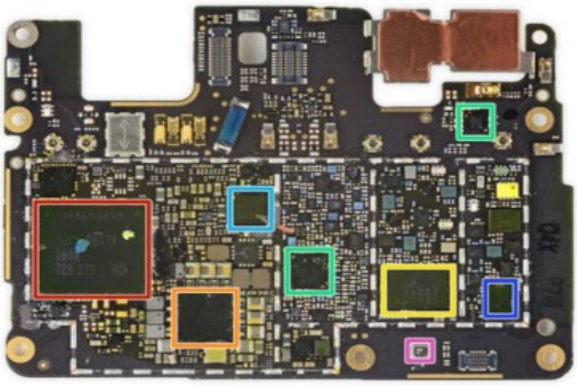
Processer within the wireless communication device (Exhibit B), such as Samsung Galxy S20 coupled with RF transceiver and Wi-Fi Module

Step 9



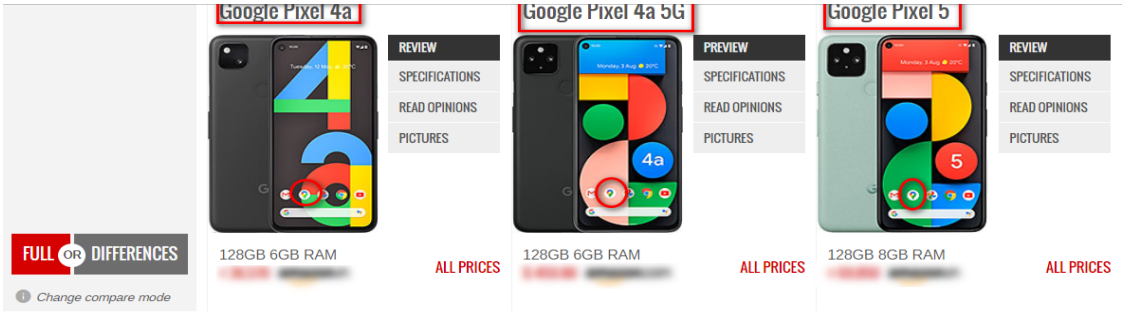
- But wait! Flippin' the boards over reveals even more flippin' chips:
  - Qualcomm SDR865 RF Tranceiver
  - Murata KM9D19075 Wi-Fi & Bluetooth Module
  - Qualcomm PM8250 power management IC
  - Qualcomm PMX55 power management IC
  - Qualcomm PM8150C power management IC
  - Qualcomm QDM4870 front-end module

Attachment 2 (Teardown of Samsung Galaxy S20 showing RF Transceiver component) at 8.

Claim 1	Corresponding Structure in Accused Systems
	Step 10  • Chips on the front of the motherboard: • Samsung K3RG2G20BM-MGCJ 4 GB LPDDR4 mobile DRAM with a quad-core Qualcomm Snapdragon 821 processor layered underneath (two cores clocked at 2.15 GHz and two cores clocked at 1.6 Ghz) • Qualcomm PMI8996 power management IC, and Qualcomm SMB1350 Quick Charge 3.0 IC • NXP TFA9891 smart audio amplifier • Qualcomm WTR4905 LTE RF transceiver • 3207RA G707A (looks like Wi-Fi) • NXP 55102 1807 S0622 (likely NFC controller) • Bosch Sensortec BMI160 low power IMU Processer within the wireless communication device (Exhibit B), such as Google pixel coupled with RF transceiver and Wi-Fi Module Step 11  • And on the back: • Samsung KLUBG4G1CE-B0B1 32 GB Universal Flash Storage (UFS) 2.0 • Qualcomm PM8996 Power Management IC • Avago ACPM-7800 power amplifier • Qualcomm WTR3925 LTE RF transceiver, and Qualcomm RF360 Dynamic Antenna Matching Tuner (QFE2550) • Qualcomm WCD9335 audio codec • Skyworks SKY77807 Quad-Band Power Amplifier Module (PAM) • Bosch Sensortec BMP280-series barometric pressure sensor **Attachment 13 (Google Pixel showing RF Transceiver component) at 9&10.**
programmed to receive information indicative of a location of the wireless mobile communications device and generate an indication of a location of the wireless mobile communications device with respect to geographic	Plaintiff contends the Exhibit-B-listed mobile-wireless-communications device's motherboard processor is programmed to process location-service information; i.e., to receive a location of the device from the wireless communications network and generate an indication of the device's location. For example, the motherboard processor may use Google Maps to obtain the device's location and provide direction from that location to a destination. Wireless mobile communication device-including but not limited to Google's branded devices such as Google Pixel 5, pixel 4a 5G, pixel 4a, pixel 4 XL, pixel 4, pixel 3a XL, pixel 3a, pixel 3 XL, pixel 3, pixel 2, pixel 2 XL, pixel XL, pixel, pixel C or other (third-parties) branded devices such as Samsung Galaxy S20 Ultra, Galaxy S20 plus, Galaxy S20, Galaxy Z fold, Galaxy S10, Galaxy A series, etc. (refer Exhibit B for complete list) has a processor for example, Quad-Core processor. When wireless communication device transceivers and processor are in communication, they are coupled. Further, the Location-based Service (LBS) provider, such as Google Map, on the Exhibit-B utilizes the processor coupled to the transceiver to estimates/receive the location on mobile wireless communications devices (specifically one or more of the mobile wireless communications devices identified on

Claim 1	Corresponding Structure in Accused Systems
features	Exhibit B) by utilizing wireless communication network or first computer. For example, the motherboard processor may use Google Maps to view and find places around the globe. Google map can also show your current location and provide direction (including with respect to geographic features such as nearby restaurants) from your location/source to any destination. In using Google Maps App, the mobile wireless communication device's motherboard processor generates signals for displaying on the device's screen a blue dot that shows the current location of the wireless mobile communication device. The Google map app estimates the location of the device from 3 sources: GPS (GPS uses satellites and knows your location within a few meters), Wi-Fi (the location of nearby Wi-Fi networks helps Maps know where you are), and cell towers (cell tower can be accurate up to a few thousand meters). When Google Maps isn't sure about your location, a light blue circle around the blue dot is shown. You might be anywhere within the light blue circle. The smaller the circle, the more certain the app is about your location. Furthermore, Google Maps App provides flexibility to download maps on SD card/internal memory of communication device (Exhibit B) examples of compatible devices is Samsung Galaxy S20, Pixel 4a, Pixel 4a 5G, Pixel 5, etc., and navigate offline. When internet is slow or mobile data is expensive, or communication device cannot connect to internet, an area can be saved to phone or tablet (Exhibit B) from Google maps app and use it when offline. Communication device can use Offline maps for Navigation through the downloaded area without internet. The following exemplifies the existence of this limitation in Accused Systems:

Claim 1	Corresponding Structure in Accused Systems

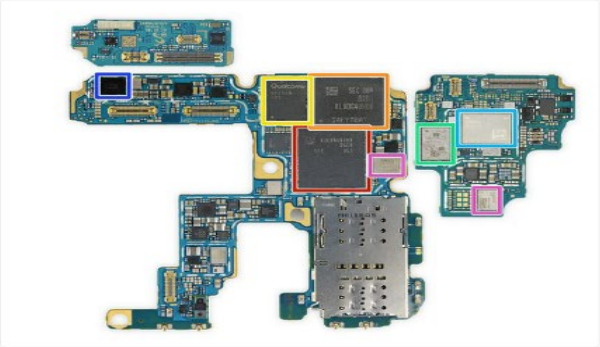


NETWORK	Technology	GSM / HSPA / LTE	GSM / HSPA / LTE / 5G	GSM / CDMA / HSPA / EVDO / LTE / 5G
LAUNCH	Announced	2020, August 03	2020, September 30	2020, September 30
	Status	Available. Released 2020, August 20	Available. Released 2020, November 05	Available. Released 2020, October 15
BODY	Dimensions	144 x 69.4 x 8.2 mm (5.67 x 2.73 x 0.32 in)	153.9 x 74 x 8.2 mm (Sub-6) or 8.5 mm (Sub-6 and mmWave)	144.7 x 70.4 x 8 mm (5.70 x 2.77 x 0.31 in)
	Weight	143 g (5.04 oz)	168 g (5G Sub-6); 171 g (5G Sub-6 and mmWave) (5.93 oz)	151 g (5.33 oz)
	Build	Glass front (Gorilla Glass 3), plastic back, plastic frame	Glass front (Gorilla Glass 3), plastic back, plastic frame	Glass front (Gorilla Glass 6), aluminum back, aluminum frame
	SIM	Nano-SIM and/or eSIM	Nano-SIM and/or eSIM	Nano-SIM and/or eSIM
				IP68 dust/water resistant (up to 1.5m for 30 mins)
DISPLAY	Type	OLED, HDR	OLED, HDR	OLED, 90Hz, HDR10+
	Size	5.81 inches, 83.2 cm^2 (~83.3% screen-to-body ratio)	6.2 inches, 95.7 cm^2 (~84.1% screen-to-body ratio)	6.0 inches, 87.6 cm^2 (~85.9% screen-to-body ratio)
	Resolution	1080 x 2340 pixels, 19.5:9 ratio (~443 ppi density)	1080 x 2340 pixels, 19.5:9 ratio (~413 ppi density)	1080 x 2340 pixels, 19.5:9 ratio (~432 ppi density)
	Protection	Corning Gorilla Glass 3	Corning Gorilla Glass 3	Corning Gorilla Glass 6
		Always-on display	Always-on display	Always-on display
PLATFORM	OS	Android 10, upgradable to Android 11	Android 11	Android 11
	Chipset	Qualcomm SDM730 Snapdragon 730G (8 nm)	Qualcomm SM7250 Snapdragon 765G (7 nm)	Qualcomm SM7250 Snapdragon 765G (7 nm)
	CPU	Octa-core (2x2.2 GHz Kryo 470 Gold & 6x1.8 GHz Kryo 470 Silver)	Octa-core (1x2.4 GHz Kryo 475 Prime & 1x2.2 GHz Kryo 475 Gold & 6x1.8 GHz Kryo 475 Silver)	Octa-core (1x2.4 GHz Kryo 475 Prime & 1x2.2 GHz Kryo 475 Gold & 6x1.8 GHz Kryo 475 Silver)
	GPU	Adreno 618	Adreno 620	Adreno 620

Attachment 4 (Processor of Google Pixel 4a, Pixel 4a 5G and Pixel 5) at 1.

Claim 1	Corresponding Structure in Accused Systems

Step 8

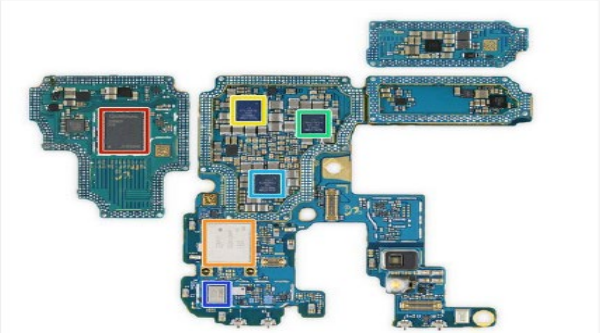


- With all shields down, we can get a better look at the silicon hiding beneath:
  - Samsung K3LK4K40BM-BGCN 12 GB LPDDR5 RAM layered over Qualcomm 865 SoC
  - Samsung KLUDG4UHDB-B2D1 128 GB UFS 3.0 flash storage
  - Qualcomm SDX55M 2nd-gen 5G modem
  - Skyworks SKY58210-11 RF Front-End Module
  - Qorvo QM78092 Front-End Module
  - Maxim MAX77705C power management IC
  - Qualcomm QPM5677 and QPM6585 5G power amplification modules

Add a comment

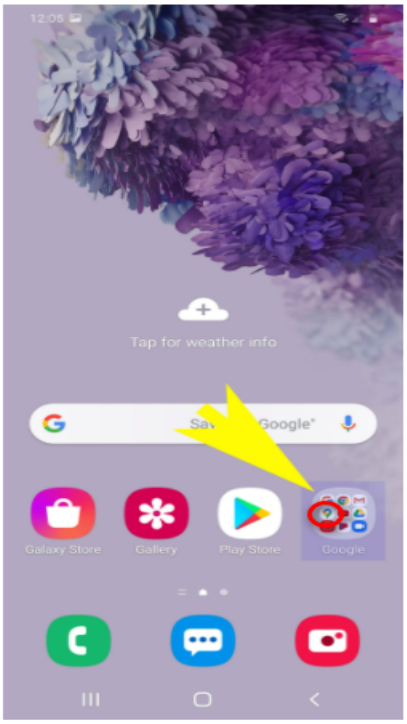
Processer within the wireless communication device (Exhibit B), such as Samsung Galxy S20 coupled with RF transceiver and Wi-Fi Module

Step 9

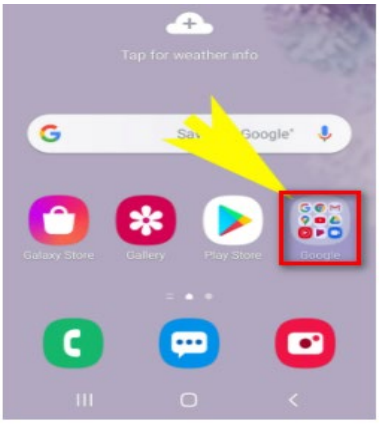


- But wait! Flippin' the boards over reveals even more flippin' chips:
  - Qualcomm SDR865 RF Tranceiver
  - Murata KM9D19075 Wi-Fi & Bluetooth Module
  - Qualcomm PM8250 power management IC
  - Qualcomm PMX55 power management IC
  - Qualcomm PM8150C power management IC
  - Qualcomm QDM4870 front-end module

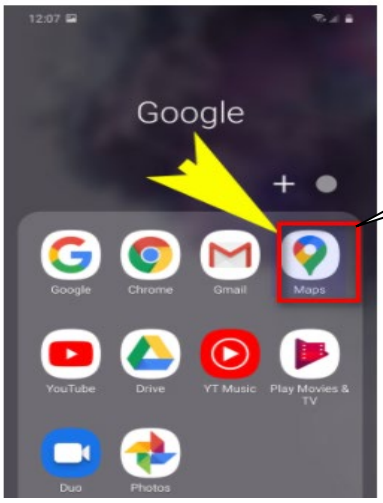
Attachment 2 (RF Transceiver and Processor of Samsung Galaxy S20) at 8.

Claim 1	Corresponding Structure in Accused Systems
	Using Turn-by-Turn Navigation with the Galaxy S20 Google Maps **Time Needed :** 8 minutes The following steps demonstrate the actual process of setting up and utilizing turn-by-turn navigation system with the Google Maps app on the new Samsung Galaxy S20 handset. Before you begin, verify and ensure that location is enabled on your phone. It has to be enabled so that your device can determine your current location. 1. **Tap to open the Google folder from the Home screen.** A new screen consisting of Google-related apps and services will be displayed.  Google Maps preloaded in the Wireless mobile communication devices (Exhibit B), such as Galaxy S20. Current location of the device is determined if location is enabled **Attachment 5 (how to use turn by turn Google map) at 1.**

Claim 1	Corresponding Structure in Accused Systems



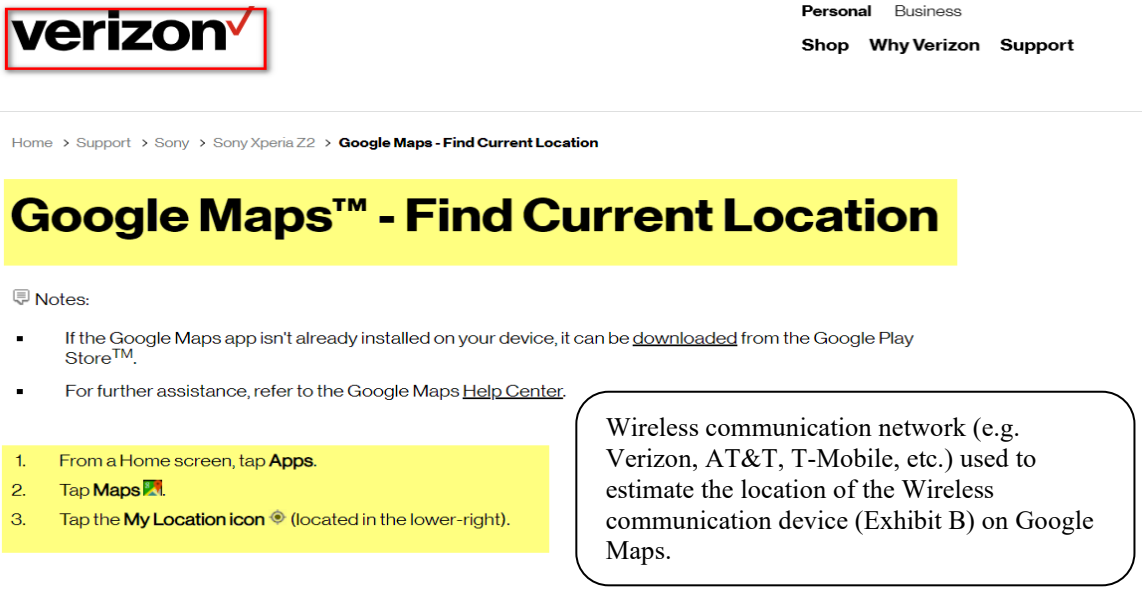
2. **Tap Maps to open Google Maps app.**
If this is the first time you use Google Maps on your Galaxy S20, you'll be prompted with a Welcome screen. If you see this screen, read and review the information then tap **GOT IT** to proceed.



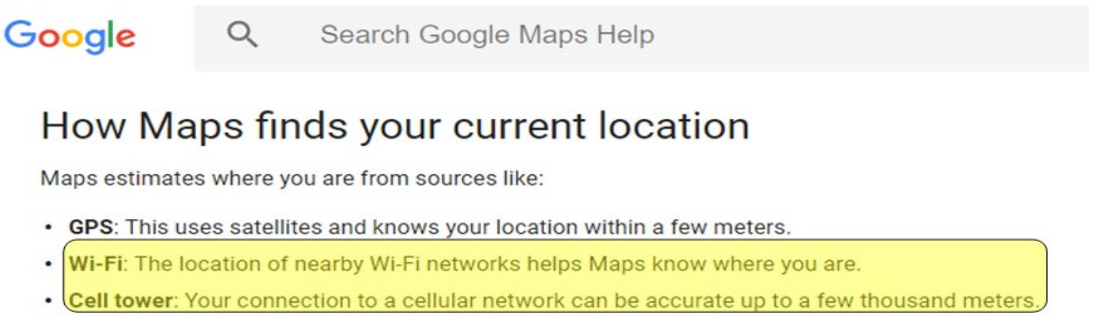
Google Maps preloaded in the Wireless mobile communication devices (Exhibit B), such as Galaxy S20.

Attachment 5 (how to use turn by turn google map) at 2&3.

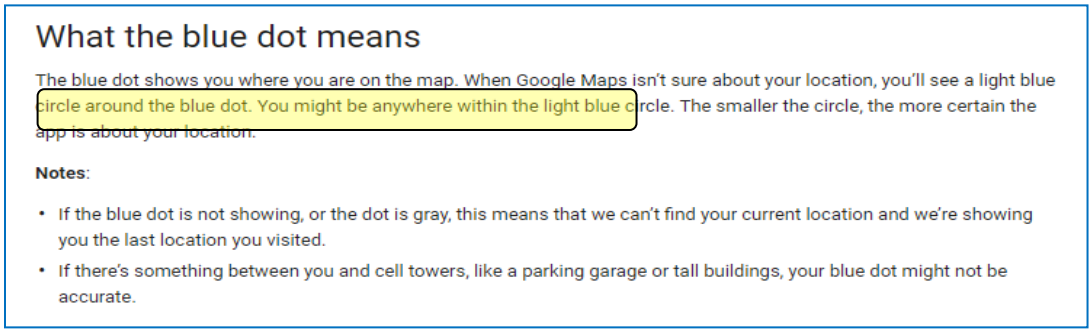
Claim 1	Corresponding Structure in Accused Systems



Attachment 6 (Find Current Location on Google map) at 1.



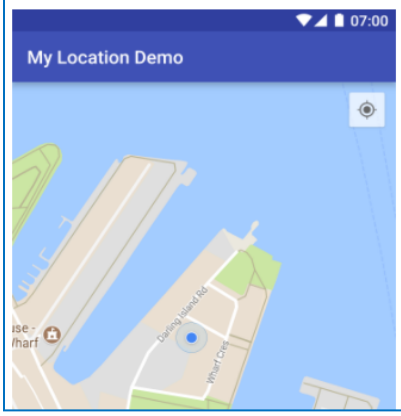
Attachment 8 (How map finds your current location) at 2.



Attachment 8 (Current location shown on google map) at 3.

Claim 1	Corresponding Structure in Accused Systems

The following screenshot shows the My Location button at top right and the My Location blue dot in the center of the map:



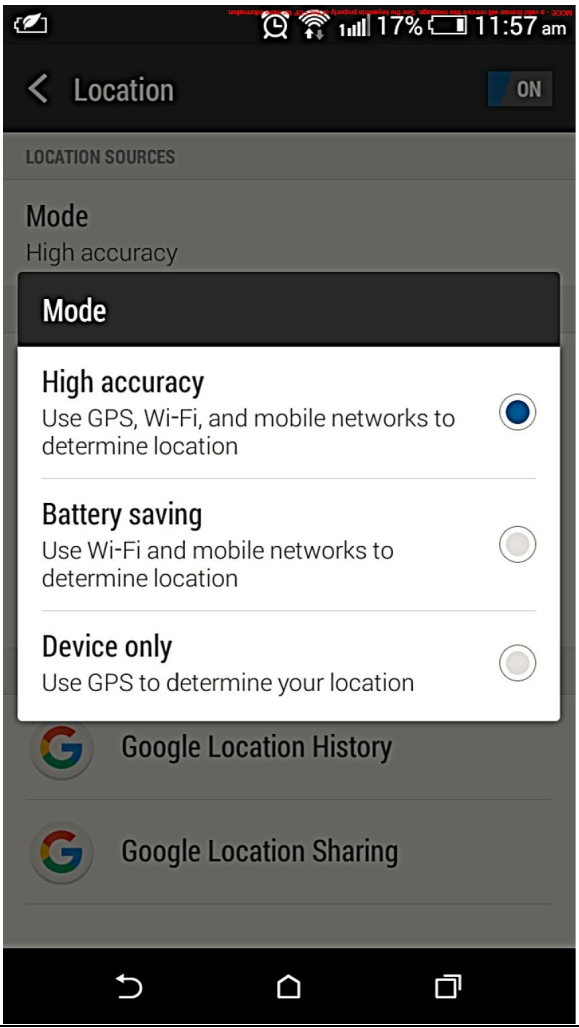
Geographical features cities, streets, etc., on Google Maps

Blue Dot indicating location the map

Processor of the wireless communication device estimated the location of the wireless communication device (Exhibit B) from wireless communication network. The Blue dot showing estimated location.

Source: Location estimation on the Wireless communication device

Attachment 22 (Location estimation on the Wireless communication device) at 10.

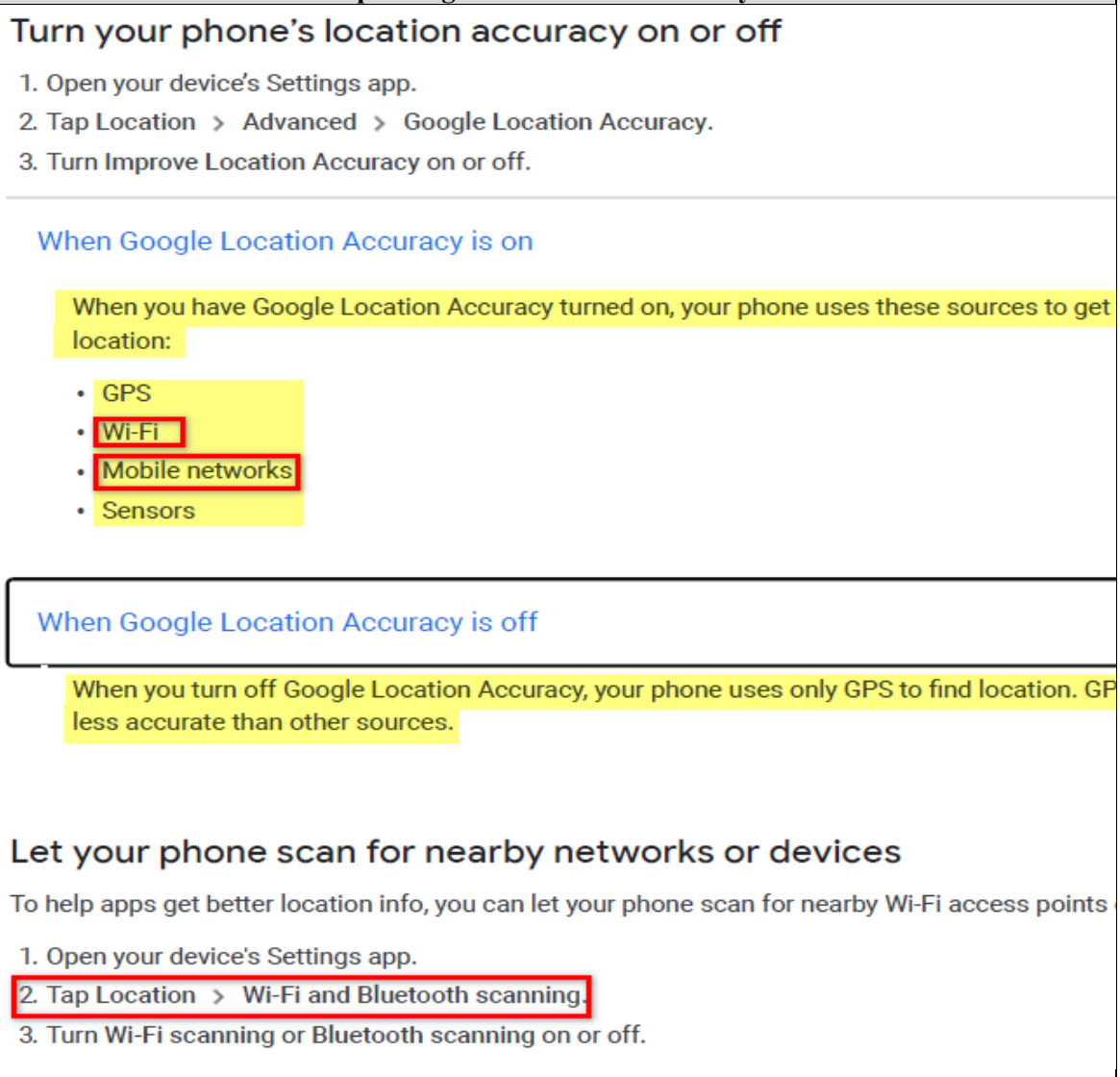


By default the "Location setting" is set at "High accuracy" mode, wherein, for example, accuracy of location of a communications device determined based on locations of nearby Wi-Fi network infrastructure (access points or hotspots) is further enhanced or fine-tuned by Google Maps Server additionally using the said communications device's GPS location and the location data obtained from the mobile network (Cell tower information and/or Location of the communications device determined through the Assisted-GPS method by the said mobile network) serving the said communications device.

Claim 1	Corresponding Structure in Accused Systems
	Attachment 45 (Google Maps_Android app_Location settings) at 1. Find and improve your location's accuracy Sometimes Google Maps might have trouble finding where you are located. If the GPS location of your blue dot on the map is inaccurate or the blue dot is not showing up, here are some things you can do to help fix the problem. **Tip**: This will also improve your search results and make them more relevant to you. Computer Android iPhone & iPad See your current location on the map 1. On your Android phone or tablet, open the Google Maps app . 2. You'll see a blue dot, which shows where you are. If you don't see a blue dot, go to the bottom and tap Your location . How Maps finds your current location Maps estimates where you are from sources like: • GPS: This uses satellites and knows your location up to around 20 meters. **Note**: 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 a cellular network can be accurate up to a few thousand meters. **Attachment 46 (Find and improve your location's accuracy - Android - Google Maps Help) at 1.**

Claim 1	Corresponding Structure in Accused Systems
	From your devices Many devices, like phones or computers, can work out their precise location. You can allow Google and other apps to provide you with useful features based on where your device is located. For example, if you're running late to meet your friends, you'll probably want to use a navigation app to know the quickest way to get to your destination. To get turn-by-turn directions, you may need to turn on your device's location and give the app the permission to access it. Or for some searches like "coffee shop", "bus stop" or "atm", results will usually be more helpful when precise location is available. On your Android device, if you choose to turn on your device location, you can use features like navigation, giving an app access to your current location, or find your phone. You can also choose which apps have permission to use your device's location with simple controls that let you turn the permission on or off for individual apps. On Android, you can see when an app is requesting to use your phone's GPS-based location when the top of your screen shows Location . Learn more Google Location Services 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. You can disable Google Location Services at any time in your device's location settings. Your device's location will continue to work even if GLS is turned off, but the device will rely only on GPS to estimate device location for apps with the necessary permission. Google Location Services is distinct from your device's location setting. Learn more The settings and permissions on Android control whether your device sensors (like GPS) or network-based location (like GLS) are used to determine your location and which apps have access to that location. They do not impact how websites and apps might estimate your location in other ways, such as from your IP Address. **Attachment 44 (How Google uses location information – Privacy & Terms – Google) at 2 &3.**

Wireless communication device receive the location of the Wireless communication device (Exhibit B) on Google Map from Wireless communication networks (e.g. Verizon, AT&T, T-Mobile, etc.)

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 21 (Manage your Pixel phone's location settings) at 2.**

Claim 1	Corresponding Structure in Accused Systems

If you use an older Android version

Choose location settings (Android 9.0)

To change location settings:

1. Open your device's Settings app.
2. Tap **Security & Location** > **Location**.
   - If you have a work profile, tap **Advanced**.

Then, choose an option:

- **Turn Location on or off**: Tap **Location**.
- **Scan for nearby networks**: Tap **Advanced** > **Scanning**. Turn **Wi-Fi scanning** or **Bluetooth scanning** on or off.
- **Turn emergency location service on or off**: Tap **Advanced** > **Google Emergency Location Service**. Turn **Emergency Location Service** on or off.

Choose location mode (Android 4.4—8.1)

You can choose your location mode based on accuracy, speed, and battery use.

1. Open your phone's Settings app.
2. Tap **Security & Location** > **Location**. If you don't see "Security & Location," tap **Location**.
3. Tap **Mode**. Then pick:
   - **High accuracy:** Use GPS, Wi-Fi, mobile networks, and sensors to get the most accurate location. Use Google Location Services to help estimate your phone's location faster and more accurately.
   - **Battery saving:** Use sources that use less battery, like Wi-Fi and mobile networks. Use Google Location Services to help estimate your phone's location faster and more accurately.
   - **Device only:** Use only GPS. Don't use Google Location Services to provide location information. This can estimate your phone's location more slowly and use more battery.

Choose location access (Android 4.1—4.3)

You can control what location information your phone can use.

1. Open your phone's Settings app.
2. Under "Personal," tap **Location access**.
3. At the top of the screen, turn **Access to my location** on or off.
   - **When location access is on, pick either or both of:**
     - **GPS satellites:** Lets your phone estimate its location from satellite signals, like a GPS device in a car.
     - **Wi-Fi & mobile network location:** Lets your phone use Google Location Services to help estimate its location faster, with or without GPS.
   - **When location access is off:**
     Your phone can't find its precise location or share it with any apps.

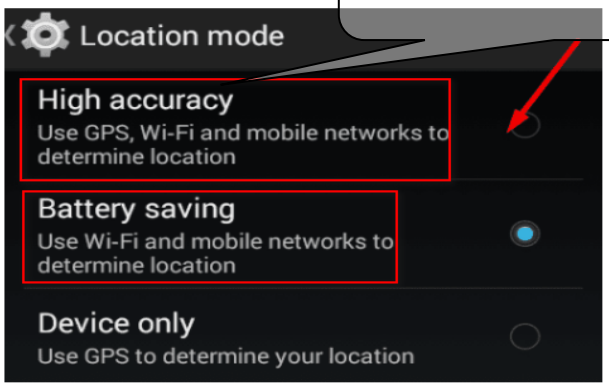
Tip: If you have a tablet that more than one person uses, each person can have different location access settings.

Attachment 40 (Manage your Pixel phone's location settings) at 3 & 4.

Claim 1	Corresponding Structure in Accused Systems

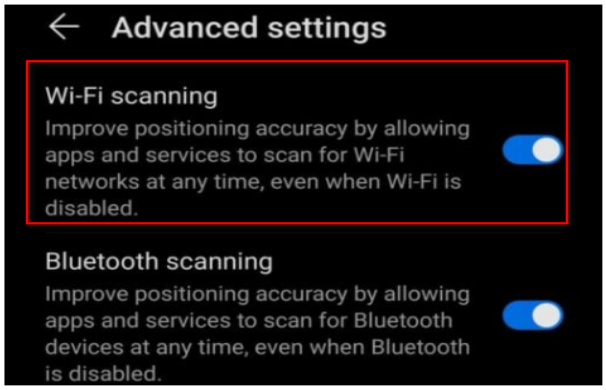
1. On your Android device, go to **Settings**
2. Tap **Location** and re-enable your location services
3. Select **Mode High accuracy**

The user of the wireless device can select the method of the location estimation



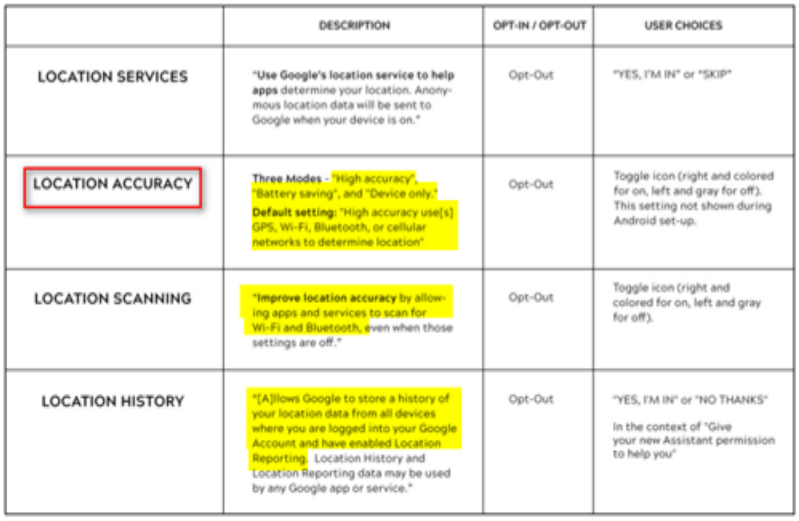
On some phone models, this option can be found under the Advanced Settings option.

Select **Advanced Settings** and enable your device to improve positioning accuracy by allowing apps to scan for Wi-Fi networks and Bluetooth devices at any time, even if Wi-Fi or Bluetooth is disabled.



Attachment 33 (Google Maps Not Updating Location) at 4.

Claim 1	Corresponding Structure in Accused Systems



	DESCRIPTION	OPT-IN / OPT-OUT	USER CHOICES
LOCATION SERVICES	"**Use Google's location service to help apps** determine your location. Anonymous location data will be sent to Google when your device is on."	Opt-Out	"YES, I'M IN" or "SKIP"
LOCATION ACCURACY	**Three Modes** - "High accuracy", "Battery saving", and "Device only." **Default setting:** "High accuracy use[s] GPS, Wi-Fi, Bluetooth, or cellular networks to determine location"	Opt-Out	Toggle icon (right and colored for on, left and gray for off). This setting not shown during Android set-up.
LOCATION SCANNING	"**Improve location accuracy** by allowing apps and services to scan for Wi-Fi and Bluetooth, even when those settings are off."	Opt-Out	Toggle icon (right and colored for on, left and gray for off).
LOCATION HISTORY	"[A]llows Google to store a history of your location data from all devices where you are logged into your Google Account and have enabled Location Reporting. Location History and Location Reporting data may be used by any Google app or service."	Opt-Out	"YES, I'M IN" or "NO THANKS" In the context of "Give your new Assistant permission to help you"

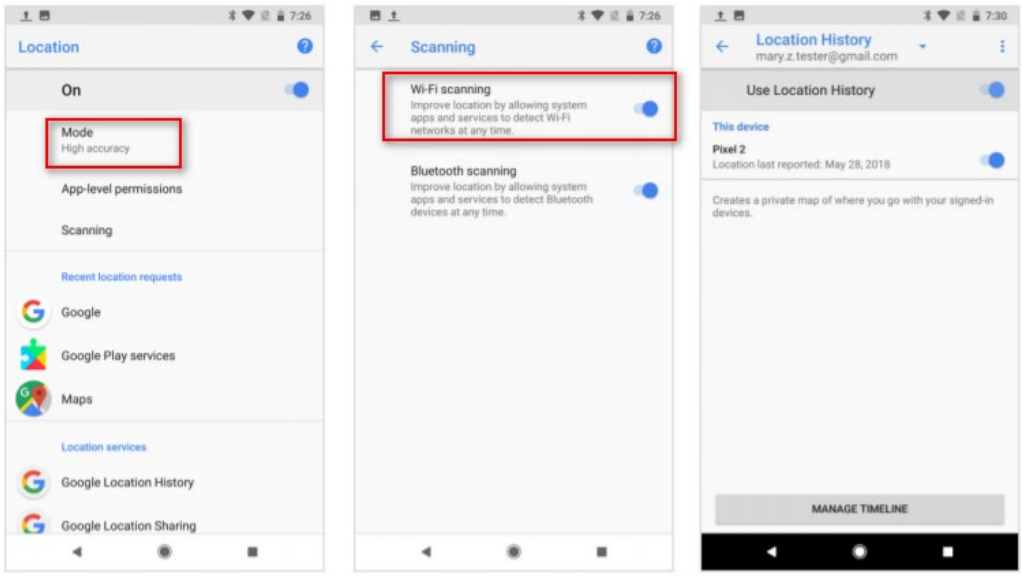
Figure 1: Four Android settings and services that relate to location information collection. [1]

Google Location Services

Google Location Services (GLS) operate at a device level and rely on sensors such as GPS, Wi-Fi, the cellular radio, and other technologies included in mobile devices to position a user in the world. If a user keeps the default settings prompted by Google, Location Services is enabled, Location Accuracy will be set to "High Accuracy" [2] and Location Scanning will be enabled for both Wi-Fi base stations and Bluetooth Beacons, regardless of a user's choice to turn Wi-Fi or Bluetooth on. The implications of user choices among the various Location Services settings are significant, but not intuitive, including:

- With Location Services turned on, Location Accuracy set to "Device only" and Location Scanning turned off, an Android device will only use GPS to provide the location of an Android device.
- When Location Accuracy is set to "High accuracy" and Location Scanning is enabled (the default setting for new device setup), an Android device will use sources including Wi-Fi, Bluetooth, and cellular radio to improve the accuracy of the device's position.

Attachment 38 (Google, Android and Location Tracking) at 2.

Claim 1	Corresponding Structure in Accused Systems
	After completing the setup process users can validate and control settings for device location via the Settings app and navigating to Google settings, then Location (Figure 4).  Figure 4: Location settings after Android device setup process As demonstrated in Figure 4, if users accept Google's defaults during the setup process, the Android device is configured with Location Services enabled, Wi-Fi and Bluetooth scanning engaged, and Location History active. **Attachment 38 (Google, Android and Location Tracking) at 5.**

Claim 1	Corresponding Structure in Accused Systems

Users can choose to disable GLS during the set-up process. However, if a user attempts to disable GLS, a warning dialogue box prompts an extreme scenario: "device location for all apps is turned off and you may not be able to locate your device if it is lost." (Figure 5) Note as well, the action prompt is to "Turn on Location" – reversing the user choice triggering the warning. Further, as described immediately below, many Google and third party apps will not function unless GLS is turned on. Therefore, Google forces user into an impossible ultimatum, have their every move constantly monitored, tracked, and stored or lose the functionality of their expensive smartphone.

If a user disables Location Services but then attempts to use a location aware app or service on their device, she will see the dialogue box shown in Figure 6. If the user clicks "OK" the service is enabled for the entire device and permanently, rather than enabling Location Services only for that particular app or service requesting the functionality.

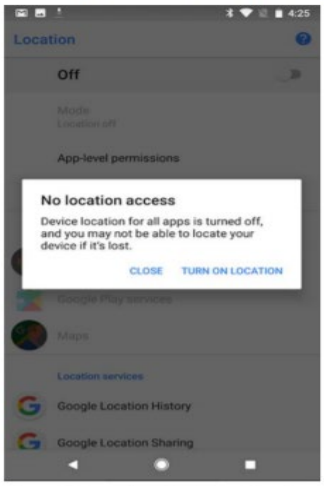


Figure 5: Location Services Warning

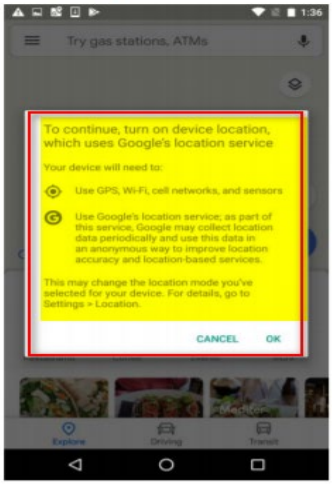


Figure 6: Re-Enable Location Services

Attachment 38 (Google, Android and Location Tracking) at 6.

We collect information about your location when you use our services, which helps us offer features like driving directions for your weekend getaway or showtimes for movies playing near you.

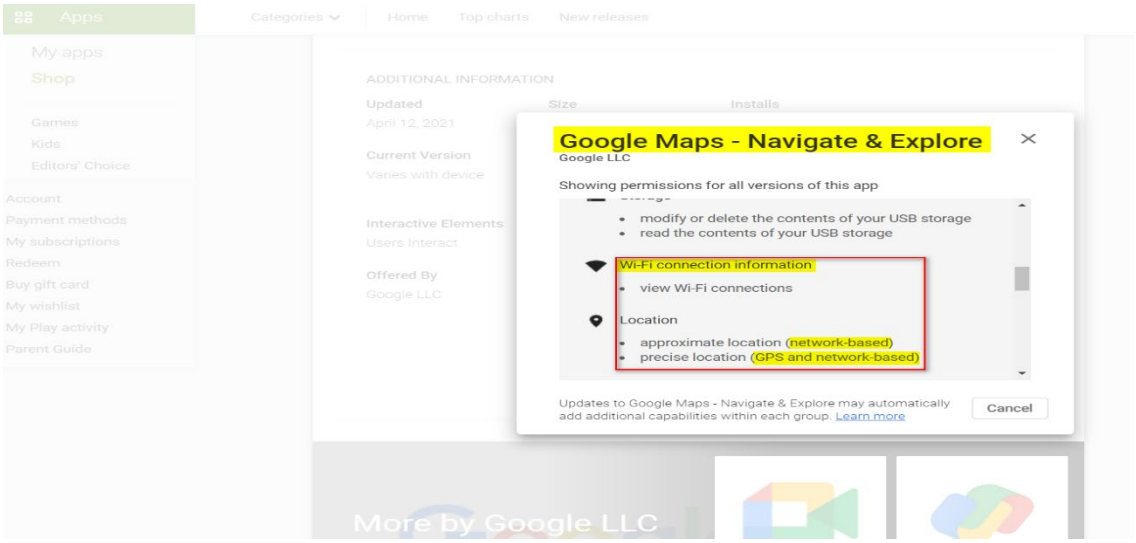
Your location can be determined with varying degrees of accuracy by:

- GPS
- IP address
- Sensor data from your device
- Information about things near your device, such as Wi-Fi access points, cell towers, and Bluetooth-enabled devices

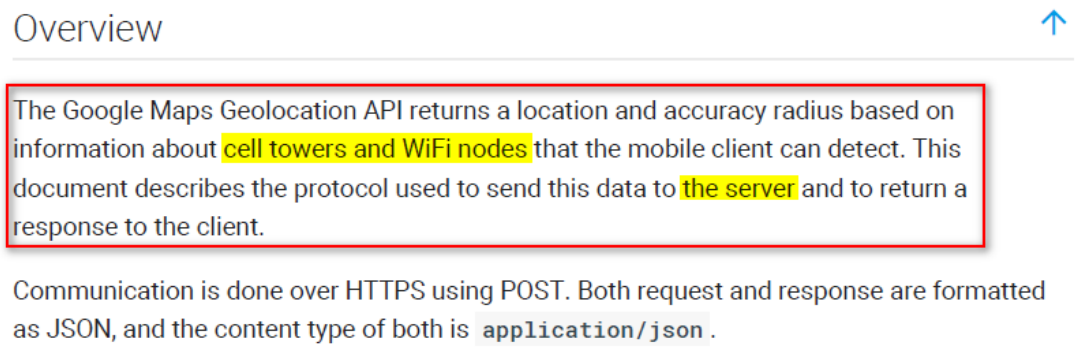
The types of location data we collect depend in part on your device and account settings. For example, you can turn your Android device's location on or off using the device's settings app. You can also turn on Location History if you want to create a private map of where you go with your signed-in devices.

Attachment 29 (Google Privacy Policy) at 4.

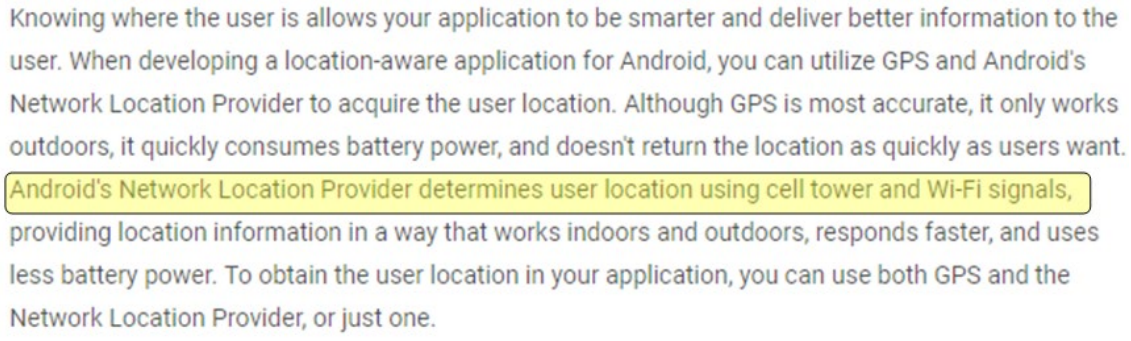
Claim 1	Corresponding Structure in Accused Systems



Attachment 39 (Google Map_Permissions) at 1.



Attachment 17 (Cell Towers/Wi-Fi Nodes (RF transceivers) in a wireless communication network) at 1.



Attachment 12 (Location of the device determined using cell tower) at 1&2.

Claim 1	Corresponding Structure in Accused Systems

The first parameter in `requestLocationUpdates()` is the type of location provider to use (in this case, the Network Location Provider for cell tower and Wi-Fi based location). You can control the frequency at which your listener receives updates with the second and third parameter—the second is the minimum time interval between notifications and the third is the minimum change in distance between notifications—setting both to zero requests location notifications as frequently as possible. The last parameter is your `LocationListener`, which receives callbacks for location updates.

To request location updates from the GPS provider, use `GPS_PROVIDER` instead of `NETWORK_PROVIDER`. You can also request location updates from both the GPS and the Network Location Provider by calling `requestLocationUpdates()` twice—once for `NETWORK_PROVIDER` and once for `GPS_PROVIDER`.

Requesting User Permissions

Google Maps application makes use of wireless communication network, having cell towers (Exhibit A) or Wi-Fi access points (Exhibit A), to estimate the location of the Wireless communication device (Exhibit B).

In order to receive location updates from `NETWORK_PR...`

`ACCESS_COARSE_LOCATION` or `ACCESS_FINE_LOCATION` permission, respectively, in your Android manifest file. Without these permissions, your application will fail at runtime when requesting location updates.

If you are using both `NETWORK_PROVIDER` and `GPS_PROVIDER`, then you need to request only the `ACCESS_FINE_LOCATION` permission, because it includes permission for both providers. Permission for `ACCESS_COARSE_LOCATION` allows access only to `NETWORK_PROVIDER`.

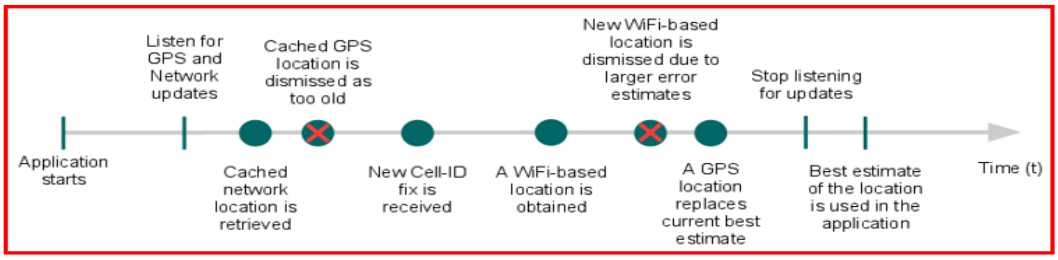
Attachment 12 (Location is estimated using cell tower/wi-fi network) at 3 & 4.

Flow for obtaining user location

Here's the typical flow of procedures for obtaining the user location:

1. Start application.
2. Sometime later, start listening for updates from desired location providers.
3. Maintain a "current best estimate" of location by filtering out new, but less accurate fixes.
4. Stop listening for location updates.
5. Take advantage of the last best location estimate.

Figure 1 demonstrates this model in a timeline that visualizes the period in which an application is listening for location updates and the events that occur during that time.



Attachment 12 (Location is estimated using cell tower/wi-fi network) at 5.

Claim 1	Corresponding Structure in Accused Systems

There are 3 location providers in Android.

They are:

gps –> (GPS, AGPS): Name of the GPS location provider. This provider determines location using satellites. Depending on conditions, this provider may take a while to return a location fix. Requires the permission android.permission.ACCESS_FINE_LOCATION.

network –> (AGPS, CellID, WiFi MACID): Name of the network location provider. This provider determines location based on availability of cell tower and WiFi access points. Results are retrieved by means of a network lookup. Requires either of the permissions android.permission.ACCESS_COARSE_LOCATION or android.permission.ACCESS_FINE_LOCATION.

passive –> (CellID, WiFi MACID): A special location provider for receiving locations without actually initiating a location fix. This provider can be used to passively receive location updates when other applications or services request them without actually requesting the locations yourself. This provider will return locations generated by other providers. Requires the permission android.permission.ACCESS_FINE_LOCATION, although if the GPS is not enabled this provider might only return coarse fixes. This is what Android calls these location providers, however, the underlying technologies to make this stuff work is mapped to the specific set of hardware and telco provided capabilities (network service).

The best way is to use the "network" or "passive" provider first, and then fallback on "gps", and depending on the task, switch between providers. This covers all cases, and provides a lowest common denominator service (in the worst case) and great service (in the best case).

Attachment 41 (Android Location Providers - GPS or Network Provider?) at 1 & 2.

Accuracy

You can specify location accuracy using the `setPriority()` method, passing one of the following values as the argument:

- `PRIORITY_HIGH_ACCURACY` provides the most accurate location possible, which is computed using as many inputs as necessary (it enables GPS, Wi-Fi, and cell, and uses a variety of Sensors), and may cause significant battery drain.
- `PRIORITY_BALANCED_POWER_ACCURACY` provides accurate location while optimizing for power. Very rarely uses GPS. Typically uses a combination of Wi-Fi and cell information to compute device location.
- `PRIORITY_LOW_POWER` largely relies on cell towers and avoids GPS and Wi-Fi inputs, providing coarse (city-level) accuracy with minimal battery drain.
- `PRIORITY_NO_POWER` receives locations passively from other apps for which location has already been computed.

The location needs of most apps can be satisfied using the balanced power or low power options. High accuracy should be reserved for apps that are running in the foreground and require *real time* location updates (for example, a mapping app).

Attachment 42 (Optimize location for battery) at 2.

Traffic conditions [edit]

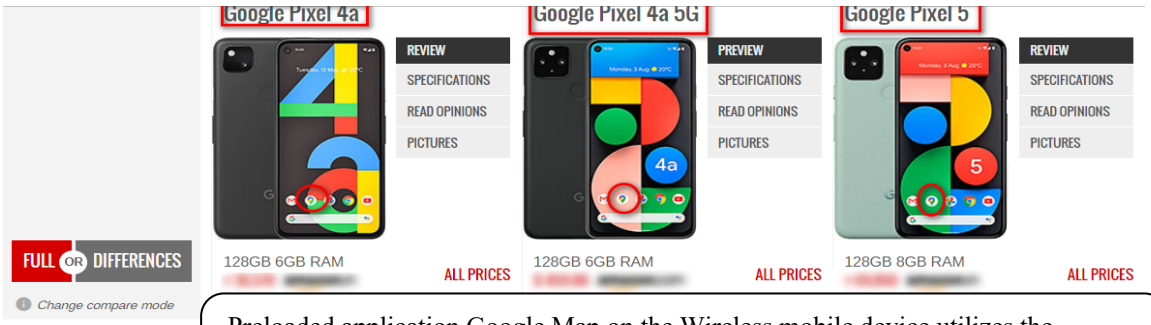
In 2007, Google began offering traffic data as a colored overlay on top of roads and motorways to represent the speed of vehicles on particular roads. Crowdsourcing is used to obtain the GPS-determined locations of a large number of cellphone users, from which live traffic maps are produced.[59][60][61]

Google has stated that the speed and location information it collects to calculate traffic conditions is anonymous.[62] Options available in each phone's settings allow users not to share information about their location with Google Maps.[63] Google stated, "Once you disable or opt out of My Location, Maps will not continue to send radio information back to Google servers to determine your handset's approximate location".[64][*failed verification*]

Attachment 43 (Google Maps Wikipedia) at 5 & 6.

Claim 1	Corresponding Structure in Accused Systems
according to mapping information stored within the wireless mobile communications device,	Plaintiff contends the Exhibit-B-listed mobile-wireless-communications device's motherboard processor is programmed to process location-service information; i.e., to receive a location of the device from the wireless communications network and generate an indication of the device's location. For example, the motherboard processor may use Google Maps to obtain the device's location and provide direction from that location to a destination. Wireless mobile communication device-including but not limited to Google's branded devices such as Google Pixel 5, pixel 4a 5G, pixel 4a, pixel 4 XL, pixel 4, pixel 3a XL, pixel 3a, pixel 3 XL, pixel 3, pixel 2, pixel 2 XL, pixel XL, pixel, pixel C or other (third-parties) branded devices such as Samsung Galaxy S20 Ultra, Galaxy S20 plus, Galaxy S20, Galaxy Z fold, Galaxy S10, Galaxy A series, etc. (refer Exhibit B for complete list) has a processor for example, Quad-Core processor. When wireless communication device transceivers and processor are in communication, they are coupled. Further, the Location-based Service (LBS) provider, such as Google Map, on the Exhibit-B utilizes the processor coupled to the transceiver to estimates/receive the location on mobile wireless communications devices (specifically one or more of the mobile wireless communications devices identified on Exhibit B) by utilizing wireless communication network or first computer. For example, the motherboard processor may use Google Maps to view and find places around the globe. Google map can also show your current location and provide direction (including with respect to geographic features such as nearby restaurants) from your location/source to any destination. In using Google Maps App, the mobile wireless communication device's motherboard processor generates signals for displaying on the device's screen a blue dot that shows the current location of the wireless mobile communication device. The Google map app estimates the location of the device from 3 sources: GPS (GPS uses satellites and knows your location within a few meters), Wi-Fi (the location of nearby Wi-Fi networks helps Maps know where you are), and cell towers (cell tower can be accurate up to a few thousand meters). When Google Maps isn't sure about your location, a light blue circle around the blue dot is shown. You might be anywhere within the light blue circle. The smaller the circle, the more certain the app is about your location. Furthermore, Plaintiff contends Google Maps App provides flexibility to download maps on SD card/internal memory of communication device (Exhibit B) examples of compatible devices is Samsung Galaxy S20, Pixel 4a, Pixel 4a 5G, Pixel 5, etc., and navigate offline. When internet is slow or mobile data is expensive, or communication device cannot connect to internet, an area can be saved to phone or tablet (Exhibit B) from Google maps app and use it when offline. Communication device can use Offline maps for Navigation through the downloaded area without internet. The following exemplifies the existence of this limitation in Accused Systems:

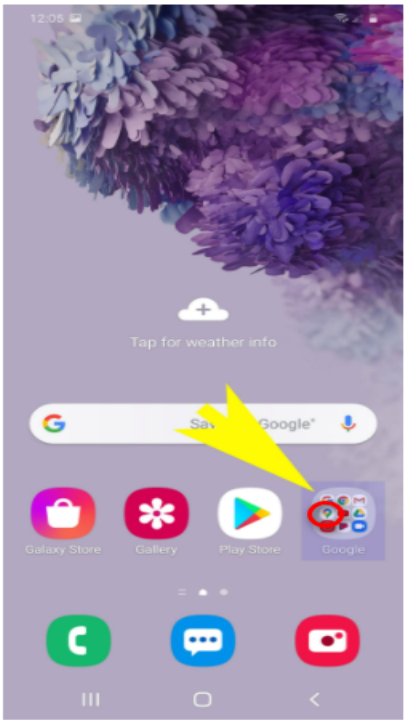
Claim 1	Corresponding Structure in Accused Systems



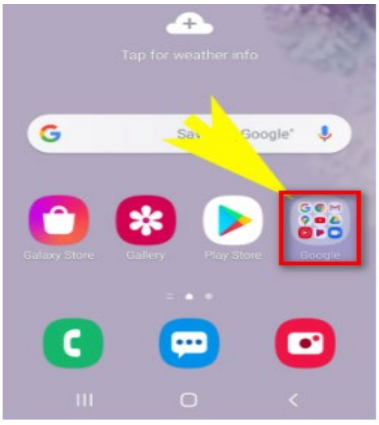
Preloaded application Google Map on the Wireless mobile device utilizes the processor coupled to the transceiver to estimates/receive the location on mobile wireless communications device by utilizing wireless communication network

NETWORK	Technology	GSM / HSPA / LTE	GSM / HSPA / LTE / 5G	GSM / CDMA / HSPA / EVDO / LTE / 5G
LAUNCH	Announced	2020, August 03	2020, September 30	2020, September 30
	Status	Available. Released 2020, August 20	Available. Released 2020, November 05	Available. Released 2020, October 15
BODY	Dimensions	144 x 69.4 x 8.2 mm (5.67 x 2.73 x 0.32 in)	153.9 x 74 x 8.2 mm (Sub-6) or 8.5 mm (Sub-6 and mmWave)	144.7 x 70.4 x 8 mm (5.70 x 2.77 x 0.31 in)
	Weight	143 g (5.04 oz)	168 g (5G Sub-6); 171 g (5G Sub-6 and mmWave) (5.93 oz)	151 g (5.33 oz)
	Build	Glass front (Gorilla Glass 3), plastic back, plastic frame	Glass front (Gorilla Glass 3), plastic back, plastic frame	Glass front (Gorilla Glass 6), aluminum back, aluminum frame
	SIM	Nano-SIM and/or eSIM	Nano-SIM and/or eSIM	Nano-SIM and/or eSIM
				IP68 dust/water resistant (up to 1.5m for 30 mins)
DISPLAY	Type	OLED, HDR	OLED, HDR	OLED, 90Hz, HDR10+
	Size	5.81 inches, 83.2 cm^2 (~83.3% screen-to-body ratio)	6.2 inches, 95.7 cm^2 (~84.1% screen-to-body ratio)	6.0 inches, 87.6 cm^2 (~85.9% screen-to-body ratio)
	Resolution	1080 x 2340 pixels, 19.5:9 ratio (~443 ppi density)	1080 x 2340 pixels, 19.5:9 ratio (~413 ppi density)	1080 x 2340 pixels, 19.5:9 ratio (~432 ppi density)
	Protection	Corning Gorilla Glass 3	Corning Gorilla Glass 3	Corning Gorilla Glass 6
		Always-on display	Always-on display	Always-on display
PLATFORM	OS	Android 10, upgradable to Android 11	Android 11	Android 11
	Chipset	Qualcomm SDM730 Snapdragon 730G (8 nm)	Qualcomm SM7250 Snapdragon 765G (7 nm)	Qualcomm SM7250 Snapdragon 765G (7 nm)
	CPU	Octa-core (2x2.2 GHz Kryo 470 Gold & 6x1.8 GHz Kryo 470 Silver)	Octa-core (1x2.4 GHz Kryo 475 Prime & 1x2.2 GHz Kryo 475 Gold & 6x1.8 GHz Kryo 475 Silver)	Octa-core (1x2.4 GHz Kryo 475 Prime & 1x2.2 GHz Kryo 475 Gold & 6x1.8 GHz Kryo 475 Silver)
	GPU	Adreno 618	Adreno 620	Adreno 620

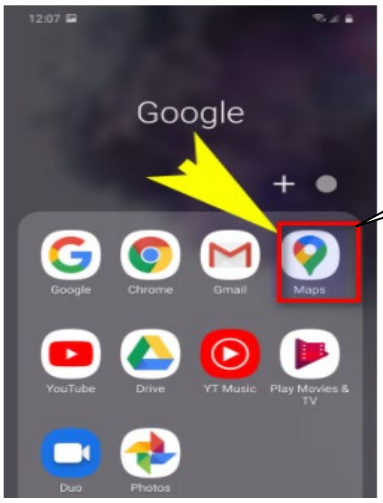
Attachment 4 (Processor of Google Pixel 4a, Pixel 4a 5G and Pixel 5) at 1.

Claim 1	Corresponding Structure in Accused Systems
	Using Turn-by-Turn Navigation with the Galaxy S20 Google Maps **Time Needed :** 8 minutes The following steps demonstrate the actual process of setting up and utilizing turn-by-turn navigation system with the Google Maps app on the new Samsung Galaxy S20 handset. Before you begin, verify and ensure that location is enabled on your phone. It has to be enabled so that your device can determine your current location. 1. **Tap to open the Google folder fr… the Home screen.** A new screen consisting of Google-re… apps and services will be displayed.  Google Maps preloaded in the Wireless mobile communication devices (Exhibit B), such as Galaxy S20. Current location of the device is determined if location is enabled. **Attachment 5 (how to use turn by turn Google map) at 1.**

Claim 1	Corresponding Structure in Accused Systems



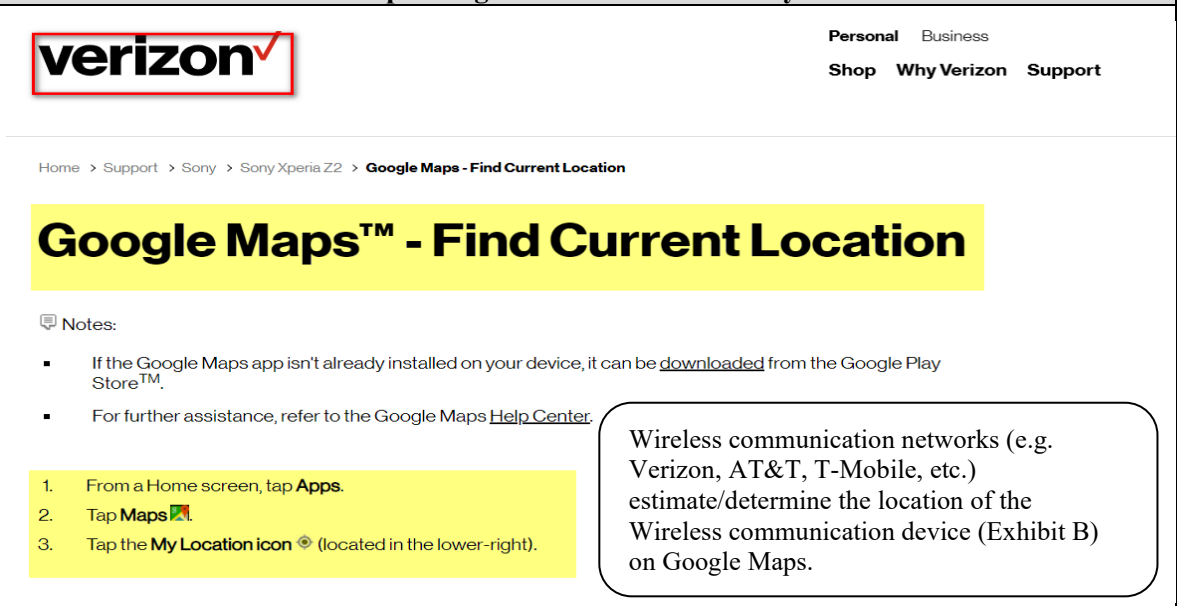
2. **Tap Maps to open Google Maps app.**
If this is the first time you use Google Maps on your Galaxy S20, you'll be prompted with a Welcome screen. If you see this screen, read and review the information then tap **GOT IT** to proceed.



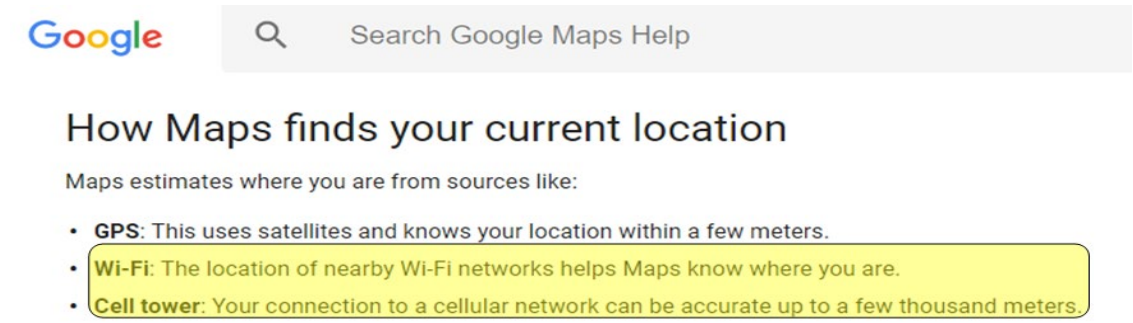
Google Maps preloaded in the Wireless mobile communication devices (Exhibit B), such as Galaxy S20.

Attachment 5 (how to use turn by turn google map) at 2&3.

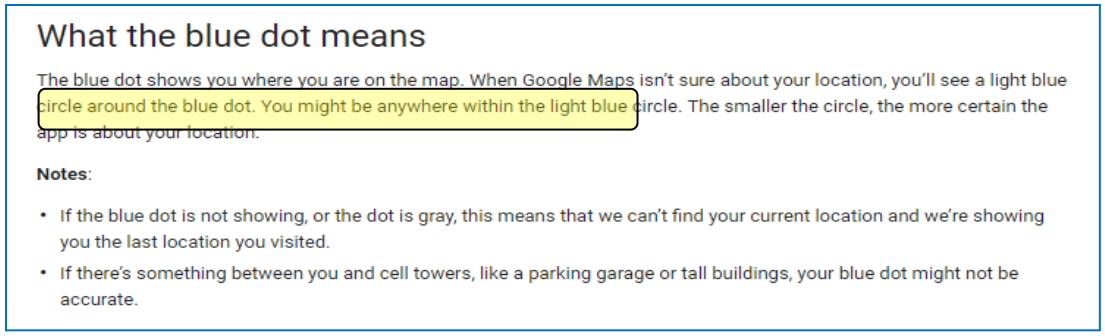
Claim 1	Corresponding Structure in Accused Systems



Attachment 6 (Find Current Location on Google map) at 1.



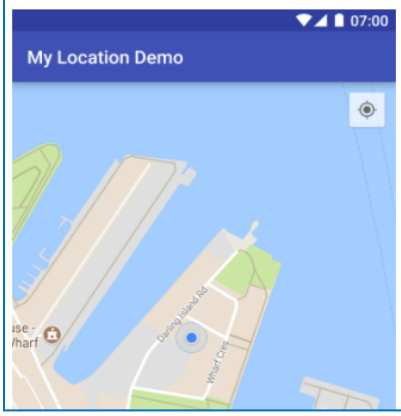
Attachment 8 (How map finds your current location) at 2.



Attachment 8 (Current location shown on google map) at 3.

Claim 1	Corresponding Structure in Accused Systems

The following screenshot shows the My Location button at top right and the My Location blue dot in the center of the map:



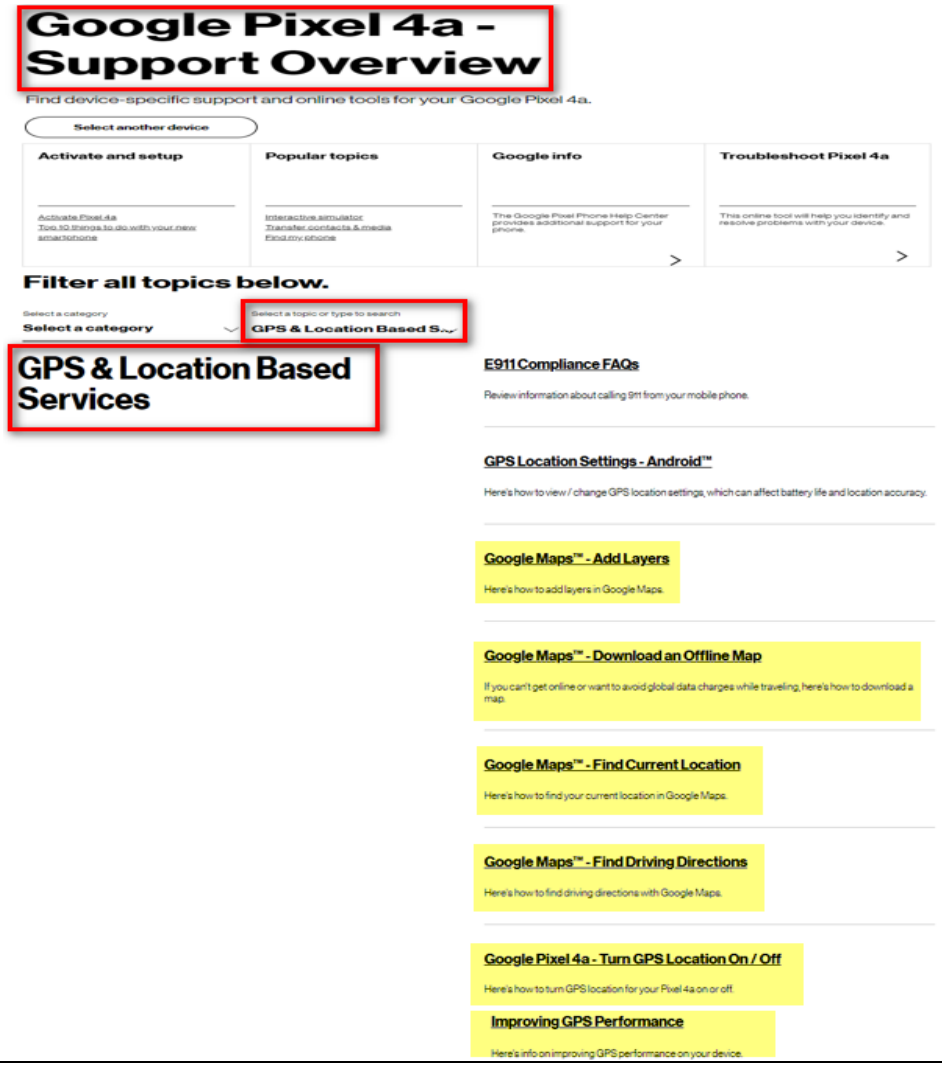
Blue Dot indicating location the map

Processor of the wireless communication device estimated the location of the wireless communication device (Exhibit B) from wireless communication network. The Blue dot showing estimated location.

Geographical features cities, streets, etc., on Google Maps

Source: Location estimation on the Wireless communication device

Attachment 22 (Location estimation on the Wireless communication device) at 10.



Claim 1	Corresponding Structure in Accused Systems
	Attachment 16 (How to use Pixel 4a GPS and location-based services) at 9.

verizon

Personal Business

Shop Why Verizon Supp

Home > Support > Google > Google Pixel 4a > Google Maps - Download an Offline Map

Google Maps™ - Download an Offline Map

The Google maps are made available both online and offline, and are stored in wireless communication device (Exhibit B) memory

Download and Save a Map

Downloading offline maps isn't available in some regions.

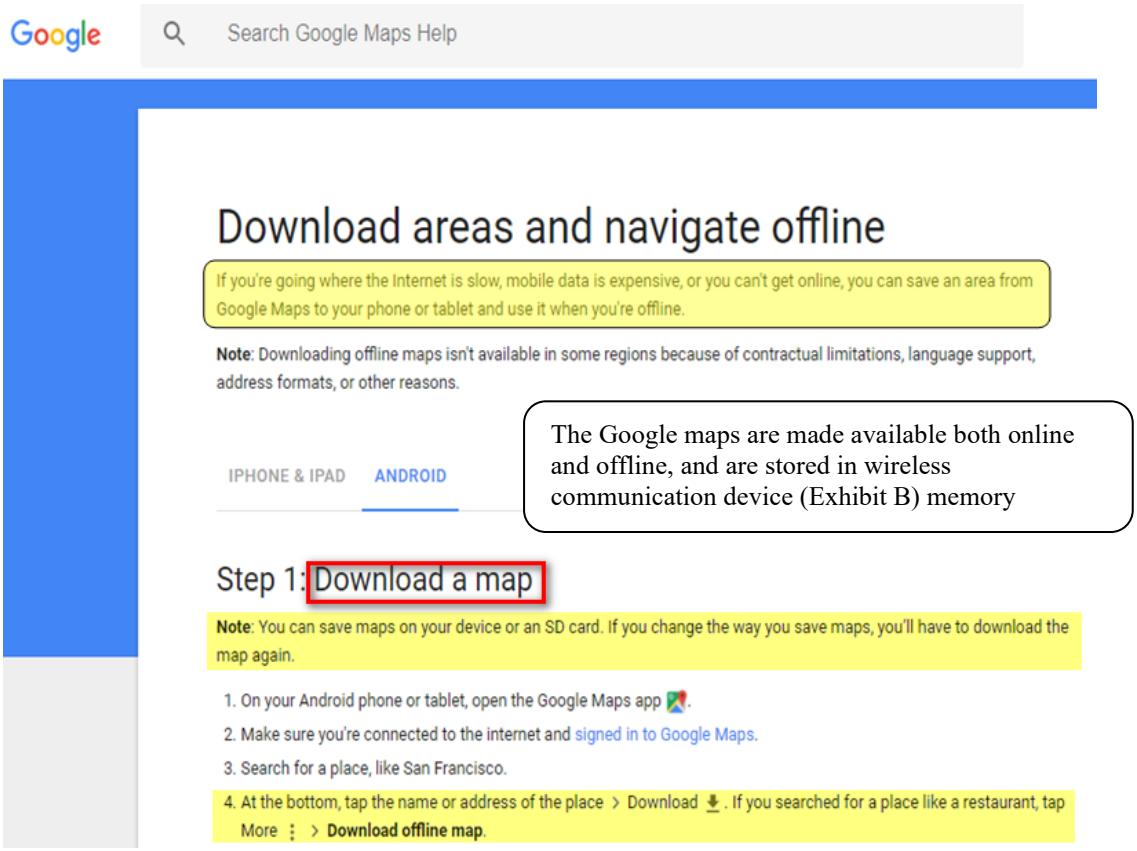
1. From a Home screen, tap **Apps**.
2. Tap **Maps**.
3. Tap the **Search bar** (located at the top) and enter the desired destination.
4. Tap the destination (located at the bottom).
5. Tap the **Menu icon** ⋮ (located in the upper-right).
6. Tap **Save offline map**.
7. Tap **Save** (located in the lower-right).
8. If preferred, enter a name for the map then tap **Save**.

View Saved Maps

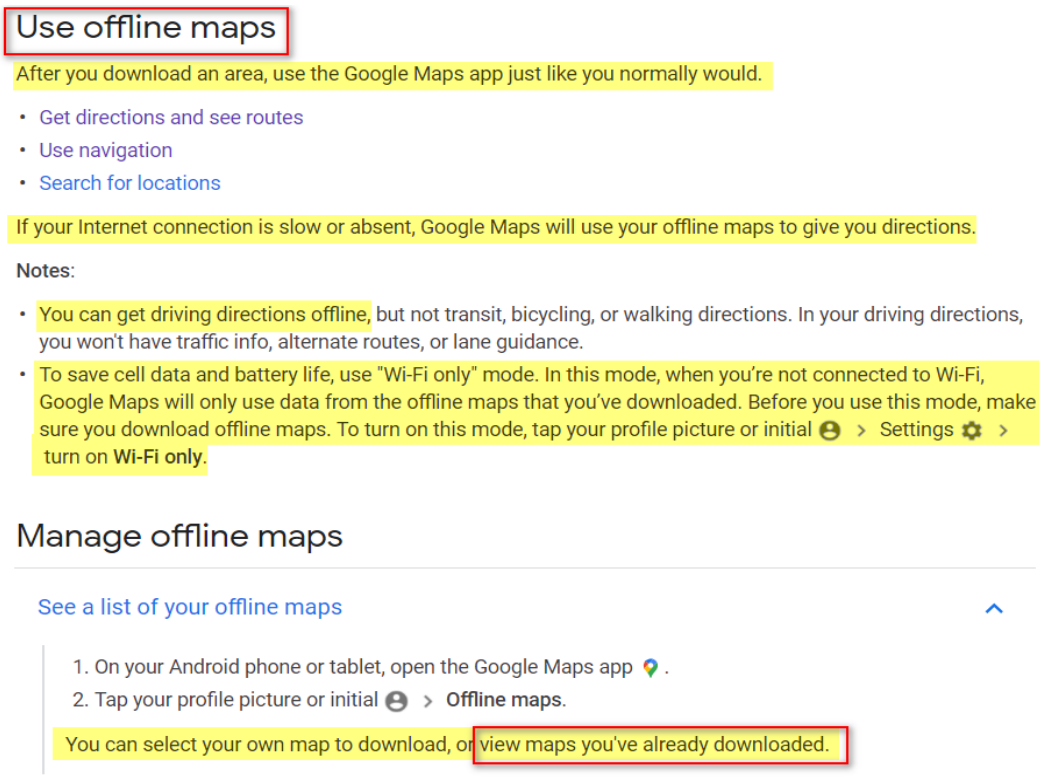
1. From a Home screen, tap **Apps**.
2. Tap **Maps**.
3. Tap the **Menu icon** ☰ (located in the upper-left).
4. Tap **Your places**.
5. Tap the appropriate map.

For additional info on downloading maps, refer to this Google support article.

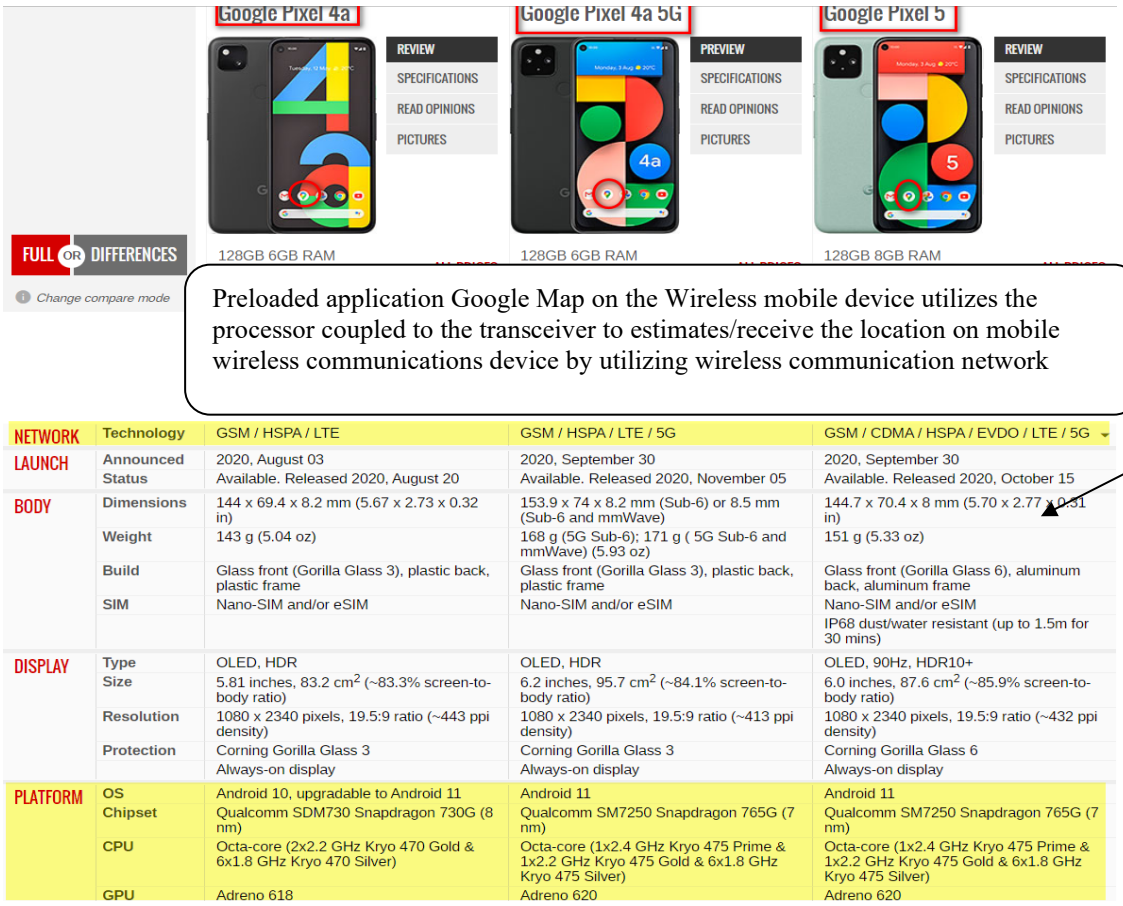
Attachment 10 (Google Map-Download an offline map on pixel 4a) at 1.

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 9 (Mapping information stored on wireless communication device) at 1.**

Claim 1	Corresponding Structure in Accused Systems
	Save a route 1. On your Android phone or tablet, open the Google Maps app . 2. Make sure you're connected to the Internet. 3. Search for your destination or tap it on the map. 4. In the bottom left, tap Directions . 5. From the top, choose your mode of transit. 6. Tap the white bar at the bottom. It's the one that shows the travel time and distance. 7. At the bottom, tap **Save offline**. Tip: • Your route is saved on your phone or tablet. Make sure to use the same phone or tablet when looking for a saved route. • Your saved route expires after 30 days. • Your route will show you the same mode of transit you chose when you saved the route. **Find a saved route** 1. On your Android phone or tablet, open the Google Maps app . 2. At the bottom, tap **Saved offline route**. Tip: • If you save a route from "Your location" and look up a saved route, the directions will start from the place where you saved the route. The directions won't start from your current location. • To get updated information like traffic, tap Refresh . • Turn-by-turn navigation isn't currently available for saved routes. To search for places and get turn-by-turn navigation, download an offline area. **Attachment 32 (Get directions & show routes) at 3.**

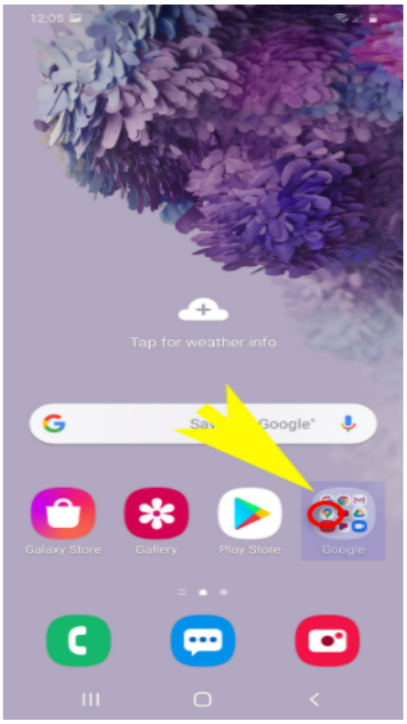
Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 31 (Download google map) at 2.**
and wherein the first processor determines user navigation information and displays the user navigation information according to the location of the wireless mobile communications device with respect to the geographic features and a destination specified at the wireless mobile communications device,	Plaintiff contends the motherboard processor (i.e., processor on the motherboard) of each Exhibit-B-listed item (i.e., mobile Wireless communications device) meets this limitation. The processor processes location-service information, including displaying user navigation information according to the device's location with regards to geographic features and a user-specified Destination. For example, using Google map app for more examples of location services processed by each Exhibit-B device's motherboard processor) the device user locates the device's current location on the google map app and then provide details for a destination on the options, provided in the Google map app. The user can then navigate (i.e., the processor processes display information) in real time from current location to destination. The processor displays navigation in the Google Maps app to display turn-by-turn directions. Using the Google map app, the processor will show the directions and use real-time traffic information to find the best route to the specified destination. The following exemplifies this limitation's existence in Accused Systems:

Claim 1	Corresponding Structure in Accused Systems

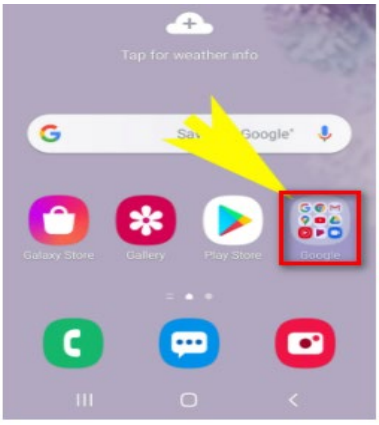


NETWORK	Technology	GSM / HSPA / LTE	GSM / HSPA / LTE / 5G	GSM / CDMA / HSPA / EVDO / LTE / 5G
LAUNCH	Announced	2020, August 03	2020, September 30	2020, September 30
	Status	Available. Released 2020, August 20	Available. Released 2020, November 05	Available. Released 2020, October 15
BODY	Dimensions	144 x 69.4 x 8.2 mm (5.67 x 2.73 x 0.32 in)	153.9 x 74 x 8.2 mm (Sub-6) or 8.5 mm (Sub-6 and mmWave)	144.7 x 70.4 x 8 mm (5.70 x 2.77 x 0.31 in)
	Weight	143 g (5.04 oz)	168 g (5G Sub-6); 171 g (5G Sub-6 and mmWave) (5.93 oz)	151 g (5.33 oz)
	Build	Glass front (Gorilla Glass 3), plastic back, plastic frame	Glass front (Gorilla Glass 3), plastic back, plastic frame	Glass front (Gorilla Glass 6), aluminum back, aluminum frame
	SIM	Nano-SIM and/or eSIM	Nano-SIM and/or eSIM	Nano-SIM and/or eSIM
				IP68 dust/water resistant (up to 1.5m for 30 mins)
DISPLAY	Type	OLED, HDR	OLED, HDR	OLED, 90Hz, HDR10+
	Size	5.81 inches, 83.2 cm^2 (~83.3% screen-to-body ratio)	6.2 inches, 95.7 cm^2 (~84.1% screen-to-body ratio)	6.0 inches, 87.6 cm^2 (~85.9% screen-to-body ratio)
	Resolution	1080 x 2340 pixels, 19.5:9 ratio (~443 ppi density)	1080 x 2340 pixels, 19.5:9 ratio (~413 ppi density)	1080 x 2340 pixels, 19.5:9 ratio (~432 ppi density)
	Protection	Corning Gorilla Glass 3	Corning Gorilla Glass 3	Corning Gorilla Glass 6
		Always-on display	Always-on display	Always-on display
PLATFORM	OS	Android 10, upgradable to Android 11	Android 11	Android 11
	Chipset	Qualcomm SDM730 Snapdragon 730G (8 nm)	Qualcomm SM7250 Snapdragon 765G (7 nm)	Qualcomm SM7250 Snapdragon 765G (7 nm)
	CPU	Octa-core (2x2.2 GHz Kryo 470 Gold & 6x1.8 GHz Kryo 470 Silver)	Octa-core (1x2.4 GHz Kryo 475 Prime & 1x2.2 GHz Kryo 475 Gold & 6x1.8 GHz Kryo 475 Silver)	Octa-core (1x2.4 GHz Kryo 475 Prime & 1x2.2 GHz Kryo 475 Gold & 6x1.8 GHz Kryo 475 Silver)
	GPU	Adreno 618	Adreno 620	Adreno 620

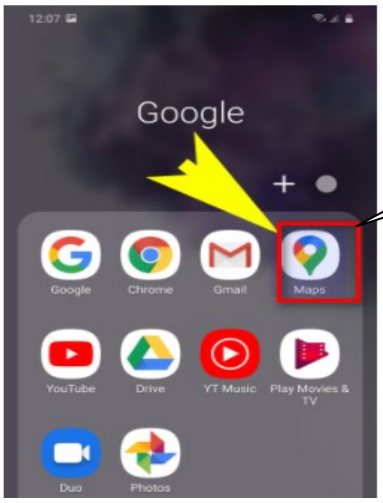
Attachment 4 (Processor of Google Pixel 4a, Pixel 4a 5G, and Pixel 5) at 1.

Claim 1	Corresponding Structure in Accused Systems
	Using Turn-by-Turn Navigation with the Galaxy S20 Google Maps **Time Needed :** 8 minutes The following steps demonstrate the actual process of setting up and utilizing turn-by-turn navigation system with the Google Maps app on the new Samsung Galaxy S20 handset. Before you begin, verify and ensure that location is enabled on your phone. It has to be enabled so that your device can determine your current location. 1. **Tap to open the Google folder fro he Home screen.** A new screen consisting of Google-rela ps and services will be displayed.  Google Maps preloaded in the Wireless mobile communication devices (Exhibit B), such as Galaxy S20. Current location of the device is determined if location is enabled **Attachment 5 (how to use turn by turn Google map) at 1.**

Claim 1	Corresponding Structure in Accused Systems



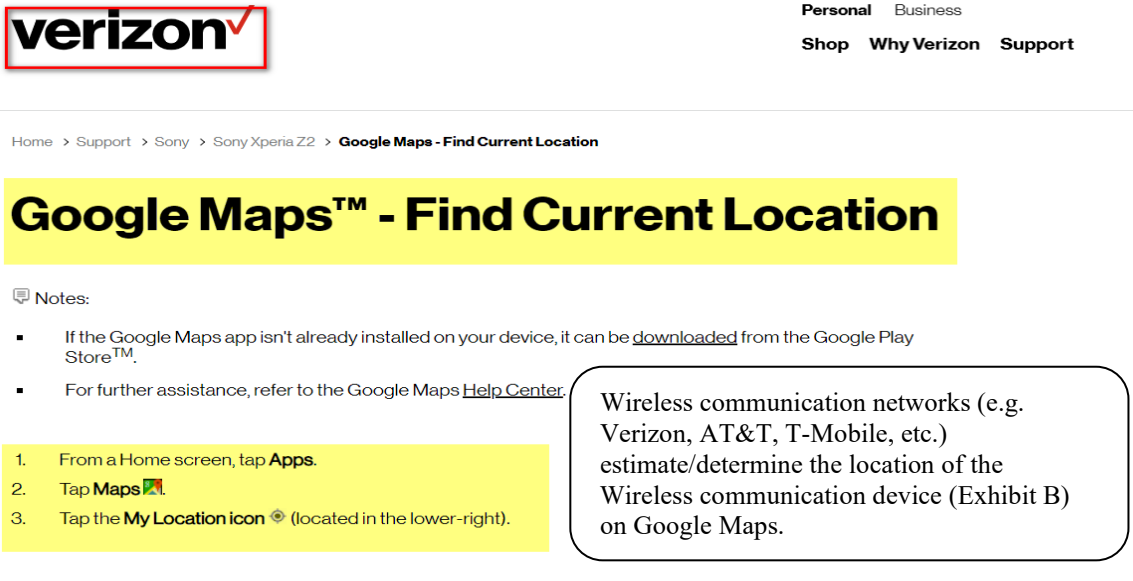
2. **Tap Maps to open Google Maps app.**
If this is the first time you use Google Maps on your Galaxy S20, you'll be prompted with a Welcome screen. If you see this screen, read and review the information then tap **GOT IT** to proceed.



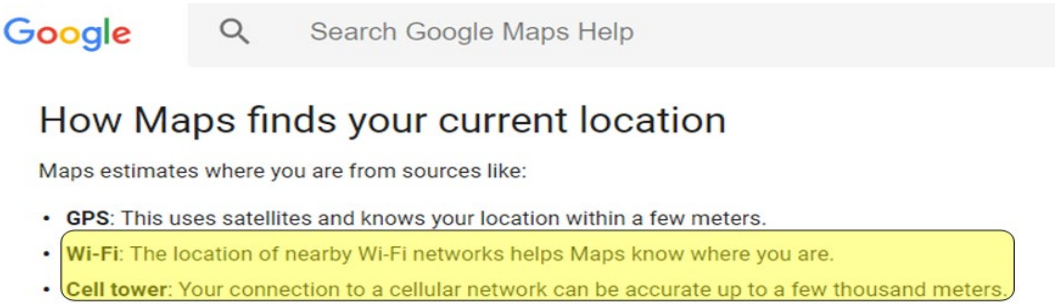
Google Maps preloaded in the Wireless mobile communication devices (Exhibit B), such as Galaxy S20.

Attachment 5 (how to use turn by turn google map) at 2&3.

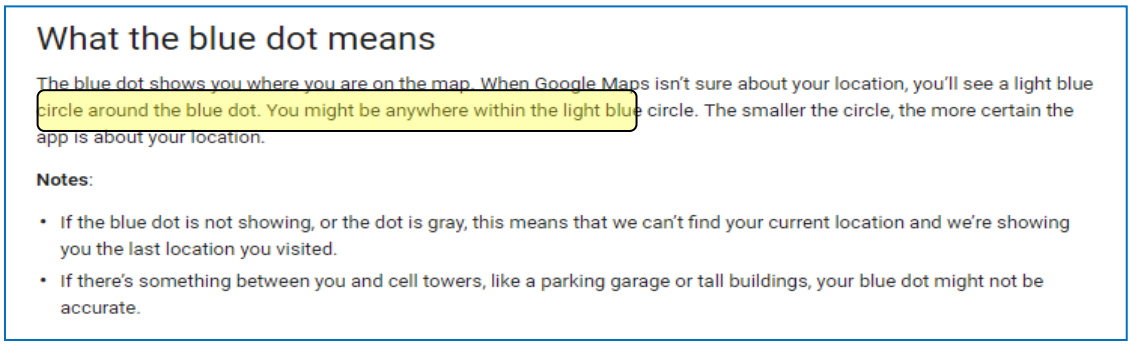
Claim 1	Corresponding Structure in Accused Systems



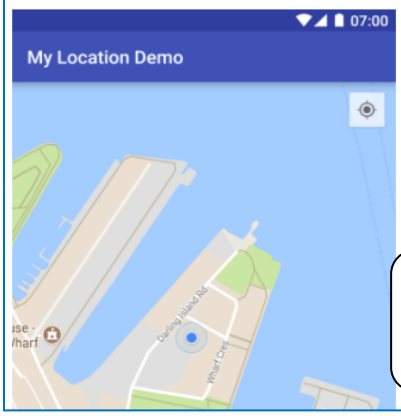
Attachment 6 (Find Current Location on Google map) at 1.



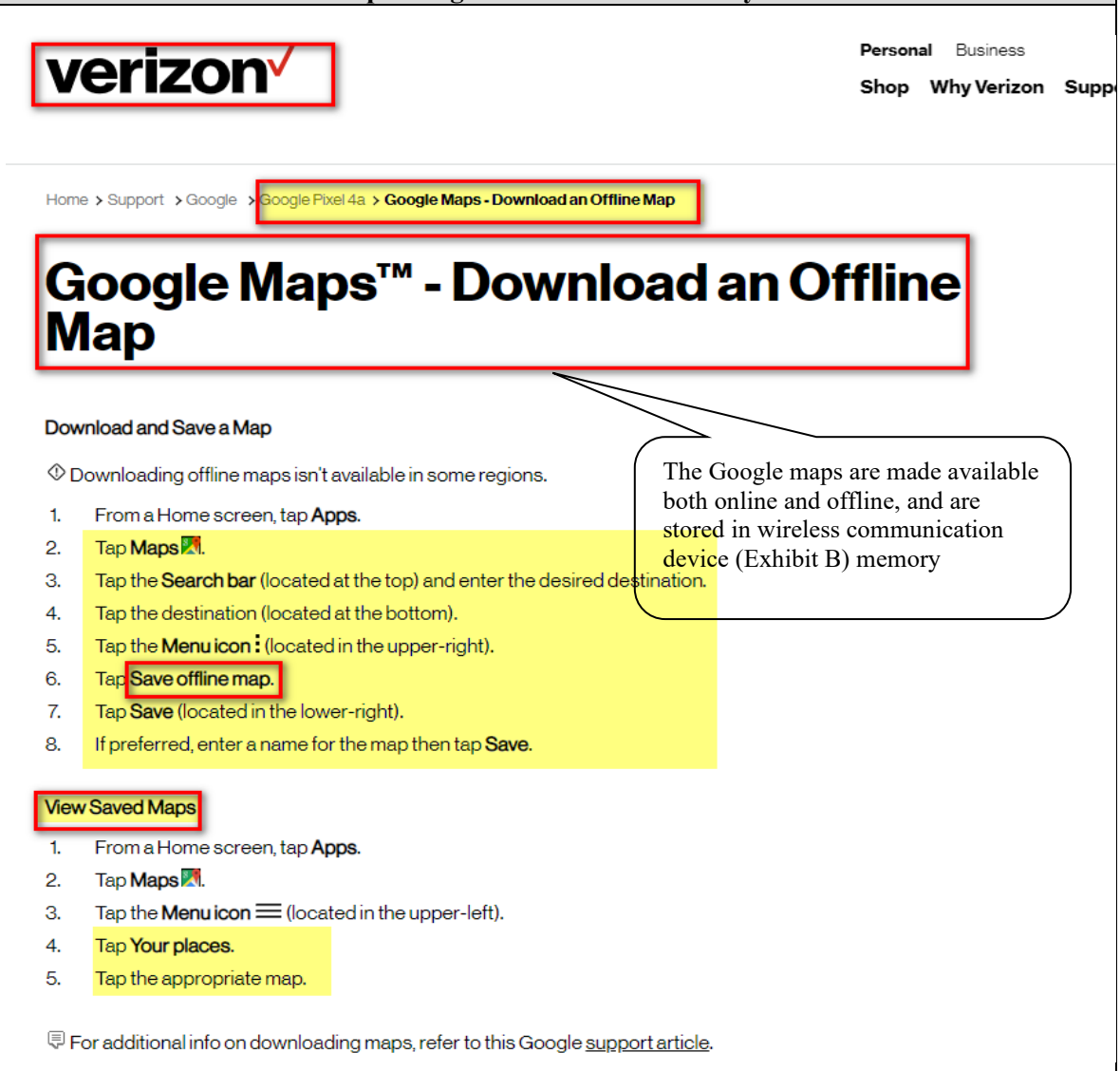
Attachment 8 (How map finds your current location) at 2.



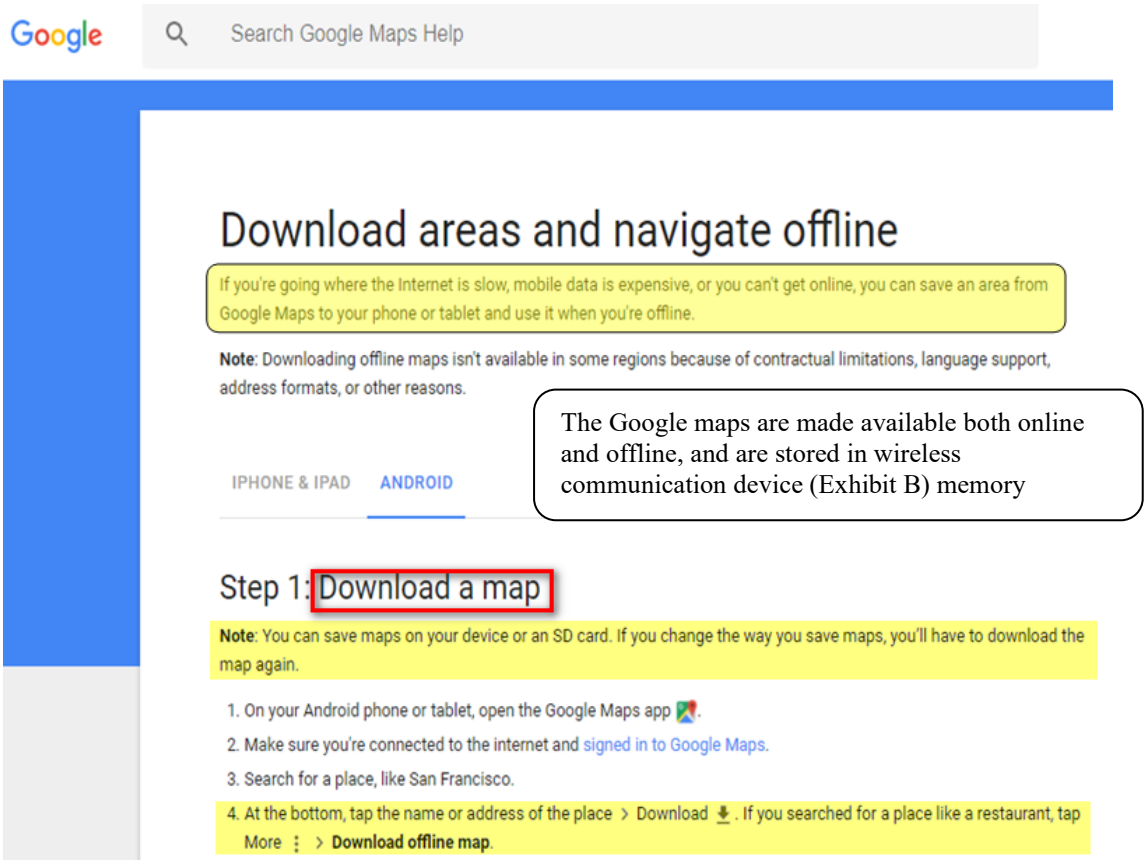
Attachment 8 (Current location shown on google map) at 3.

Claim 1	Corresponding Structure in Accused Systems
	The following screenshot shows the My Location button at top right and the My Location blue dot in the center of the map:  Blue Dot indicating location the map Processor of the wireless communication device estimate the location of the wireless communication device (Exhibit B) from wireless communication network. The Blue dot showing estimated location. Geographical features cities, streets, etc., on Google Maps **Source:** Location estimation on the Wireless communication device **Attachment 22 (Location estimation on the Wireless communication device) at 10.**

Claim 1	Corresponding Structure in Accused Systems



Attachment 10 (Google Map-Download an offline map on Pixel 4a) at 1.

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 9 (Mapping information stored on wireless communication device) at 1.**

Claim 1	Corresponding Structure in Accused Systems

Get directions & show routes

You can get directions for driving, public transit, walking, or biking on Google Maps. Whenever you find multiple routes, the best route to your destination is blue. Other routes are in gray on the map.

Some directions in Google Maps are in beta, and may have limited availability. Always be cautious when using directions on Google Maps, remain aware of your surroundings at all times, and take necessary means to ensure safety of yourself and those around you. When in doubt, follow actual traffic regulations by confirming signage from the road or path that you are on when using directions.

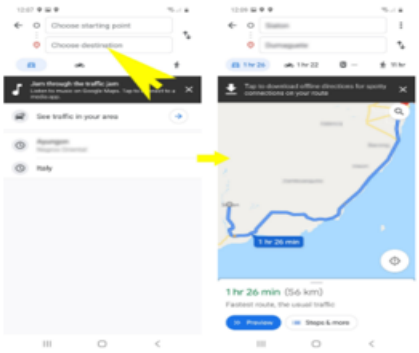
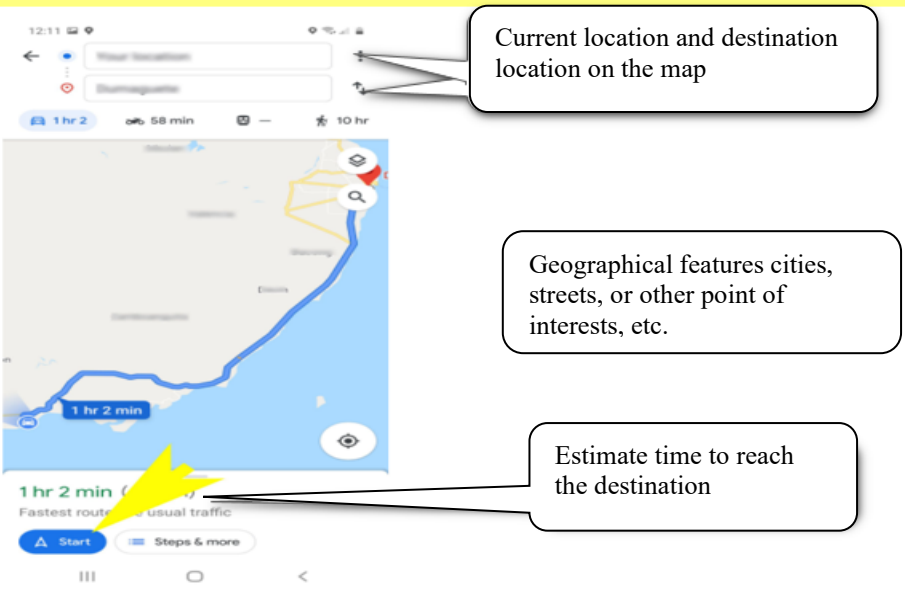
Android Computer iPhone & iPad

1. On your Android phone or tablet, open the Google Maps app .
2. Search for your destination or tap it on the map.
3. In the bottom left, tap Directions .
4. Choose one of the following:
   - **Driving:**
   - **Motorcycle:**
   - **Transit:**
   - **Walking:**
   - **Rides:**
   - **Cycling:**
5. To get the list of directions, tap the bar at the bottom that shows travel time and distance.
6. To choose another route, tap it on the map. Each route shows the estimated travel time on the map.

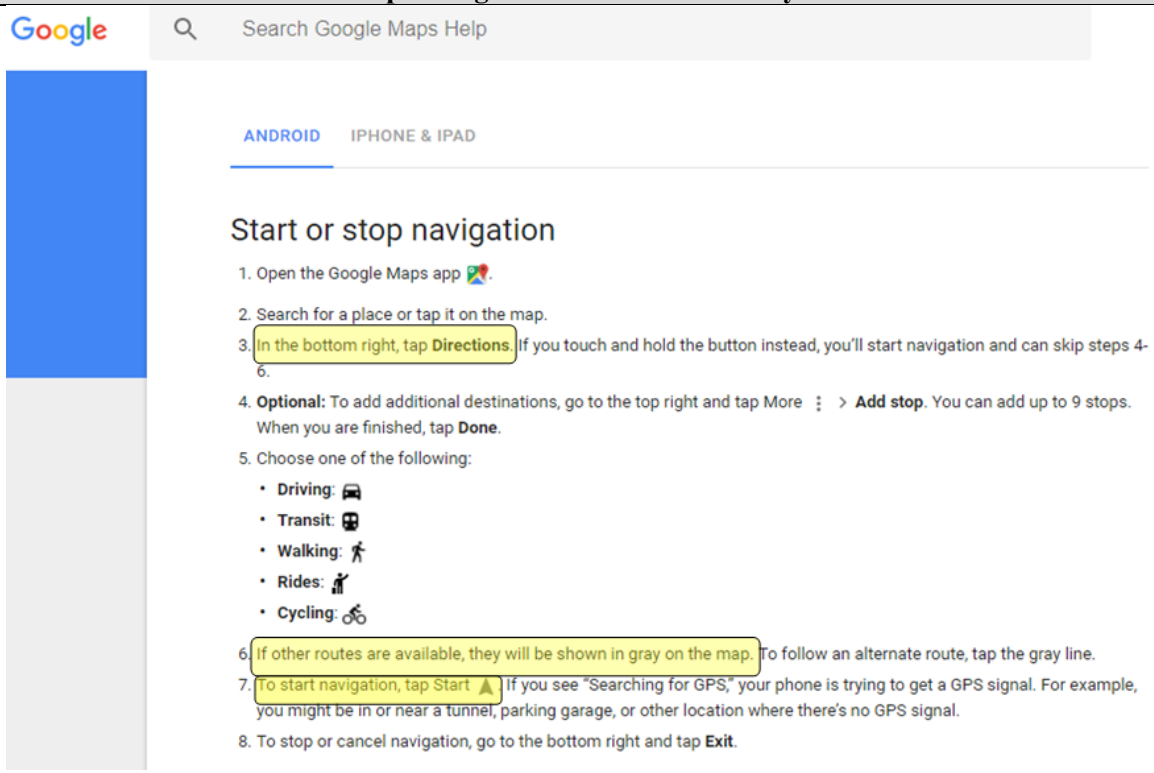
Tip:

- For transit directions, choose a route, then tap the bar at the bottom that shows travel time and distance.
- Not all cities have public transit directions in Google Maps. Learn which cities are covered .
- For Driving and Transit directions, to pin your favorite trips, tap Pin at the bottom. Learn more about how to pin your favorite trips.

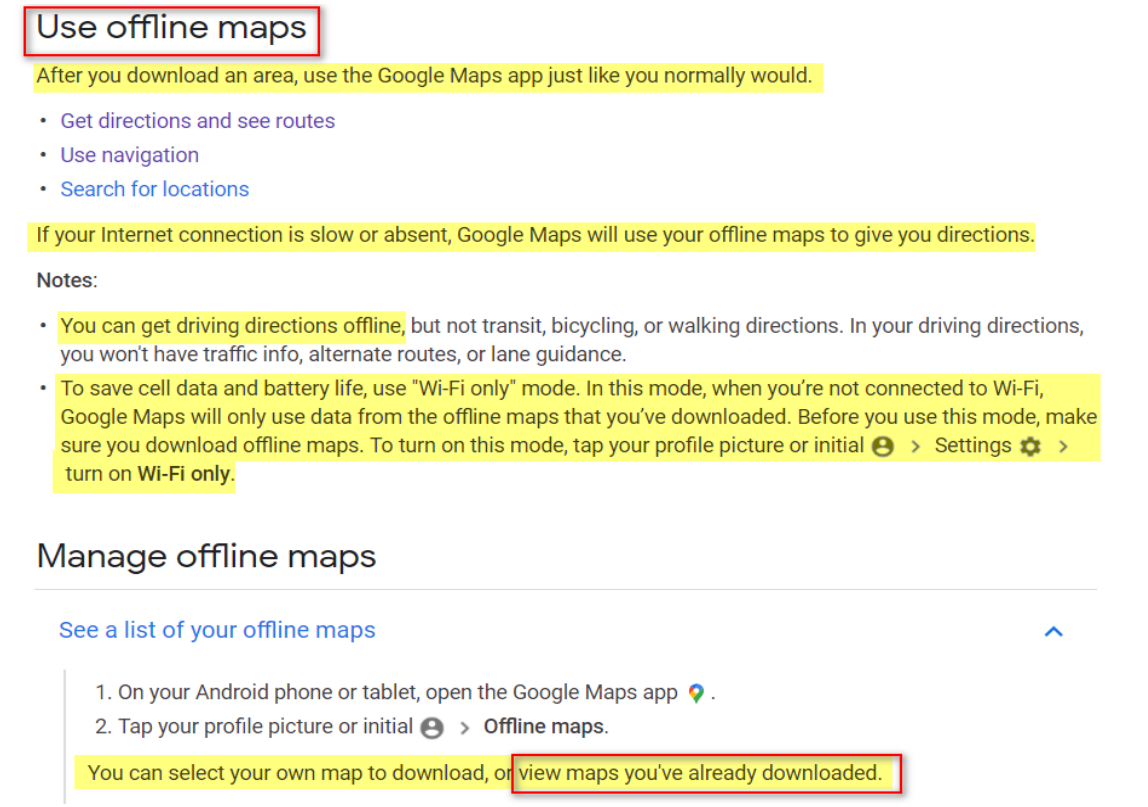
Attachment 32 (Get directions & show routes) at 3.

Claim 1	Corresponding Structure in Accused Systems
	4. **Tap the Choose destination field to specify your target location as a travel destination.** On the next screen, simply type in the name of the place where you'd like to travel to. If prompted, select the correct location from the search result.  Navigation Information displayed to user based on destination entered on the Wireless communication device (Exhibit B). 5. **After entering your destination, tap the Start button at the bottom-left corner of the screen.** That should prompt the app to start giving turn by turn navigation instructions.  **Attachment 5 (Navigation based on destination entered on Google Maps) at 4 & 5.**

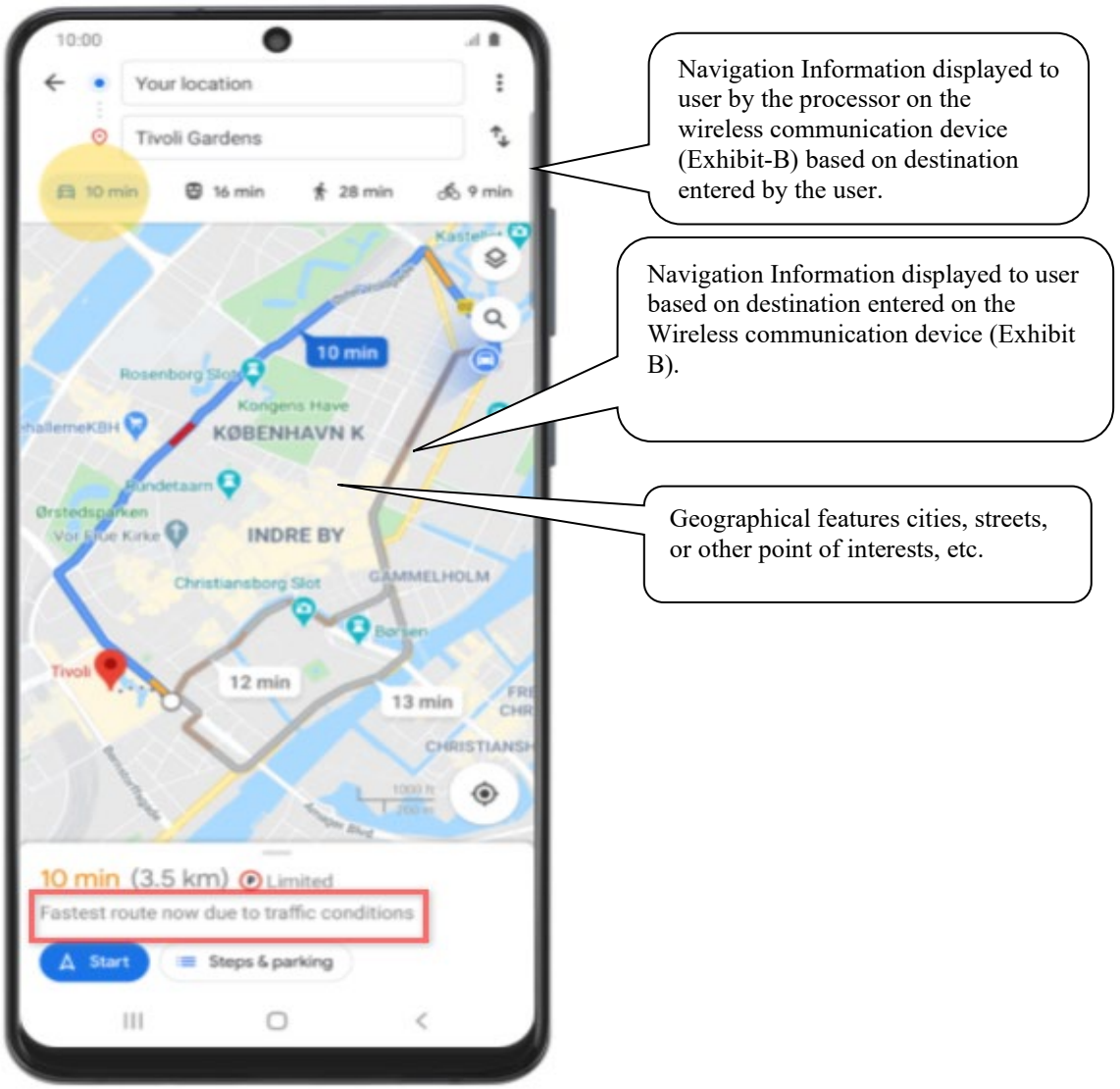
Claim 1	Corresponding Structure in Accused Systems

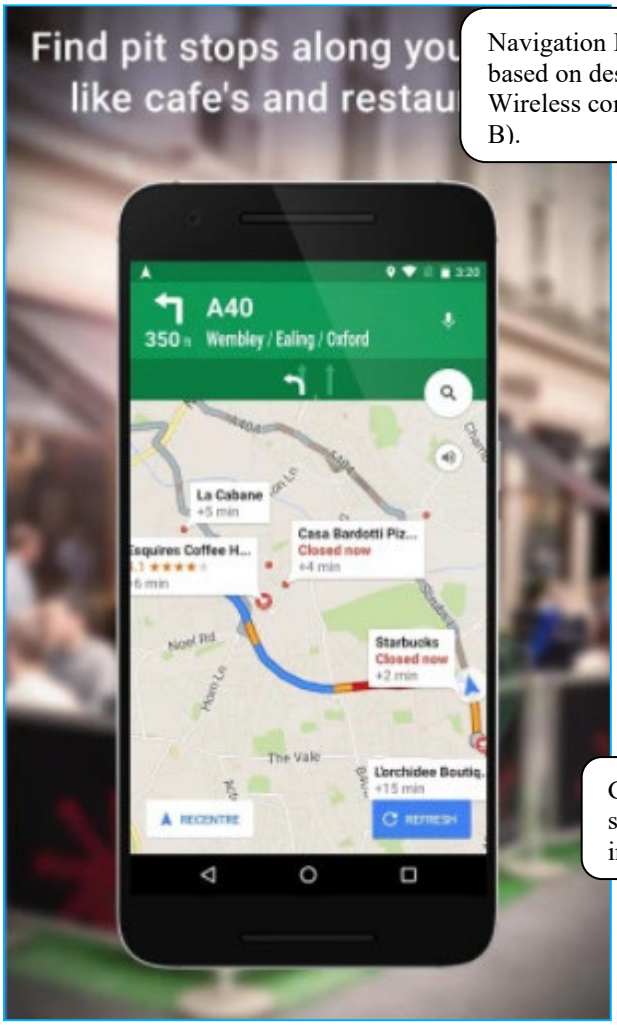


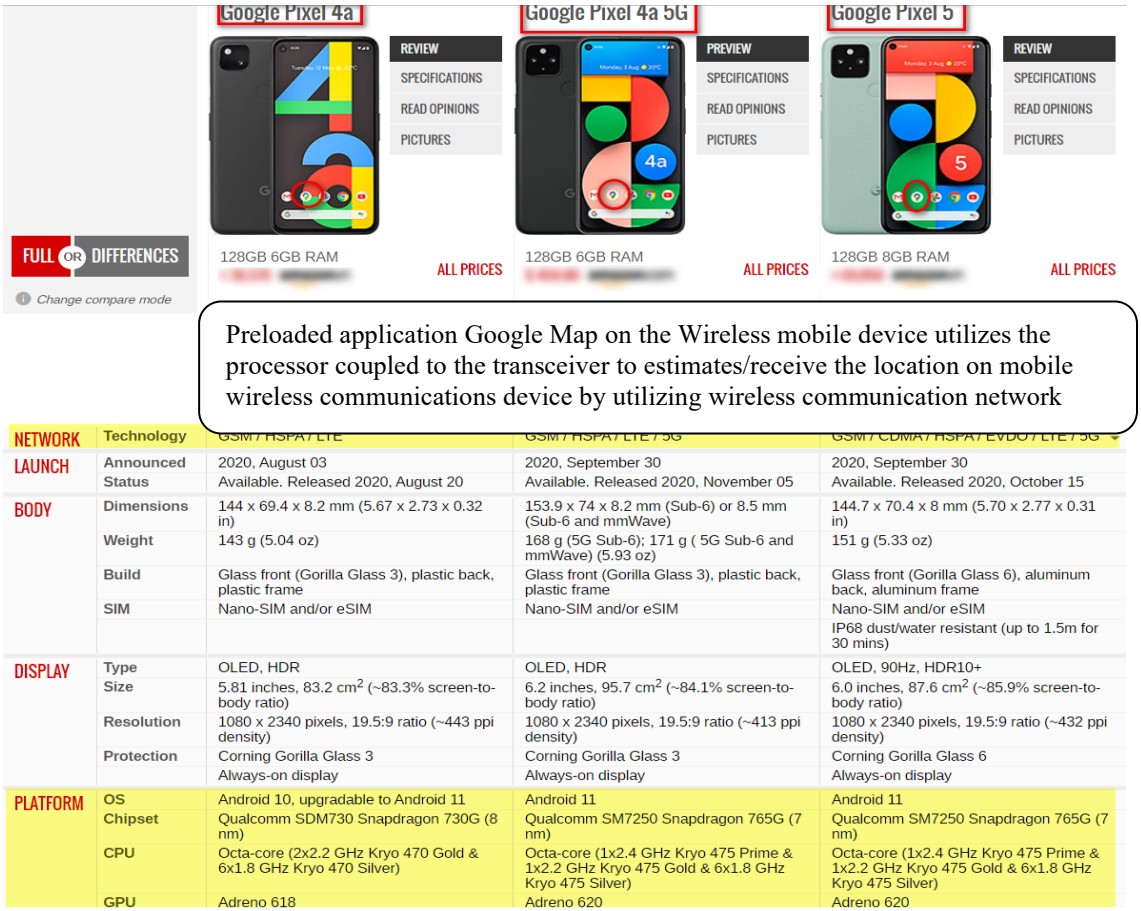
Attachment 11 (Navigation based on destination entered on Google Maps) at 1 & 2.

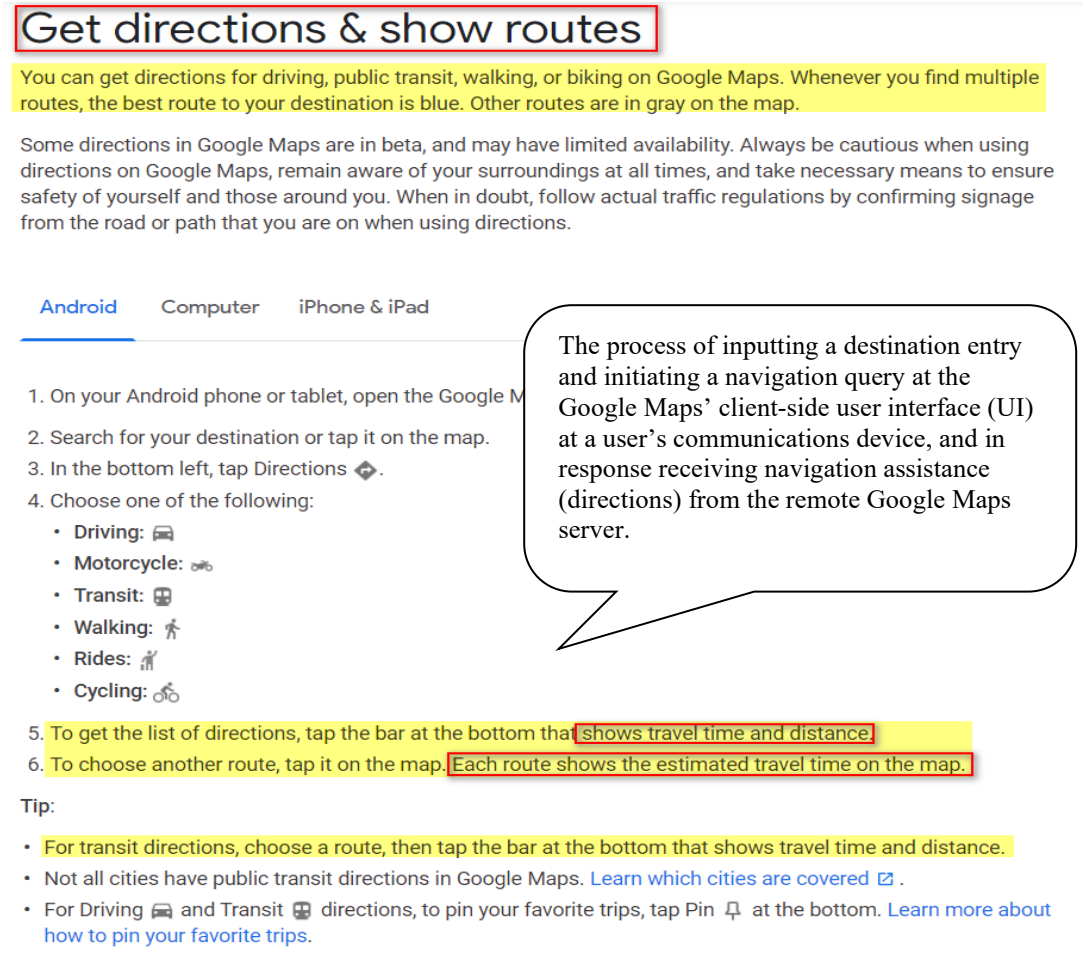


Attachment 31 (Download google map) at 2.

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 25 (Use Google Maps - Samsung Galaxy S20 Ultra 5G) at 6.**

Claim 1	Corresponding Structure in Accused Systems
	 Navigation Information displayed to user based on destination entered on the Wireless communication device (Exhibit B). Current location on the map Geographical features cities, streets, or other point of interests, etc. **Source:** Navigation based on destination entered on Google Maps
wherein the first processor further sends the user navigation information to the network as a number of segments, wherein at least one other processor outside the network updates the user navigation information in conformity with traffic congestion	Plaintiff contends each item listed on Exhibit B corresponds to this claim limitation because each Exhibit-B item includes a processor. Wireless mobile communication device- including but not limited to Google's branded devices such as Google Pixel 5, pixel 4a 5G, pixel 4a, pixel 4 XL, pixel 4, pixel 3a XL, pixel 3a, pixel 3 XL, pixel 3, pixel 2, pixel 2 XL, pixel XL, pixel, pixel C or other (third-parties) branded devices such as Samsung Galaxy S20 Ultra, Galaxy S20 plus, Galaxy S20, Galaxy Z fold, Galaxy S10, Galaxy A series, etc. (refer Exhibit B for complete list) has a processor, for example, Quad-Core/ Octa-core processor. Further, the Google Maps utilizing the processor can send the user navigation information to the network as a number of segments as to receive the traffic information for the segments, it is required to send the navigation information to the network as a number of segments. As can be seen from the citations, the wireless communications device (Exhibit-B), having a processor, while navigating keeps on communicating the navigation information to the wireless communication network. The Google Maps hardware/software in the wireless communication network computes the average speed (numerical value) or average delays for each segment based on traffic congestion information for each segment. The updated information in response to the user's current navigation information is then transmitted by Google Maps hardware/software to

Claim 1	Corresponding Structure in Accused Systems
information accessible to the at least one other processor outside the network by computing a numerical value for the segments corresponding to the expected time to travel through the segments, updates the user navigation information in conformity with the numerical values for the segments, and sends the updated user navigation information to the wireless mobile communications device;	the wireless communication device (Exhibit-B). The Google Map provides the user of the wireless communication device with the delays from traffic, summary of incidents and the average speed of each segment on the traffic page and also provides the user with the suggested navigation information with the received traffic information. The suggested route screen shows the proposed new route, outlining the original and suggested route, as well as listing the estimated time saved. The following exemplifies the existence of this limitation in Accused Systems:  **Attachment 4 (Processor of Google Pixel 4a, Pixel 4a 5G and Pixel 5) at 1.**

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 32 (Get directions and show routes - Android - Google Maps Help) at 1.**

Claim 1	Corresponding Structure in Accused Systems

Save a route

1. On your Android phone or tablet, open the Google Maps app .
2. Make sure you're connected to the Internet.
3. Search for your destination or tap it on the map.
4. In the bottom left, tap Directions .
5. From the top, choose your mode of transit.
6. Tap the white bar at the bottom. It's the one that shows the travel time and distance.
7. At the bottom, tap **Save offline**.

Tip:

- Your route is saved on your phone or tablet. Make sure to use the same phone or tablet when looking for a saved route.
- Your saved route expires after 30 days.
- Your route will show you the same mode of transit you chose when you saved the route.

Find a saved route

1. On your Android phone or tablet, open the Google Maps app .
2. At the bottom, tap **Saved offline route**.

Tip:

- If you save a route from "Your location" and look up a saved route, the directions will start from the place where you saved the route. The directions won't start from your current location.
- To get updated information like traffic, tap Refresh .
- Turn-by-turn navigation isn't currently available for saved routes. To search for places and get turn-by-turn navigation, download an offline area.

Attachment 32 (Get directions & show routes) at 3.

Update offline maps

Offline maps that you downloaded on your phone or tablet need to be updated before they expire. When your offline maps expire in 15 days or less, Google Maps will try to update the area automatically when you're connected to Wi-Fi.

If your offline maps aren't automatically updated, you can update them by following the steps below.

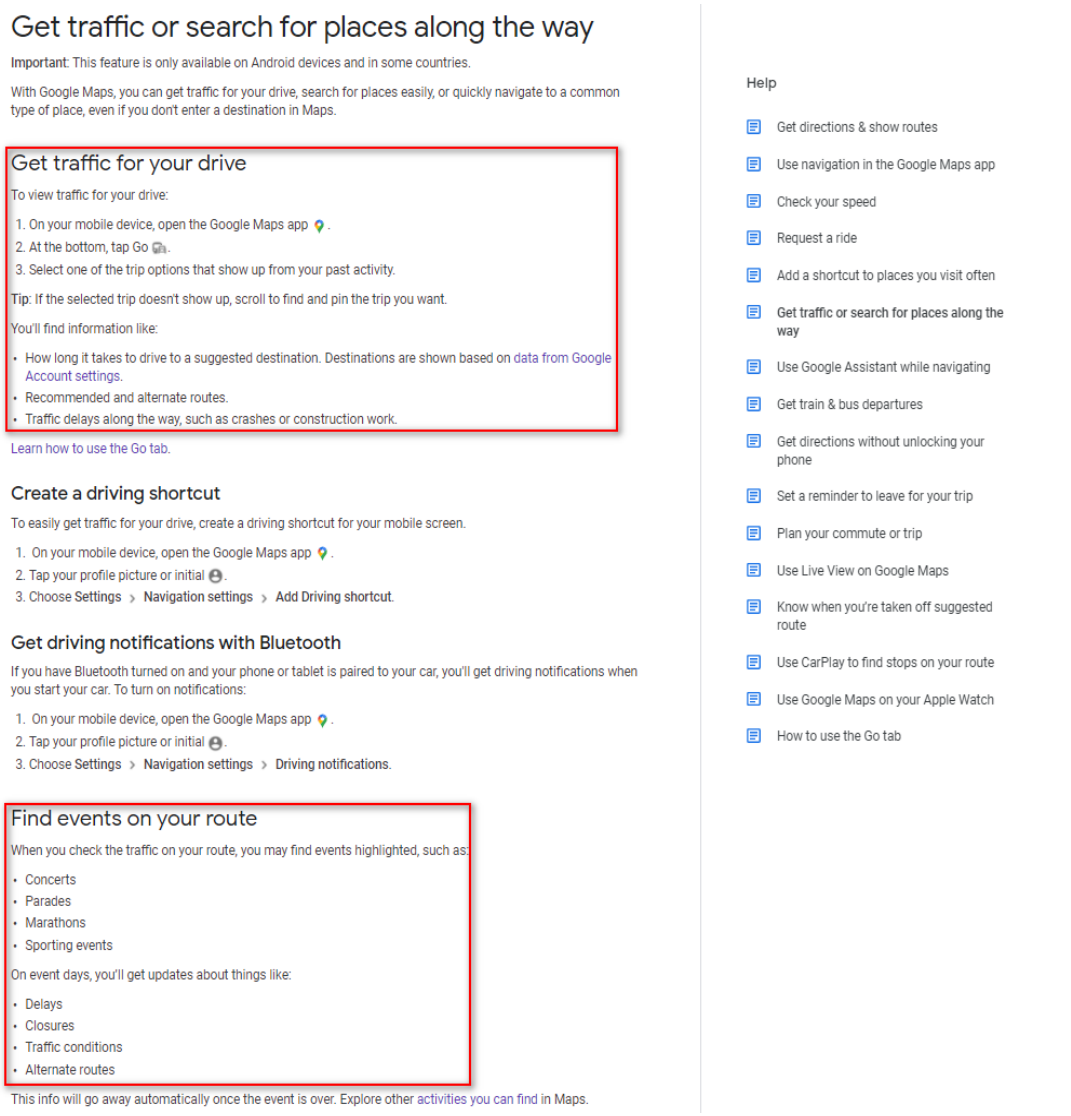
From the notification

1. In the "Update offline maps" notification, tap **Update Now**.
2. Tap the expired or expiring area on the list.
3. Tap **Update**.
4. The offline area will update.

From anywhere else

1. On your Android phone or tablet, open the Google Maps app .
2. Tap your profile picture or initial > **Offline maps**.
3. Tap the expired or expiring area on the list.
4. Tap Update.
5. The offline area will update.

Attachment 31 (Download google map) at 3.

Claim 1	Corresponding Structure in Accused Systems
	

Attachment 26 (Get traffic or search for places along the way - Google Maps Help) at 1.

Claim 1	Corresponding Structure in Accused Systems
	Putting it all together So how exactly does this all work in real life? Say you're heading to a doctor's appointment across town, driving down the road you typically take to get there. When you leave the house, traffic is flowing freely, with zero indication of any disruptions along the way. With Google Maps' traffic predictions combined with live traffic conditions, we let you know that if you continue down your current route, there's a good chance you'll get stuck in unexpected gridlock traffic about 30 minutes into your ride—which would mean missing your appointment. As a result, Google Maps automatically reroutes you using its knowledge about nearby road conditions and incidents—helping you avoid the jam altogether and get to your appointment on time. Predicting traffic and determining routes is incredibly complex—and we'll keep working on tools and technology to keep you out of gridlock, and on a route that's as safe and efficient as possible. **Attachment 35 (How AI helps predict traffic and determine routes - Google Maps) at 2.**

Claim 1	Corresponding Structure in Accused Systems

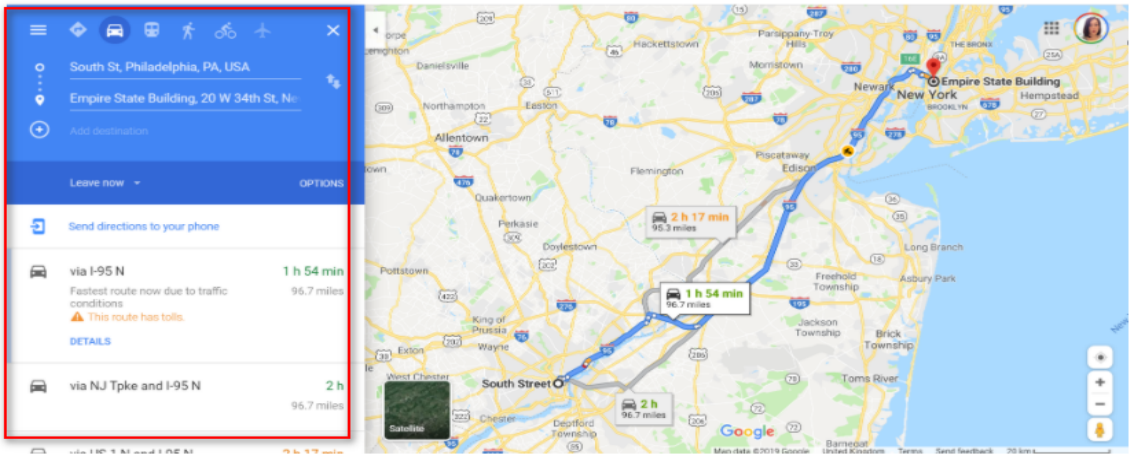
How to change your route on Google Maps on desktop

1. Open Google Maps and type in the address or name of the location you wish to travel to before pressing Enter.

2. Once the location comes up, click the Directions button beneath the info card. **3.** Enter the starting point for your journey. This could be your home address or wherever you'll be departing from.

4. Using the menu box above the journey information, choose which directions you would like to use - options for the purposes of this article include driving, public transit, cycling, and walking.

5. On the map, you'll notice outlines for several routes. The default one, or the one Google Maps believes is best, will be highlighted blue.



Jennifer Still/Business Insider

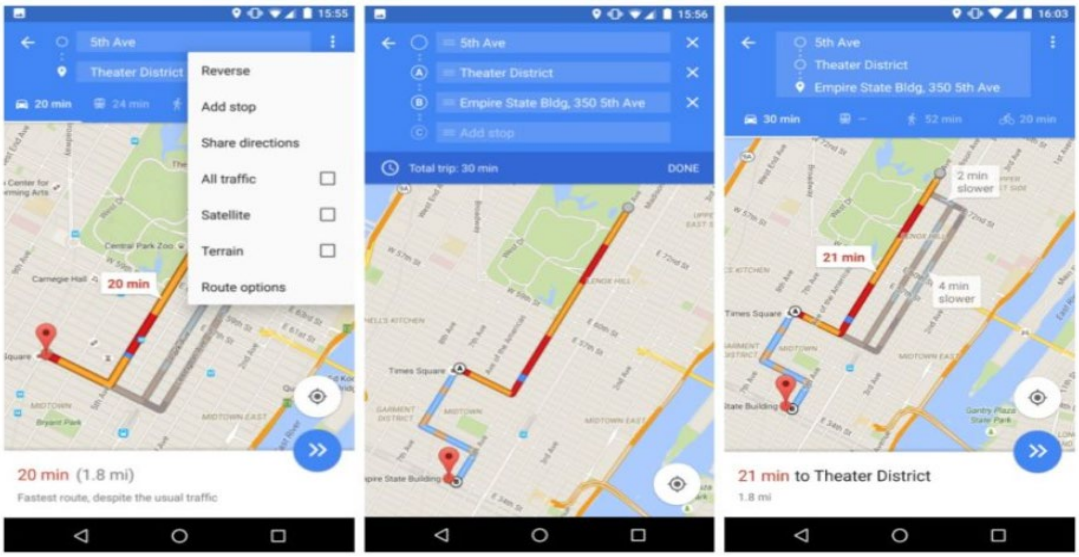
You can change your route by choosing one of the grey alternate ones, or dragging it to another route.

6. To choose an alternate route, either click on a greyed-out route on the map or click on one of the other routes listed on the left-hand side menu. Note that you can also change routes by clicking on one and dragging it so that the directions will take you via certain roads.

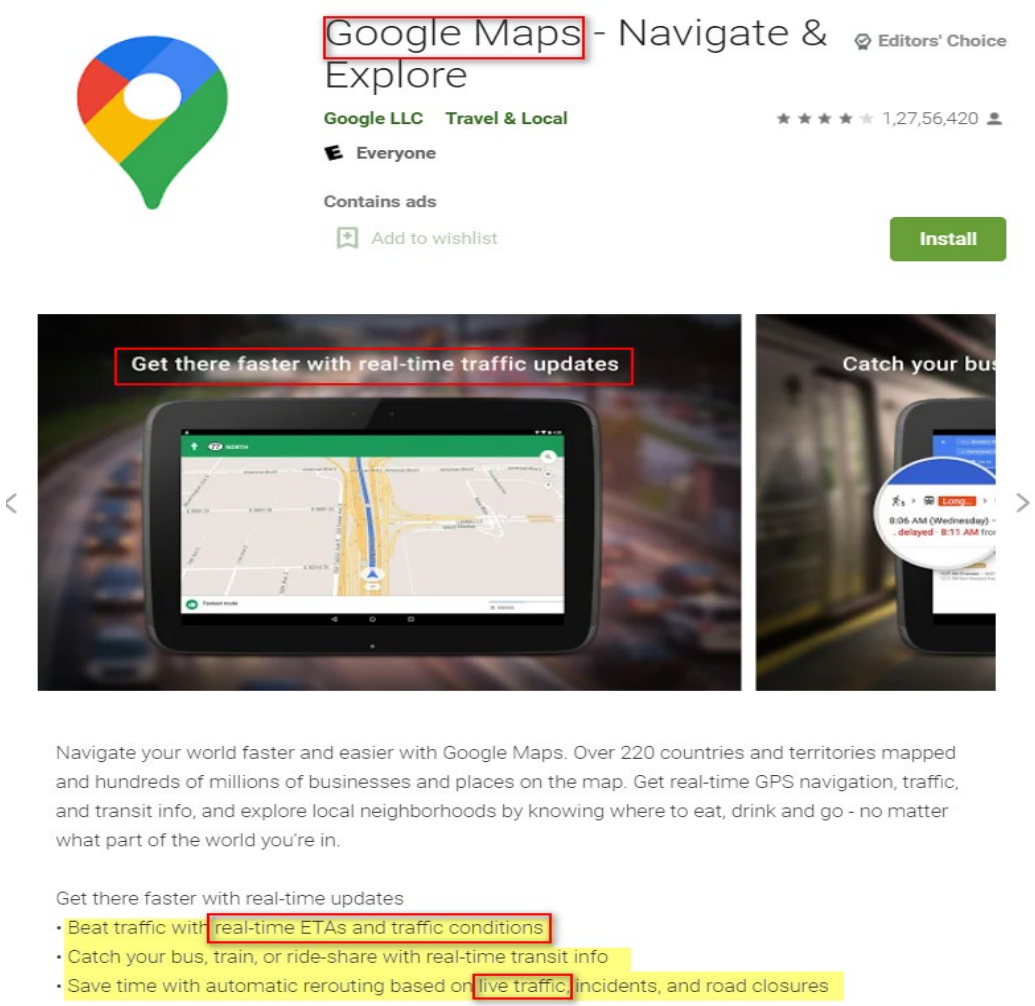
Attachment 37 (How to change the route on Google Map) at 3.

Google map Navigator hardware/software (Exhibit C) in the wireless network computes the estimated time delays (numerical value) for each segment corresponding to the time to travel through each segment. The updated information in response to user's current navigation information is then transmitted by the Google Map hardware/software (Exhibit C) to the wireless communication device (Exhibit-B)

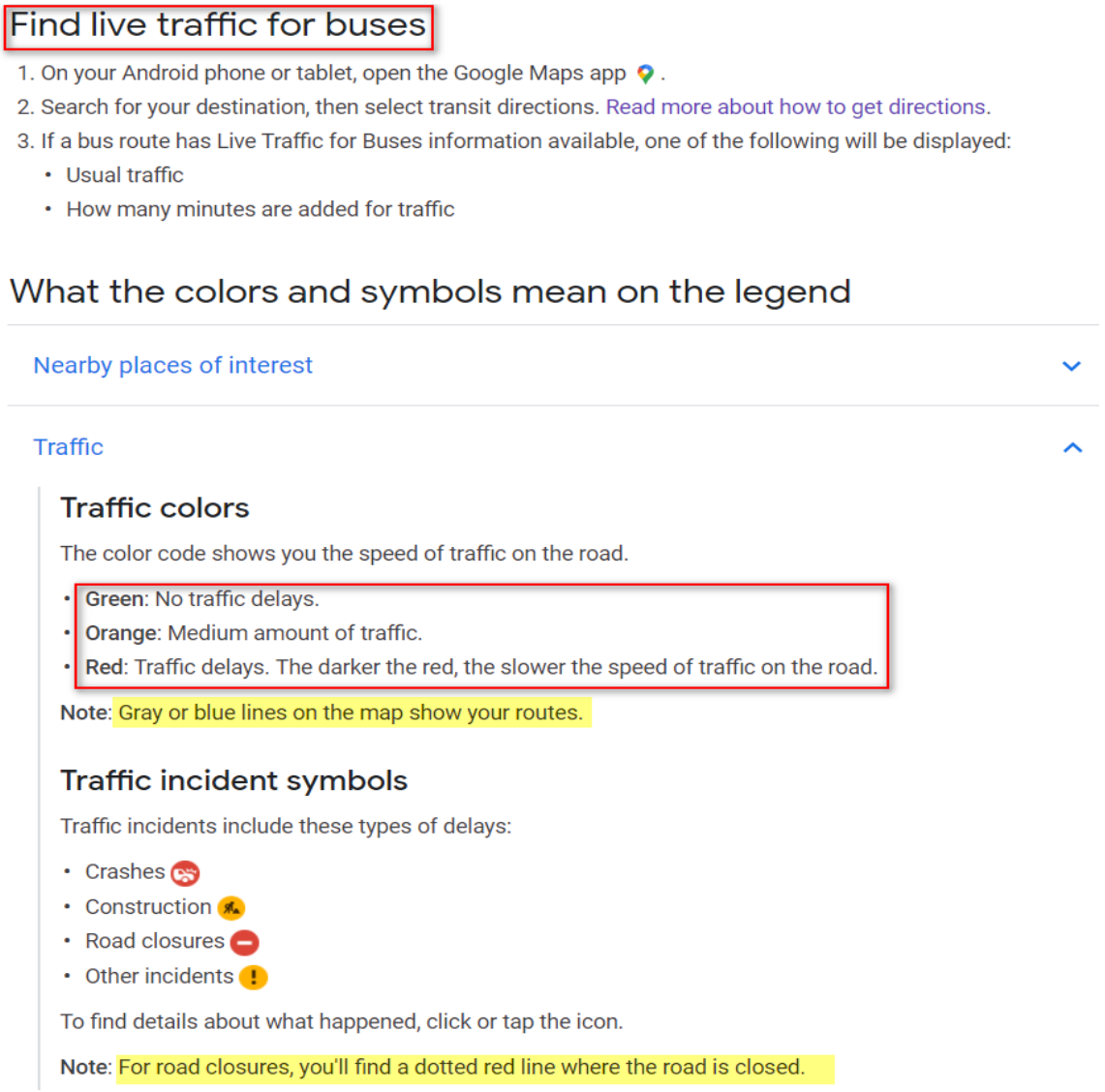
Claim 1	Corresponding Structure in Accused Systems

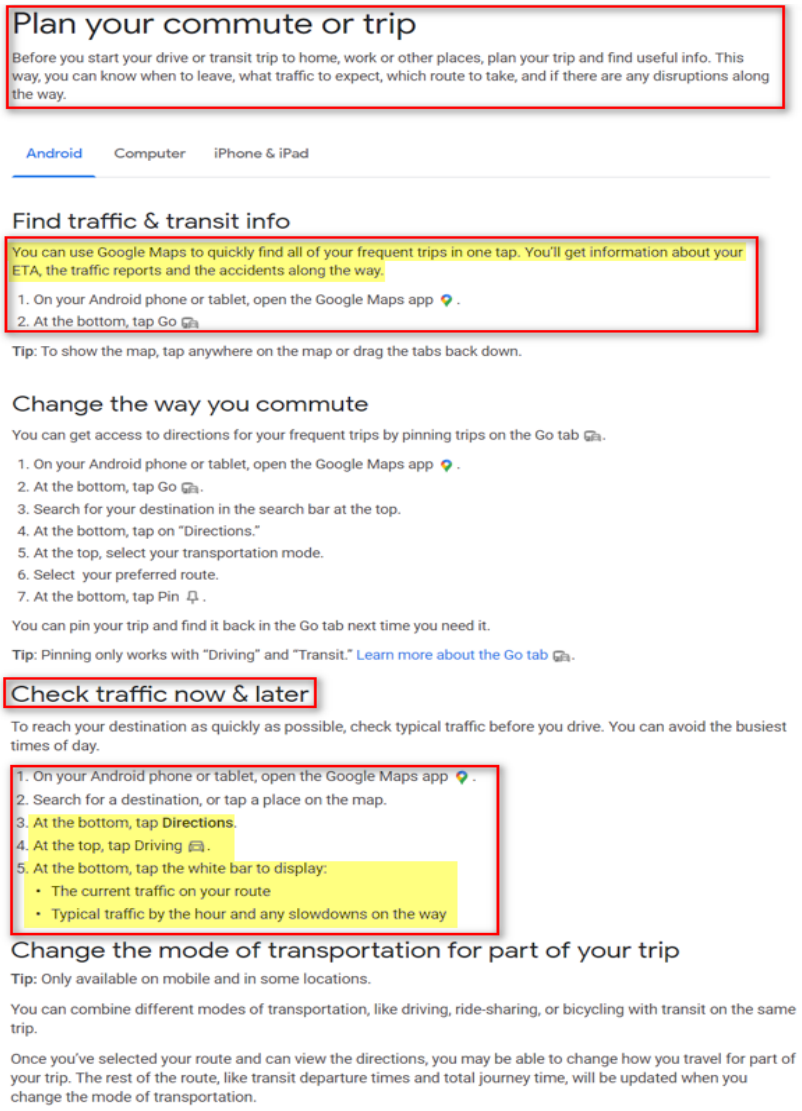


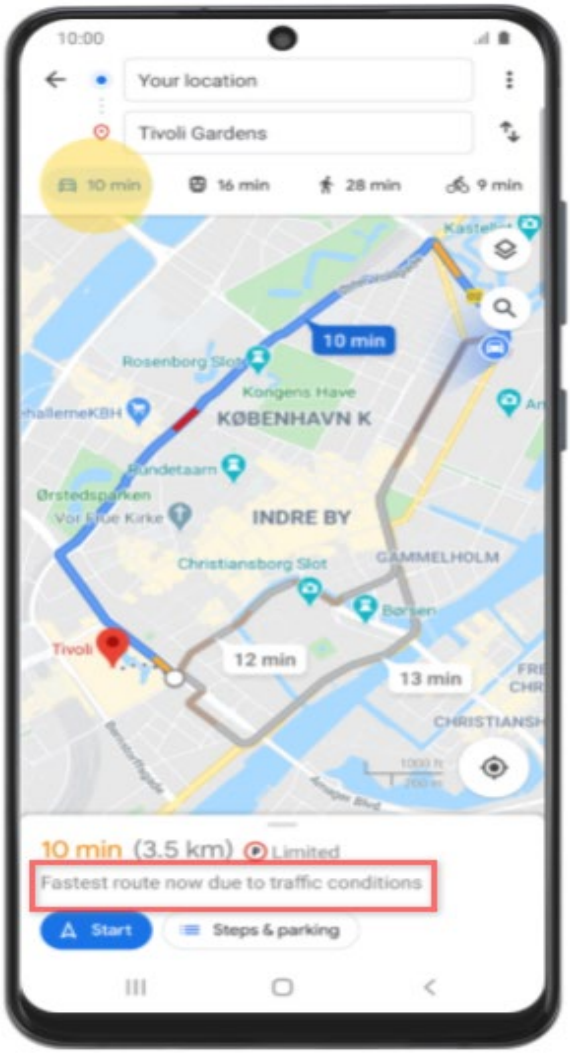
Attachment 24 (Traffic information summary on Google Maps) at 9.



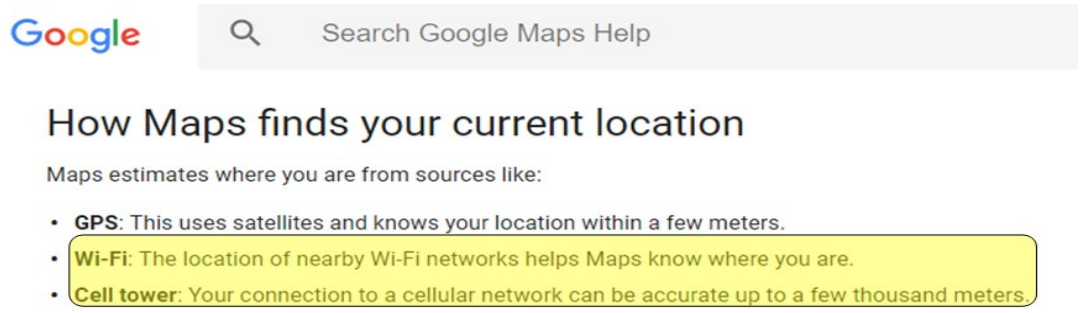
Attachment 23 (Google Maps – Navigation & Explore) at 1.

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 34 (View places, traffic, terrain, biking, and transit) at 2.**

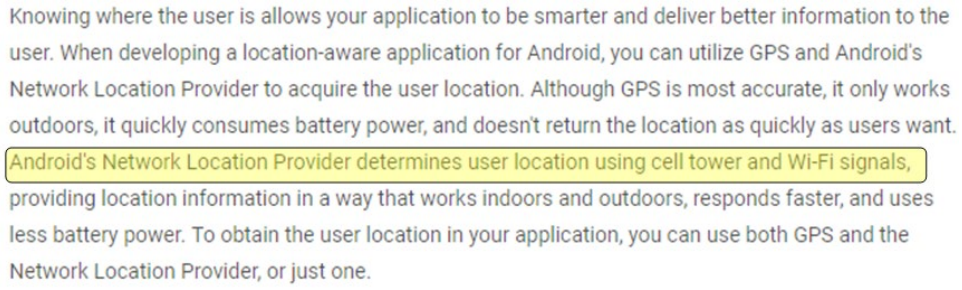
Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 36 (Plan your commute or trip) at 1&2.**

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 25 (Use Google Maps - Samsung Galaxy S20 Ultra 5G) at 6.**
at least one second radio-frequency transceiver and an associated at least one second antenna of the wireless communications network to which the second radio-frequency transceiver is coupled; and	Plaintiff contends each Accused System includes at least one item listed on Exhibit A, each of which is a base station and each of which is coupled to at least one antenna. Base station includes radio-frequency transceivers designed and used for radio-frequency communication with at least one antenna. When base-station transceivers and antennas are in communication, they are coupled. Further, in addition to being so coupled, the transceivers and antenna of each Exhibit-A item are also, by placement within a base station, physically coupled. The cell of the wireless communications network include base stations for transmission and reception of wireless signals to and from the mobile wireless communication devices or UEs or user devices (mobile phones, laptops, tablets, PDAs etc.). These base stations are, therefore, RF transceivers. Also, these base stations are coupled with at least one antenna for the function of transmission and reception. The following exemplifies this limitation's existence in Accused Systems:

Claim 1	Corresponding Structure in Accused Systems

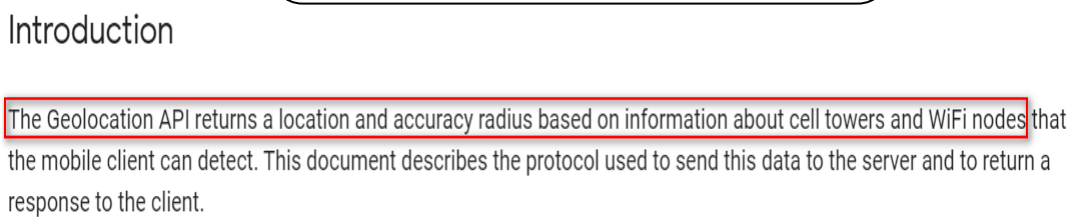


Attachment 8 (How map find your current location) at 2.



Attachment 12 (Location of the device determined using cell tower) at 1&2.

Google Maps provides location information based on cell towers/Wi-Fi nodes which form part of cellular communication network. These cell towers are radio frequency transceivers with antenna (Exhibit A).



Attachment 17 (Cell Towers/Wi-Fi Nodes (RF transceivers) in a wireless communication network) at 1

Claim 1	Corresponding Structure in Accused Systems

The first parameter in `requestLocationUpdates()` is the type of location provider to use (in this case, the Network Location Provider for cell tower and Wi-Fi based location). You can control the frequency at which your listener receives updates with the second and third parameter—the second is the minimum time interval between notifications and the third is the minimum change in distance between notifications—setting both to zero requests location notifications as frequently as possible. The last parameter is your `LocationListener`, which receives callbacks for location updates.

To request location updates from the GPS provider, use `GPS_PROVIDER` instead of `NETWORK_PROVIDER`. You can also request location updates from both the GPS and the Network Location Provider by calling `requestLocationUpdates()` twice—once for `NETWORK_PROVIDER` and once for `GPS_PROVIDER`.

Google Maps application makes use of wireless communication network, having cell towers (Exhibit A) or Wi-Fi access points (Exhibit A), to estimate the location of the Wireless communication device (Exhibit B).

Requesting User Permissi

In order to receive location updates from `NETWORK_PROVIDER` or `GPS_PROVIDER`, you must request the user's permission by declaring either the `ACCESS_COARSE_LOCATION` or `ACCESS_FINE_LOCATION` permission, respectively, in your Android manifest file. Without these permissions, your application will fail at runtime when requesting location updates.

If you are using both `NETWORK_PROVIDER` and `GPS_PROVIDER`, then you need to request only the `ACCESS_FINE_LOCATION` permission, because it includes permission for both providers. Permission for `ACCESS_COARSE_LOCATION` allows access only to `NETWORK_PROVIDER`.

Attachment 12 (Location is estimated using cell tower/wi-fi network) at 3 & 4.

Help your phone get a more accurate location (Google Location Services a.k.a. Google Location Accuracy)

Turn your phone's location accuracy on or off

1. Open your device's Settings app.
2. Tap **Location** > **Advanced** > **Google Location Accuracy**.
3. Turn **Improve Location Accuracy** on or off.

When Google Location Accuracy is on

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

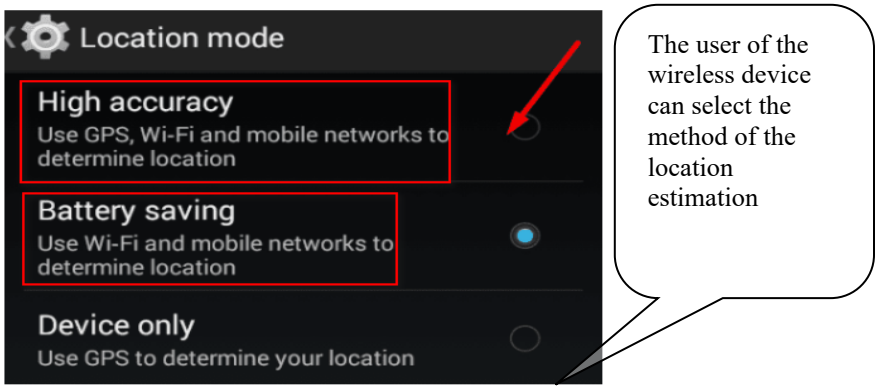
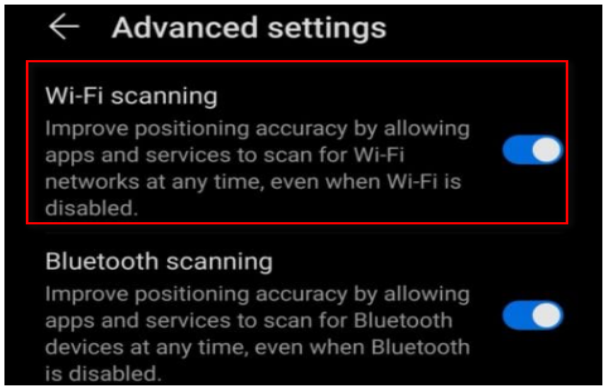
Wireless communication device receive the location of the Wireless communication device (Exhibit B) on Google Map from Wireless communication networks (e.g. Verizon, AT&T, T-Mobile, etc.)

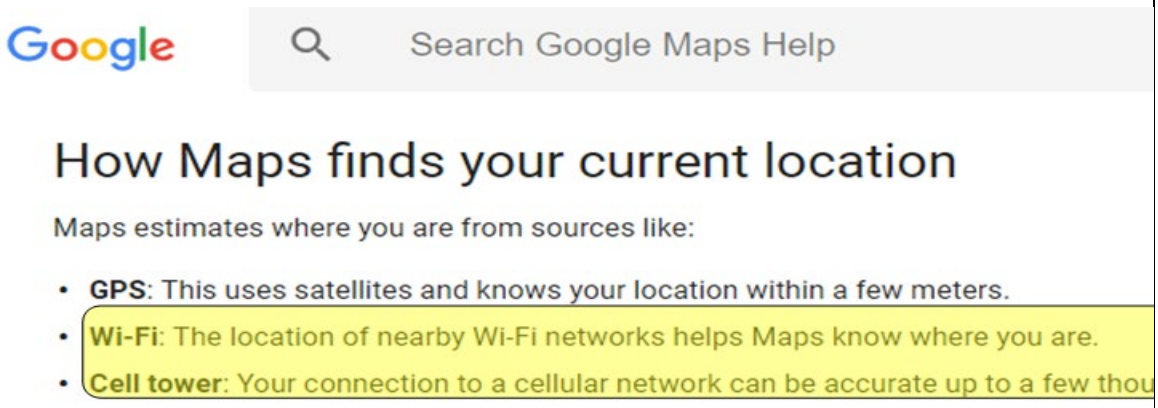
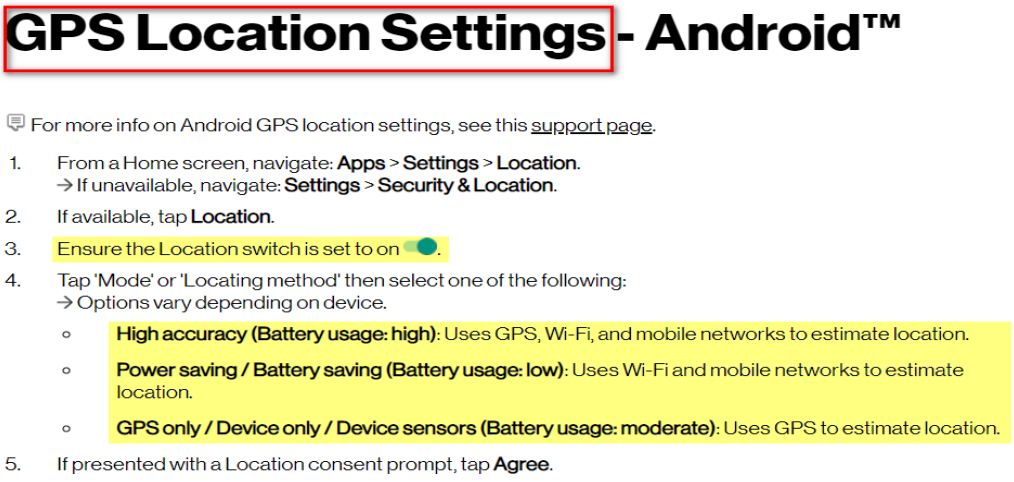
When Google Location Accuracy is off

Let your phone scan for nearby networks or devices

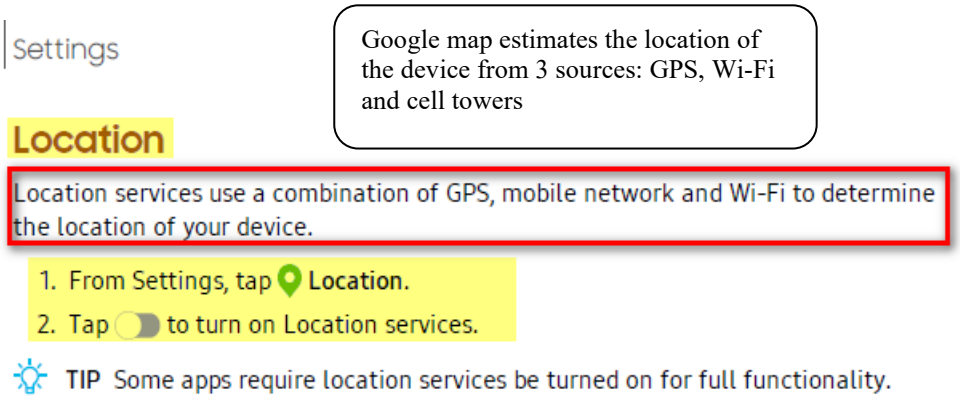
To help apps get better location info, you can let your phone scan for nearby Wi-Fi access points or Bluetooth devices.

1. Open your device's Settings app.
2. Tap **Location** > **Wi-Fi and Bluetooth scanning**.
3. Turn **Wi-Fi scanning** or **Bluetooth scanning** on or off.

Claim 1	Corresponding Structure in Accused Systems
	Attachment 21 (Manage your Pixel phone's location settings) at 2. 1. On your Android device, go to **Settings** 2. Tap **Location** and re-enable your location services 3. Select **Mode High accuracy**  On some phone models, this option can be found under the Advanced Settings option. Select **Advanced Settings** and enable your device to improve positioning accuracy by allowing apps to scan for Wi-Fi networks and Bluetooth devices at any time, even if Wi-Fi or Bluetooth is disabled.  **Attachment 33 (Google Maps Not Updating Location) at 4.**

Claim 1	Corresponding Structure in Accused Systems
a second processor coupled to the at least one second radio-frequency transceiver programmed to acquire the information indicative of a location of the wireless mobile communications device,	Plaintiff contends that Google Maps has one or more processors that determine(s) the location of wireless mobile communications devices. These processors communicatively coupled to the second RF transceiver(s) and are programmed to determine a wireless mobile communication device's location. Wireless mobile communications devices can, through the second RF transceiver(s), communicatively connect to and use Google Maps. Google Maps' processors can determine the device's current location and direction from that location/source to any destination. The processors are programmed to estimate the location of the device from 3 sources: GPS (GPS uses satellites and knows your location within a few meters), Wi-Fi (the location of nearby Wi-Fi networks helps Maps know where you are), and cell towers (cell tower can be accurate up to a few thousand meters). The following exemplifies this limitation's existence in Accused Systems:  Google Search Google Maps Help How Maps finds your current location Maps estimates where you are from sources like: • **GPS**: This uses satellites and knows your location within a few meters. • **Wi-Fi**: The location of nearby Wi-Fi networks helps Maps know where you are. • **Cell tower**: Your connection to a cellular network can be accurate up to a few thou **Attachment 8 (How map find your current location) at 2.**  **GPS Location Settings - Android™** For more info on Android GPS location settings, see this support page. 1. From a Home screen, navigate: **Apps** > **Settings** > **Location**. → If unavailable, navigate: **Settings** > **Security & Location**. 2. If available, tap **Location**. 3. Ensure the Location switch is set to on. 4. Tap 'Mode' or 'Locating method' then select one of the following: → Options vary depending on device. ◦ **High accuracy (Battery usage: high)**: Uses GPS, Wi-Fi, and mobile networks to estimate location. ◦ **Power saving / Battery saving (Battery usage: low)**: Uses Wi-Fi and mobile networks to estimate location. ◦ **GPS only / Device only / Device sensors (Battery usage: moderate)**: Uses GPS to estimate location. 5. If presented with a Location consent prompt, tap **Agree**. **Attachment 18 (method of estimate the location of the device) at 1.**

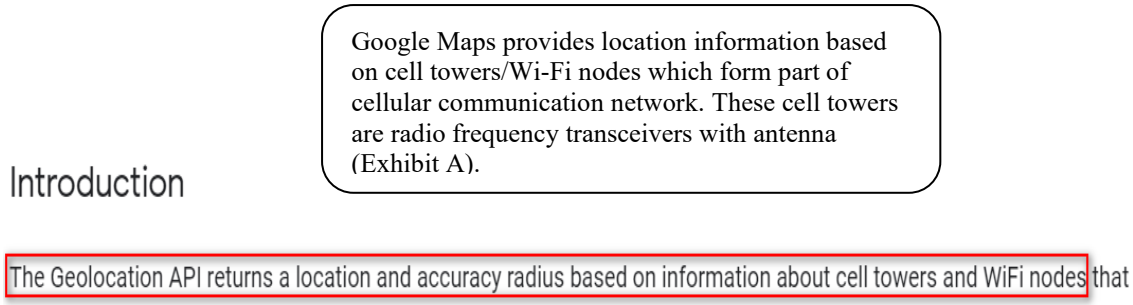
Claim 1	Corresponding Structure in Accused Systems



Attachment 15 (Turn ON/OFF the location setting) at 161.

Knowing where the user is allows your application to be smarter and deliver better information to the user. When developing a location-aware application for Android, you can utilize GPS and Android's Network Location Provider to acquire the user location. Although GPS is most accurate, it only works outdoors, it quickly consumes battery power, and doesn't return the location as quickly as users want. Android's Network Location Provider determines user location using cell tower and Wi-Fi signals, providing location information in a way that works indoors and outdoors, responds faster, and uses less battery power. To obtain the user location in your application, you can use both GPS and the Network Location Provider, or just one.

Attachment 12 (Location of the device determine using cell tower) at 1&2.



Attachment 17 (Cell Towers/Wi-Fi Nodes (RF transceivers) in a wireless communication network) at 1.

Claim 1	Corresponding Structure in Accused Systems

The first parameter in `requestLocationUpdates()` is the type of location provider to use (in this case, the Network Location Provider for cell tower and Wi-Fi based location). You can control the frequency at which your listener receives updates with the second and third parameter—the second is the minimum time interval between notifications and the third is the minimum change in distance between notifications—setting both to zero requests location notifications as frequently as possible. The last parameter is your `LocationListener`, which receives callbacks for location updates.

To request location updates from the GPS provider, use `GPS_PROVIDER` instead of `NETWORK_PROVIDER`. You can also request location updates from both the GPS and the Network Location Provider by calling `requestLocationUpdates()` twice—once for `NETWORK_PROVIDER` and once for `GPS_PROVIDER`.

Google Maps application makes use of wireless communication network, having cell towers (Exhibit A) or Wi-Fi access points (Exhibit A), to estimate the location of the Wireless communication device (Exhibit B).

Requesting User Permissions

In order to receive location updates from `NETWORK_PROVIDER` [illegible] `ACCESS_COARSE_LOCATION` or `ACCESS_FINE_LOCATION` permission, respectively, in your Android manifest file. Without these permissions, your application will fail at runtime when requesting location updates.

If you are using both `NETWORK_PROVIDER` and `GPS_PROVIDER`, then you need to request only the `ACCESS_FINE_LOCATION` permission, because it includes permission for both providers. Permission for `ACCESS_COARSE_LOCATION` allows access only to `NETWORK_PROVIDER`.

Attachment 12 (Location is estimated using cell tower/wi-fi network) at 3 & 4.

Help your phone get a more accurate location (Google Location Services a.k.a. Google Location Accuracy)

Turn your phone's location accuracy on or off

1. Open your device's Settings app.
2. Tap **Location** > **Advanced** > **Google Location Accuracy**.
3. Turn **Improve Location Accuracy** on or off.

When Google Location Accuracy is on

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

Wireless communication device receive the location of the Wireless communication device (Exhibit B) on Google Map from Wireless communication networks (e.g. Verizon, AT&T, T-Mobile, etc.)

When Google Location Accuracy is off

Let your phone scan for nearby networks or devices

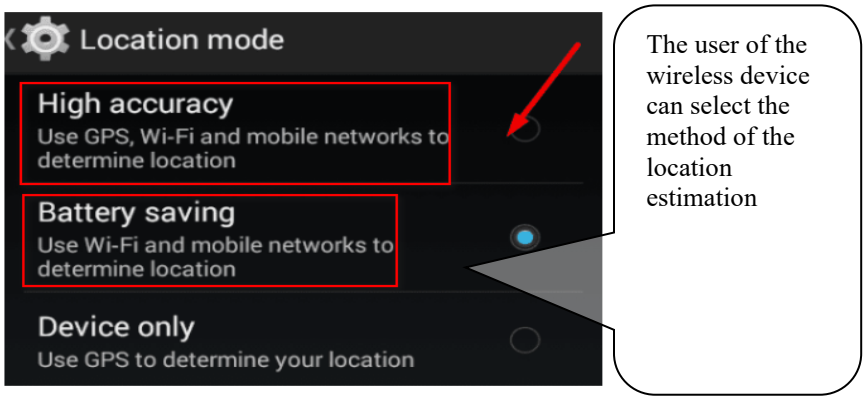
To help apps get better location info, you can let your phone scan for nearby Wi-Fi access points or Bluetooth devices.

1. Open your device's Settings app.
2. Tap **Location** > **Wi-Fi and Bluetooth scanning**.
3. Turn **Wi-Fi scanning** or **Bluetooth scanning** on or off.

Attachment 21 (Manage your Pixel phone's location settings) at 2.

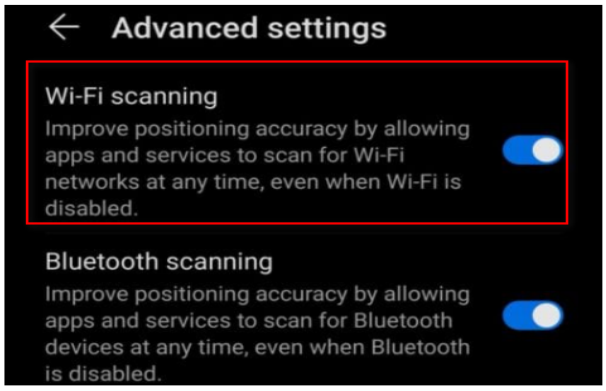
Claim 1	Corresponding Structure in Accused Systems

1. On your Android device, go to **Settings**
2. Tap **Location** and re-enable your location services
3. Select **Mode High accuracy**



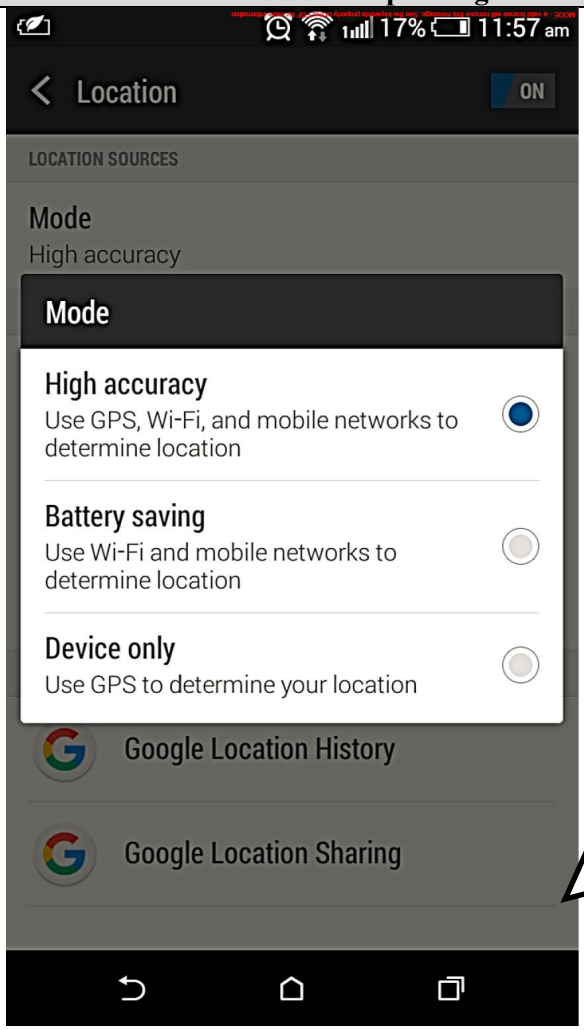
On some phone models, this option can be found under the Advanced Settings option.

Select **Advanced Settings** and enable your device to improve positioning accuracy by allowing apps to scan for Wi-Fi networks and Bluetooth devices at any time, even if Wi-Fi or Bluetooth is disabled.



Attachment 33 (Google Maps Not Updating Location) at 4.

Claim 1	Corresponding Structure in Accused Systems



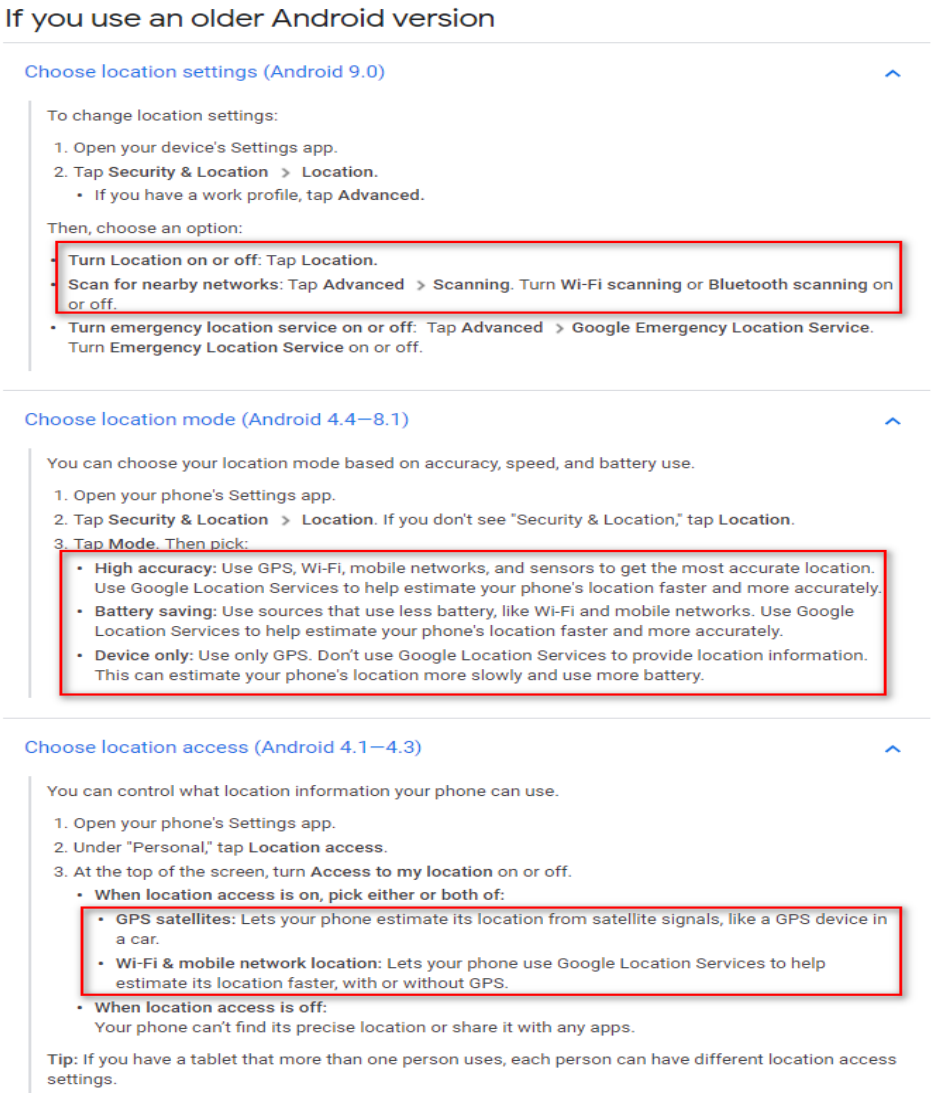
By default the "Location setting" is set at "High accuracy" mode, wherein, for example, accuracy of location of a communications device determined based on locations of nearby Wi-Fi network infrastructure (access points or hotspots) is further enhanced or fine-tuned by Google Maps Server additionally using the said communications device's GPS location and the location data obtained from the mobile network (Cell tower information and/or Location of the communications device determined through the Assisted-GPS method by the said mobile network) serving the said communications device.

Attachment 45 (Google Maps_Android app_Location settings) at 1.

Claim 1	Corresponding Structure in Accused Systems
	# Find and improve your location's accuracy Sometimes Google Maps might have trouble finding where you are located. If the GPS location of your blue dot on the map is inaccurate or the blue dot is not showing up, here are some things you can do to help fix the problem. **Tip**: This will also improve your search results and make them more relevant to you. Computer Android iPhone & iPad ## See your current location on the map 1. On your Android phone or tablet, open the Google Maps app . 2. You'll see a blue dot, which shows where you are. If you don't see a blue dot, go to the bottom and tap Your location . ## How Maps finds your current location Maps estimates where you are from sources like: • GPS: This uses satellites and knows your location up to around 20 meters. **Note**: 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 a cellular network can be accurate up to a few thousand meters. **Attachment 46 (Find and improve your location's accuracy - Android - Google Maps Help) at 1.**

Claim 1	Corresponding Structure in Accused Systems
	From your devices Many devices, like phones or computers, can work out their precise location. You can allow Google and other apps to provide you with useful features based on where your device is located. For example, if you're running late to meet your friends, you'll probably want to use a navigation app to know the quickest way to get to your destination. To get turn-by-turn directions, you may need to turn on your device's location and give the app the permission to access it. Or for some searches like "coffee shop", "bus stop" or "atm", results will usually be more helpful when precise location is available. On your Android device, if you choose to turn on your device location, you can use features like navigation, giving an app access to your current location, or find your phone. You can also choose which apps have permission to use your device's location with simple controls that let you turn the permission on or off for individual apps. On Android, you can see when an app is requesting to use your phone's GPS-based location when the top of your screen shows Location . Learn more Google Location Services 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. You can disable Google Location Services at any time in your device's location settings. Your device's location will continue to work even if GLS is turned off, but the device will rely only on GPS to estimate device location for apps with the necessary permission. Google Location Services is distinct from your device's location setting. Learn more The settings and permissions on Android control whether your device sensors (like GPS) or network-based location (like GLS) are used to determine your location and which apps have access to that location. They do not impact how websites and apps might estimate your location in other ways, such as from your IP Address. **Attachment 44 (How Google uses location information – Privacy & Terms – Google) at 2 &3.**

Claim 1	Corresponding Structure in Accused Systems



If you use an older Android version

Choose location settings (Android 9.0)

To change location settings:

1. Open your device's Settings app.
2. Tap **Security & Location** > **Location**.
   - If you have a work profile, tap **Advanced**.

Then, choose an option:

- **Turn Location on or off**: Tap **Location**.
- **Scan for nearby networks**: Tap **Advanced** > **Scanning**. Turn **Wi-Fi scanning** or **Bluetooth scanning** on or off.
- **Turn emergency location service on or off**: Tap **Advanced** > **Google Emergency Location Service**. Turn **Emergency Location Service** on or off.

Choose location mode (Android 4.4—8.1)

You can choose your location mode based on accuracy, speed, and battery use.

1. Open your phone's Settings app.
2. Tap **Security & Location** > **Location**. If you don't see "Security & Location," tap **Location**.
3. Tap **Mode**. Then pick:
   - **High accuracy**: Use GPS, Wi-Fi, mobile networks, and sensors to get the most accurate location. Use Google Location Services to help estimate your phone's location faster and more accurately.
   - **Battery saving**: Use sources that use less battery, like Wi-Fi and mobile networks. Use Google Location Services to help estimate your phone's location faster and more accurately.
   - **Device only**: Use only GPS. Don't use Google Location Services to provide location information. This can estimate your phone's location more slowly and use more battery.

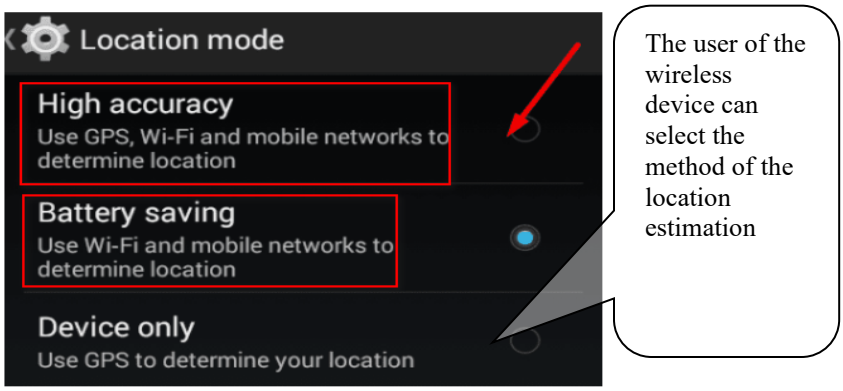
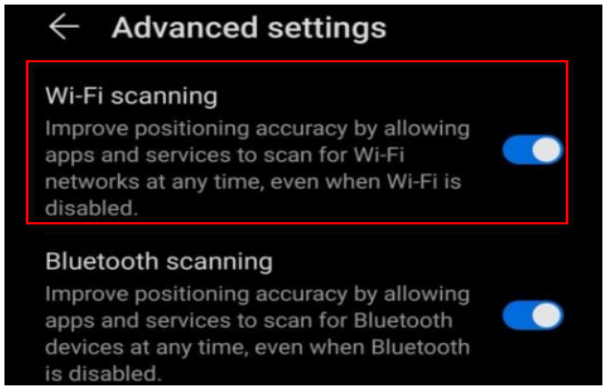
Choose location access (Android 4.1—4.3)

You can control what location information your phone can use.

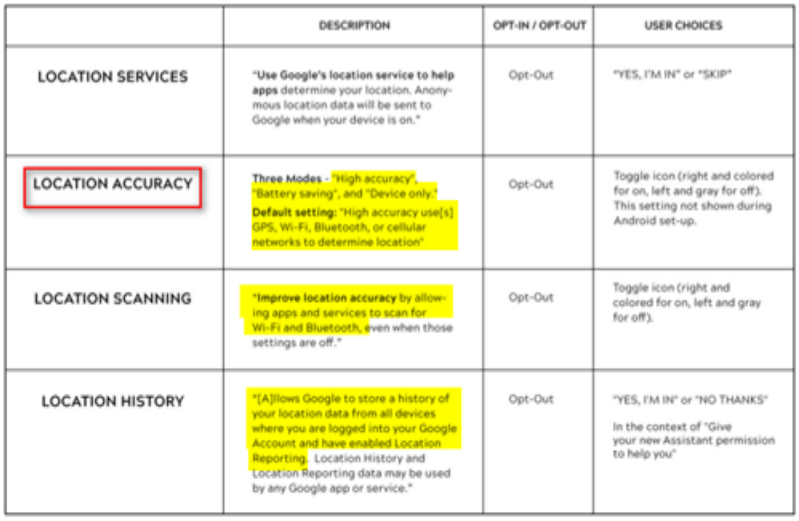
1. Open your phone's Settings app.
2. Under "Personal," tap **Location access**.
3. At the top of the screen, turn **Access to my location** on or off.
   - **When location access is on, pick either or both of:**
     - **GPS satellites:** Lets your phone estimate its location from satellite signals, like a GPS device in a car.
     - **Wi-Fi & mobile network location:** Lets your phone use Google Location Services to help estimate its location faster, with or without GPS.
   - **When location access is off:**
     Your phone can't find its precise location or share it with any apps.

Tip: If you have a tablet that more than one person uses, each person can have different location access settings.

Attachment 40 (Manage your Pixel phone's location settings) at 3 & 4.

Claim 1	Corresponding Structure in Accused Systems
	1. On your Android device, go to **Settings** 2. Tap **Location** and re-enable your location services 3. Select **Mode High accuracy**  On some phone models, this option can be found under the Advanced Settings option. Select **Advanced Settings** and enable your device to improve positioning accuracy by allowing apps to scan for Wi-Fi networks and Bluetooth devices at any time, even if Wi-Fi or Bluetooth is disabled.  **Attachment 33 (Google Maps Not Updating Location) at 4.**

Claim 1	Corresponding Structure in Accused Systems



	DESCRIPTION	OPT-IN / OPT-OUT	USER CHOICES
LOCATION SERVICES	"**Use Google's location service to help apps** determine your location. Anonymous location data will be sent to Google when your device is on."	Opt-Out	"YES, I'M IN" or "SKIP"
LOCATION ACCURACY	**Three Modes** - "High accuracy", "Battery saving", and "Device only." **Default setting:** "High accuracy use[s] GPS, Wi-Fi, Bluetooth, or cellular networks to determine location"	Opt-Out	Toggle icon (right and colored for on, left and gray for off). This setting not shown during Android set-up.
LOCATION SCANNING	"**Improve location accuracy** by allowing apps and services to scan for Wi-Fi and Bluetooth, even when those settings are off."	Opt-Out	Toggle icon (right and colored for on, left and gray for off).
LOCATION HISTORY	"[A]llows Google to store a history of your location data from all devices where you are logged into your Google Account and have enabled Location Reporting. Location History and Location Reporting data may be used by any Google app or service."	Opt-Out	"YES, I'M IN" or "NO THANKS" In the context of "Give your new Assistant permission to help you"

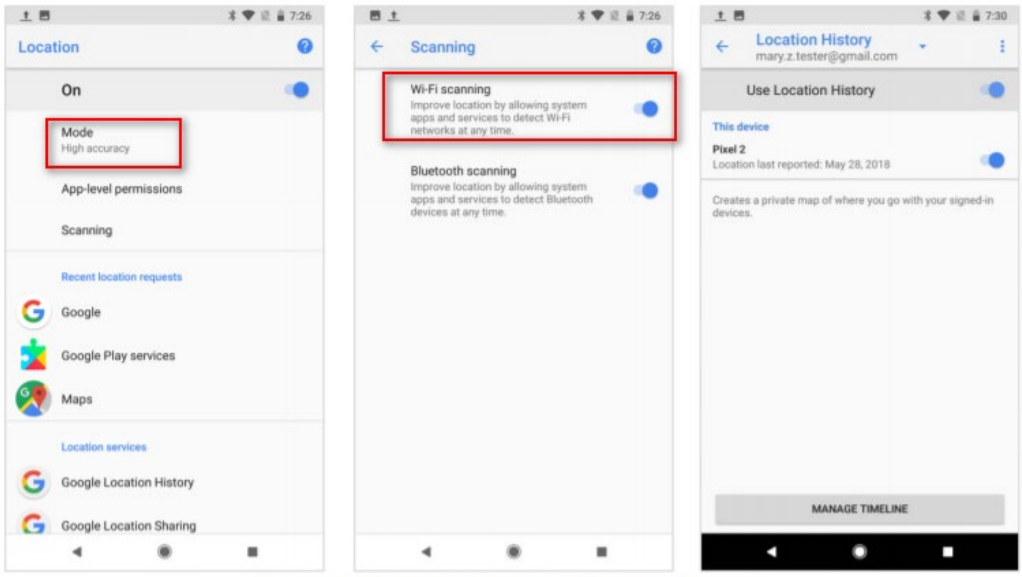
Figure 1: Four Android settings and services that relate to location information collection. [1]

Google Location Services

Google Location Services (GLS) operate at a device level and rely on sensors such as GPS, Wi-Fi, the cellular radio, and other technologies included in mobile devices to position a user in the world. If a user keeps the default settings prompted by Google, Location Services is enabled, Location Accuracy will be set to "High Accuracy" [2] and Location Scanning will be enabled for both Wi-Fi base stations and Bluetooth Beacons, regardless of a user's choice to turn Wi-Fi or Bluetooth on. The implications of user choices among the various Location Services settings are significant, but not intuitive, including:

- With Location Services turned on, Location Accuracy set to "Device only" and Location Scanning turned off, an Android device will only use GPS to provide the location of an Android device.
- When Location Accuracy is set to "High accuracy" and Location Scanning is enabled (the default setting for new device setup), an Android device will use sources including Wi-Fi, Bluetooth, and cellular radio to improve the accuracy of the device's position.

Attachment 38 (Google, Android and Location Tracking) at 2.

Claim 1	Corresponding Structure in Accused Systems
	After completing the setup process users can validate and control settings for device location via the Settings app and navigating to Google settings, then Location (Figure 4).  Figure 4: Location settings after Android device setup process As demonstrated in Figure 4, if users accept Google's defaults during the setup process, the Android device is configured with Location Services enabled, Wi-Fi and Bluetooth scanning engaged, and Location History active. **Attachment 38 (Google, Android and Location Tracking) at 5.**

Claim 1	Corresponding Structure in Accused Systems

Users can choose to disable GLS during the set-up process. However, if a user attempts to disable GLS, a warning dialogue box prompts an extreme scenario: "device location for all apps is turned off and you may not be able to locate your device if it is lost." (Figure 5) Note as well, the action prompt is to "Turn on Location" – reversing the user choice triggering the warning. Further, as described immediately below, many Google and third party apps will not function unless GLS is turned on. Therefore, Google forces user into an impossible ultimatum, have their every move constantly monitored, tracked, and stored or lose the functionality of their expensive smartphone.

If a user disables Location Services but then attempts to use a location aware app or service on their device, she will see the dialogue box shown in Figure 6. If the user clicks "OK" the service is enabled for the entire device and permanently, rather than enabling Location Services only for that particular app or service requesting the functionality.

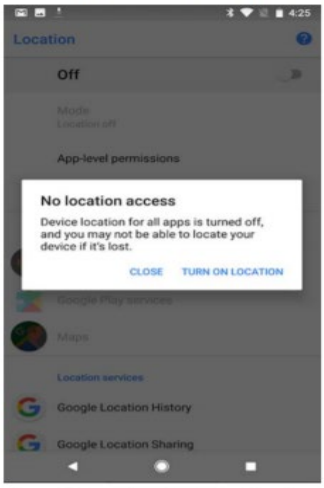


Figure 5: Location Services Warning

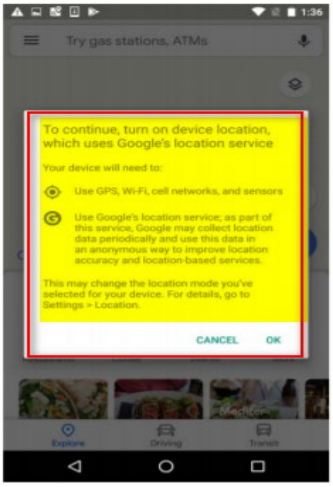


Figure 6: Re-Enable Location Services

Attachment 38 (Google, Android and Location Tracking) at 6.

We collect information about your location when you use our services, which helps us offer features like driving directions for your weekend getaway or showtimes for movies playing near you.

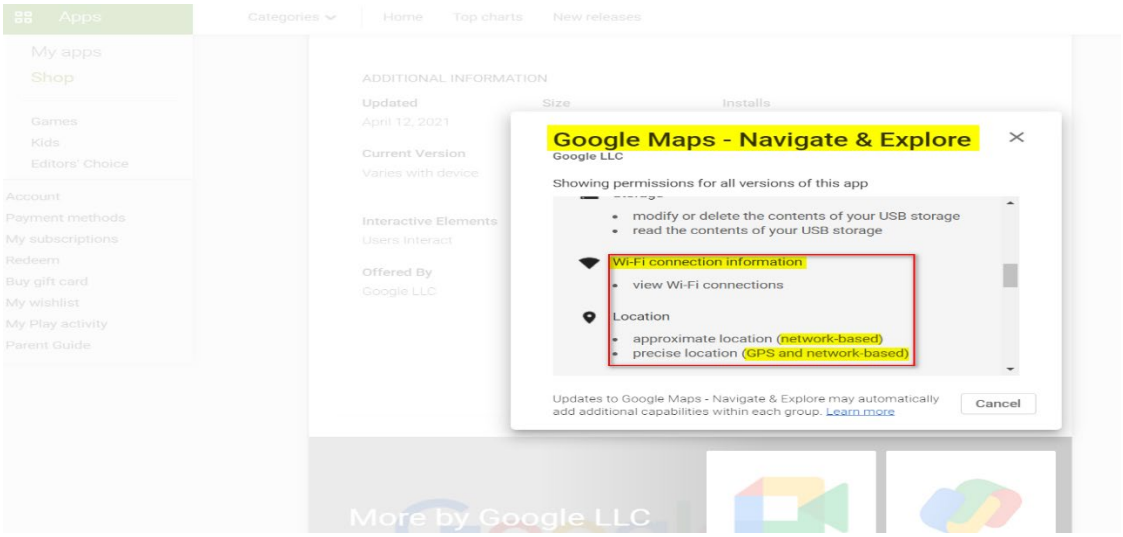
Your location can be determined with varying degrees of accuracy by:

- GPS
- IP address
- Sensor data from your device
- Information about things near your device, such as Wi-Fi access points, cell towers, and Bluetooth-enabled devices

The types of location data we collect depend in part on your device and account settings. For example, you can turn your Android device's location on or off using the device's settings app. You can also turn on Location History if you want to create a private map of where you go with your signed-in devices.

Attachment 29 (Google Privacy Policy) at 4.

Claim 1	Corresponding Structure in Accused Systems



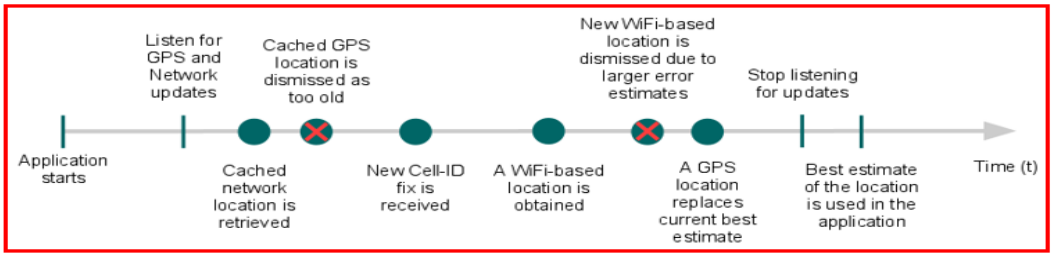
Attachment 39 (Google Map_Permissions) at 1.

Flow for obtaining user location

Here's the typical flow of procedures for obtaining the user location:

1. Start application.
2. Sometime later, start listening for updates from desired location providers.
3. Maintain a "current best estimate" of location by filtering out new, but less accurate fixes.
4. Stop listening for location updates.
5. Take advantage of the last best location estimate.

Figure 1 demonstrates this model in a timeline that visualizes the period in which an application is listening for location updates and the events that occur during that time.



Attachment 12 (Location is estimated using cell tower/wi-fi network) at 5.

Claim 1	Corresponding Structure in Accused Systems

There are 3 location providers in Android.

They are:

gps –> (GPS, AGPS): Name of the GPS location provider. This provider determines location using satellites. Depending on conditions, this provider may take a while to return a location fix. Requires the permission android.permission.ACCESS_FINE_LOCATION.

network –> (AGPS, CellID, WiFi MACID): Name of the network location provider. This provider determines location based on availability of cell tower and WiFi access points. Results are retrieved by means of a network lookup. Requires either of the permissions android.permission.ACCESS_COARSE_LOCATION or android.permission.ACCESS_FINE_LOCATION.

passive –> (CellID, WiFi MACID): A special location provider for receiving locations without actually initiating a location fix. This provider can be used to passively receive location updates when other applications or services request them without actually requesting the locations yourself. This provider will return locations generated by other providers. Requires the permission android.permission.ACCESS_FINE_LOCATION, although if the GPS is not enabled this provider might only return coarse fixes. This is what Android calls these location providers, however, the underlying technologies to make this stuff work is mapped to the specific set of hardware and telco provided capabilities (network service).

The best way is to use the "network" or "passive" provider first, and then fallback on "gps", and depending on the task, switch between providers. This covers all cases, and provides a lowest common denominator service (in the worst case) and great service (in the best case).

Attachment 41 (Android Location Providers - GPS or Network Provider?) at 1 & 2.

Accuracy

You can specify location accuracy using the `setPriority()` method, passing one of the following values as the argument:

- `PRIORITY_HIGH_ACCURACY` provides the most accurate location possible, which is computed using as many inputs as necessary (it enables GPS, Wi-Fi, and cell, and uses a variety of Sensors), and may cause significant battery drain.
- `PRIORITY_BALANCED_POWER_ACCURACY` provides accurate location while optimizing for power. Very rarely uses GPS. Typically uses a combination of Wi-Fi and cell information to compute device location.
- `PRIORITY_LOW_POWER` largely relies on cell towers and avoids GPS and Wi-Fi inputs, providing coarse (city-level) accuracy with minimal battery drain.
- `PRIORITY_NO_POWER` receives locations passively from other apps for which location has already been computed.

The location needs of most apps can be satisfied using the balanced power or low power options. High accuracy should be reserved for apps that are running in the foreground and require *real time* location updates (for example, a mapping app).

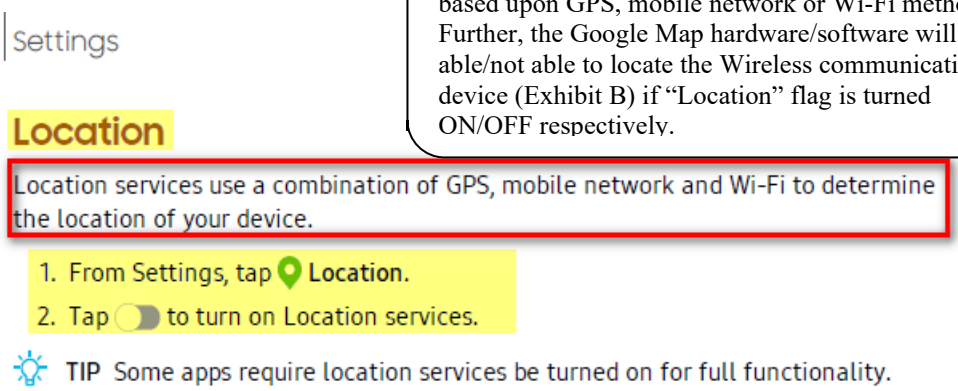
Attachment 42 (Optimize location for battery) at 2.

Traffic conditions [edit]

In 2007, Google began offering traffic data as a colored overlay on top of roads and motorways to represent the speed of vehicles on particular roads. Crowdsourcing is used to obtain the GPS-determined locations of a large number of cellphone users, from which live traffic maps are produced.[59][60][61]

Google has stated that the speed and location information it collects to calculate traffic conditions is anonymous.[62] Options available in each phone's settings allow users not to share information about their location with Google Maps.[63] Google stated, "Once you disable or opt out of My Location, Maps will not continue to send radio information back to Google servers to determine your handset's approximate location".[64][*failed verification*]

Attachment 43 (Google Maps Wikipedia) at 5 & 6.

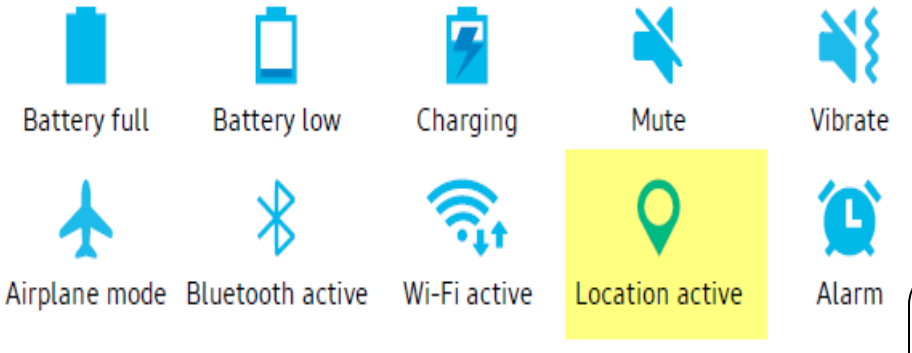
Claim 1	Corresponding Structure in Accused Systems
wherein the second processor selectively acquires the information indicative of a location of the wireless mobile communications device dependent on the setting of preference flags,	Plaintiff contends each Exhibit-B wireless mobile can set preference flags that enable or disable accessibility to data relevant to the device's location by Location-Based Services (LBS) providers. Such programmability by a wireless device is at times known as a privacy setting. Further, such programmability is available by location-permission granting (wireless mobile communications device must grant permission). The LBS providers' processors select to determine a wireless mobile communications device's location if the preference flags applicable to that device have been set for enablement. The processors select to not determine a wireless mobile communications device's location if the preference flags applicable to that device have not been set for enablement. The following exemplifies this limitation's existence in Accused Systems: Google map estimated the location of the device based upon GPS, mobile network or Wi-Fi method. Further, the Google Map hardware/software will be able/not able to locate the Wireless communication device (Exhibit B) if "Location" flag is turned ON/OFF respectively.  **Attachment 15 (Turn ON/OFF the location setting) at 161.**

Claim 1	Corresponding Structure in Accused Systems

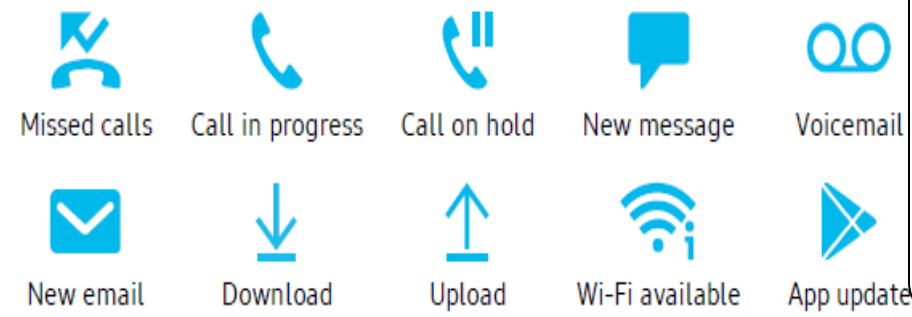
Status bar

The Status bar provides device information on the right side and notification alerts or the left.

Status icons



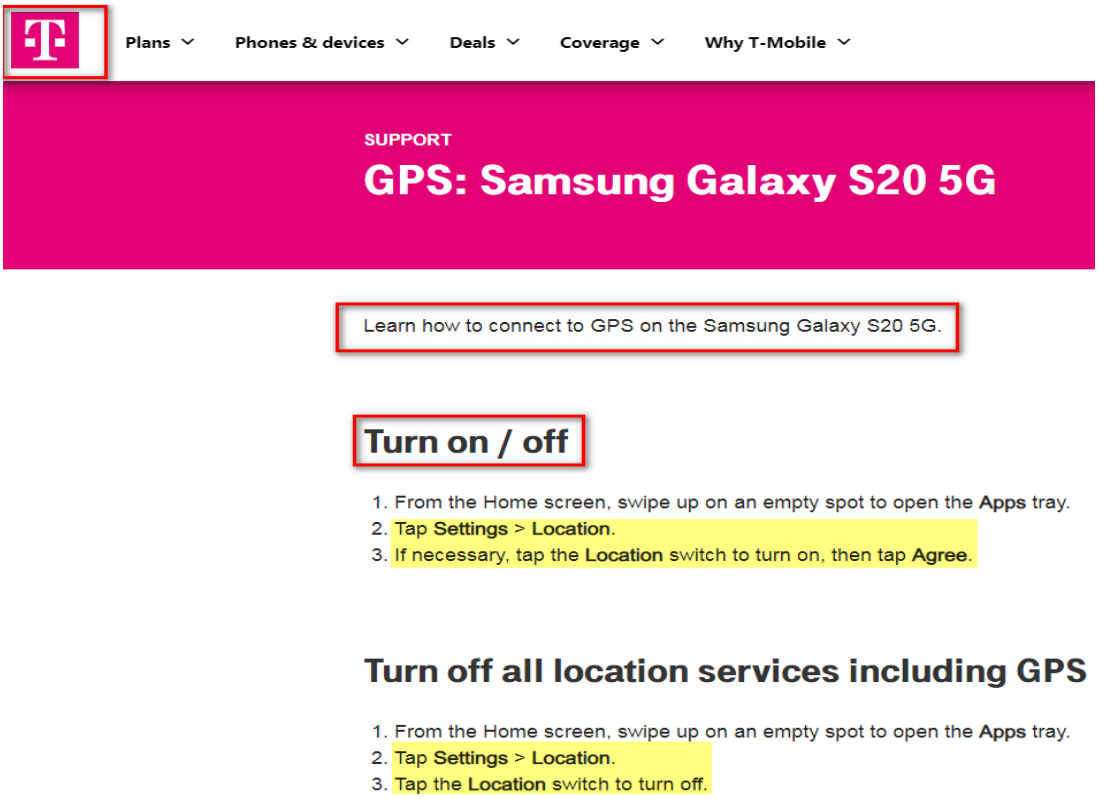
Notification icons



Google Map hardware/software will be able/not able to locate the Wireless communication device (Exhibit B) if "Location" flag is turned ON/OFF respectively

Attachment 15 (Icon for turn ON/OFF the location setting) at 161.

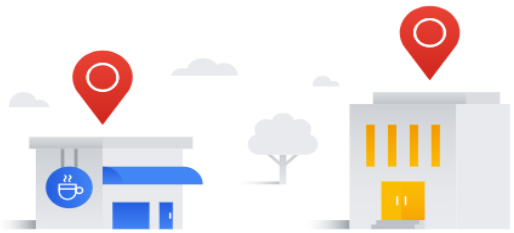
Claim 1	Corresponding Structure in Accused Systems



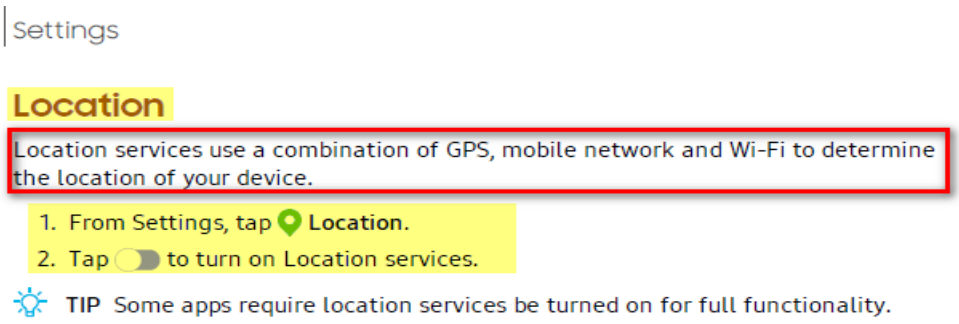
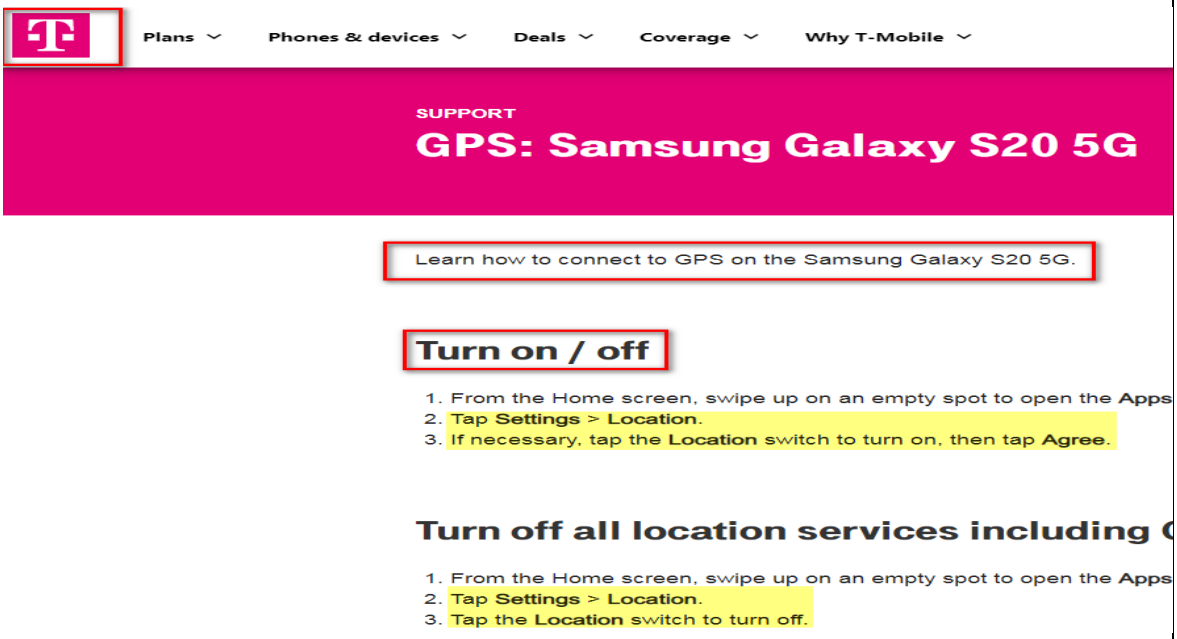
Attachment 19 (Turn ON/OFF the location) at 1.

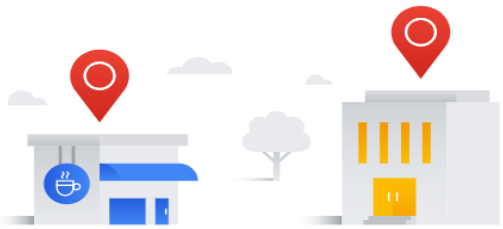
Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 20 (Turn ON/OFF the location) at 1.**

Claim 1	Corresponding Structure in Accused Systems
	Help your phone get a more accurate location (Google Location Services a.k.a. Google Location Accuracy) **Turn your phone's location accuracy on or off** 1. Open your device's Settings app. 2. Tap **Location** > **Advanced** > **Google Location Accuracy**. 3. Turn **Improve Location Accuracy** on or off. When Google Location Accuracy is on 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 Wireless communication device receive the location of the Wireless communication device (Exhibit B) on Google Map from Wireless communication networks (e.g. Verizon, AT&T, T-Mobile, etc.) When Google Location Accuracy is off **Let your phone scan for nearby networks or devices** To help apps get better location info, you can let your phone scan for nearby Wi-Fi access points or Bluetooth devices. 1. Open your device's Settings app. 2. Tap **Location** > **Wi-Fi and Bluetooth scanning**. 3. Turn **Wi-Fi scanning** or **Bluetooth scanning** on or off. **Attachment 21 (Manage your Pixel phone's location settings) at 2.**

Claim 1	Corresponding Structure in Accused Systems
	Your location information  We collect information about your location when you use our services, which helps us offer features like driving directions for your weekend getaway or showtimes for movies playing near you. Your location can be determined with varying degrees of accuracy by: • GPS • IP address • Sensor data from your device • Information about things near your device, such as Wi-Fi access points, cell towers, and Bluetooth-enabled devices The types of location data we collect depend in part on your device and account settings. For example, you can turn your Android device's location on or off using the device's settings app. You can also turn on Location History if you want to create a private map of where you go with your signed-in devices. **Attachment 29 (Google privacy policy) at 4.**
wherein the second processor acquires the information indicative of a location of the wireless mobile communications device if the preference flags are set to a state that permits tracking of the wireless mobile communications device,	Plaintiff contends each Exhibit-B wireless mobile can set preference flags that enable or disable accessibility to data relevant to the device's location by Location-Based Services (LBS) providers. The LBS providers' processors select to determine a wireless mobile communications device's location if the preference flags applicable to that device have been set for enablement. The processors select to not determine a wireless mobile communications device's location if the preference flags applicable to that device have not been set for enablement. The Navigation hardware/software will only be able to determine and track the location of the Wireless communication device (Exhibit B) such as but not limited to including but not limited to Google's branded devices such as Google Pixel 5, pixel 4a 5G, pixel 4a, pixel 4 XL, pixel 4, pixel 3a XL, pixel 3a, pixel 3 XL, pixel 3, pixel 2, pixel 2 XL, pixel XL, pixel, pixel C or other (third-parties) branded devices such as Samsung Galaxy S20 Ultra, Galaxy S20 plus, Galaxy S20, Galaxy Z fold, Galaxy S10, Galaxy A series, etc. (refer Exhibit B for complete list), Plaintiff contends each Exhibit-B wireless mobile can set preference flags that enable or disable accessibility to data relevant to the device's location by Location-Based Services (LBS) providers. Such programmability by a wireless device is at times known as a privacy setting. Further, such programmability is available by location-permission granting (wireless mobile communications device must grant permission). Plaintiff contends that if the preference flags are enabled (i.e., the wireless mobile communication device's user has granted permission), LBS providers' processor(s)

Screenshot of the "Location setting" associated with Google Maps app installed on an Android communications device.

Claim 1	Corresponding Structure in Accused Systems
	proceed with determining the device's location and, when determined, communicates that location to the first processor through the second RF transceiver (which, as discussed above, is a transceiver to which the LBS-providers' processors communicatively couple). The LBS-providers' processors are programmed to estimate the location of the device from 3 sources: GPS (GPS uses satellites and knows your location within a few meters), Wi-Fi (the location of nearby Wi-Fi networks helps Maps know where you are), and cell towers (cell tower can be accurate up to a few thousand meters). The following exemplifies this limitation's existence in Accused Systems:  **Attachment 15 (Turn ON/OFF the location setting) at 161.**  **Attachment 19 (Turn ON/OFF the location) at 1.**

Claim 1	Corresponding Structure in Accused Systems
	Your location information  We collect information about your location when you use our services, which helps us offer features like driving directions for your weekend getaway or showtimes for movies playing near you. Your location can be determined with varying degrees of accuracy by: • GPS • IP address • Sensor data from your device • Information about things near your device, such as Wi-Fi access points, cell towers, and Bluetooth-enabled devices The types of location data we collect depend in part on your device and account settings. For example, you can turn your Android device's location on or off using the device's settings app. You can also turn on Location History if you want to create a private map of where you go with your signed-in devices. **Attachment 29 (Google privacy policy) at 4.**

Claim 1	Corresponding Structure in Accused Systems
	verizon Personal Business Shop Why Verizon Support Home › Support › Google › Google Pixel 4a › Google Pixel 4a - Turn GPS Location On / Off **Google Pixel 4a - Turn GPS Location On / Off** Satellite or standalone GPS services require more power and have a greater effect on battery life. 1. From a Home screen, swipe up to display all apps. 2. Navigate: Settings > Location. 3. Tap the Use location switch to turn on or off. → You must turn this feature on to adjust GPS services. 4. If presented, review the disclaimer(s) then tap AGREE. **Attachment 20 (Turn ON/OFF the location) at 1.**

Claim 1	Corresponding Structure in Accused Systems

Turn location on or off for your phone

1. Open your phone's Settings app.
2. Tap **Location**. If you have a work profile, tap **Advanced**.
3. At the top, turn **Use location** on or off.

Tip: You can also turn your phone's location on or off with Quick Settings. Learn about Quick Settings.

When Location is on

- Apps can find your phone's location to give you location-based info or services. Learn how to change app location settings.
- If Google Location Accuracy is on, Google Location Services can collect data to improve location-based services. Learn about Google Location Services.
- You can get search results and ads in apps based on your phone's location.
- You can locate where your phone is if you lose it. Learn about Find My Device.
- You can share your phone's location with others. Learn about Location Sharing with Google Maps and sending location in emergencies.
- If you have Location History turned on, the places your phone goes will be saved. You can review and manage them later. Learn about Location History.

Attachment 21 (Manage your pixel phone settings) at 1.

Help your phone get a more accurate location (Google Location Services a.k.a. Google Location Accuracy)

Turn your phone's location accuracy on or off

1. Open your device's Settings app.
2. Tap **Location** > **Advanced** > **Google Location Accuracy**.
3. Turn **Improve Location Accuracy** on or off.

When Google Location Accuracy is on

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

Wireless communication device receive the location of the Wireless communication device (Exhibit B) on Google Map from Wireless communication networks (e.g. Verizon, AT&T, T-Mobile, etc.)

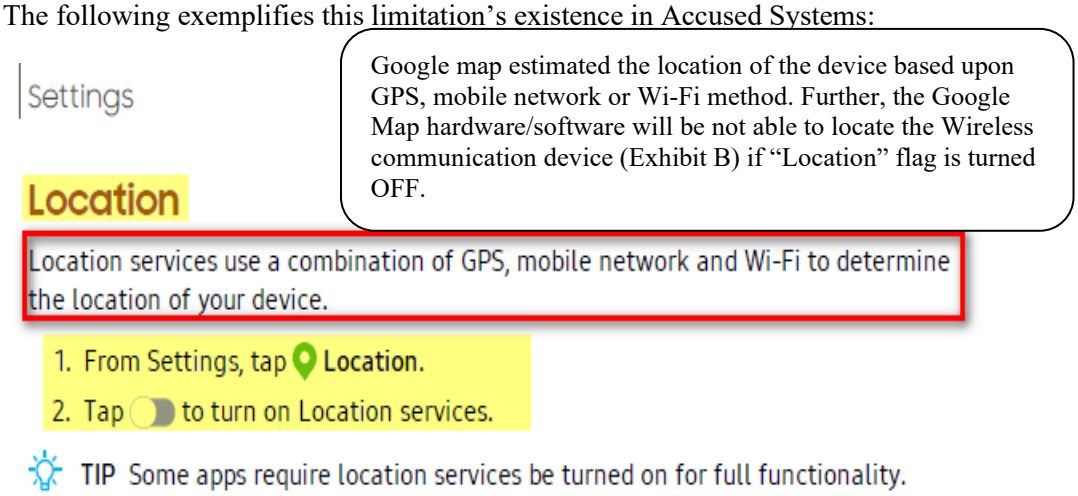
When Google Location Accuracy is off

Let your phone scan for nearby networks or devices

To help apps get better location info, you can let your phone scan for nearby Wi-Fi access points or Bluetooth devices.

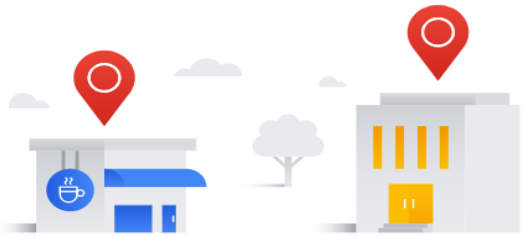
1. Open your device's Settings app.
2. Tap **Location** > **Wi-Fi and Bluetooth scanning**.
3. Turn **Wi-Fi scanning** or **Bluetooth scanning** on or off.

Attachment 21 (Manage your Pixel phone's location settings) at 2.

Claim 1	Corresponding Structure in Accused Systems
and wherein the second processor does not acquire the information indicative of the location of the wireless mobile communications device if the preference flags are set to a state that prohibits tracking of the wireless mobile communications device.	Plaintiff contends that if the preference flags are not enabled (i.e., the wireless-mobile-communication device's user has not granted permission), LBS provider application hardware/software, will not be able to determine and track the location of the Wireless communication device (Exhibit B) such as but not limited to Google's branded devices such as Google Pixel 5, pixel 4a 5G, pixel 4a, pixel 4 XL, pixel 4, pixel 3a XL, pixel 3a, pixel 3 XL, pixel 3, pixel 2, pixel 2 XL, pixel XL, pixel, pixel C or other (third-parties) branded devices such as Samsung Galaxy S20 Ultra, Galaxy S20 plus, Galaxy S20, Galaxy Z fold, Galaxy S10, Galaxy A series, etc. (refer Exhibit B for complete list), if the location flag on the Wireless communication device (Exhibit B) is turned off (that is, locations privacy settings are set to "Deny"). The following exemplifies this limitation's existence in Accused Systems:  Google map estimated the location of the device based upon GPS, mobile network or Wi-Fi method. Further, the Google Map hardware/software will be not able to locate the Wireless communication device (Exhibit B) if "Location" flag is turned OFF. **Attachment 15 (Turn ON/OFF the location setting) at 161.**

Claim 1	Corresponding Structure in Accused Systems

Your location information



We collect information about your location when you use our services, which helps us offer features like driving directions for your weekend getaway or showtimes for movies playing near you.

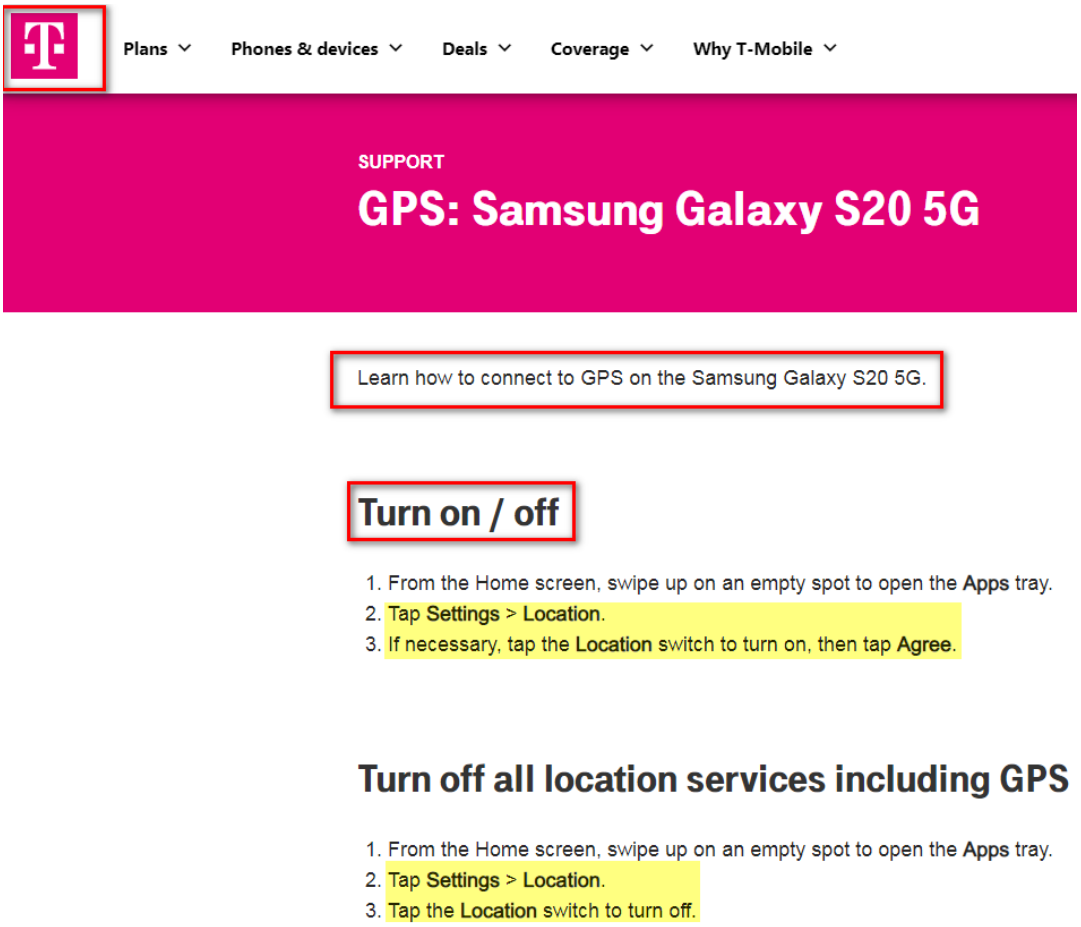
Your location can be determined with varying degrees of accuracy by:

- GPS
- IP address
- Sensor data from your device
- Information about things near your device, such as Wi-Fi access points, cell towers, and Bluetooth-enabled devices

The types of location data we collect depend in part on your device and account settings. For example, you can turn your Android device's location on or off using the device's settings app. You can also turn on Location History if you want to create a private map of where you go with your signed-in devices.

Attachment 29 (Google privacy policy) at 4.

Claim 1	Corresponding Structure in Accused Systems



Attachment 19 (Turn ON/OFF the location) at 1.

Claim 1	Corresponding Structure in Accused Systems

verizon

Personal Business

Shop Why Verizon Support

Home › Support › Google › Google Pixel 4a › Google Pixel 4a - Turn GPS Location On / Off

Google Pixel 4a - Turn GPS Location On / Off

Satellite or standalone GPS services require more power and have a greater effect on battery life.

1. From a Home screen, swipe up to display all apps.
2. Navigate: Settings > Location.
3. Tap the Use location switch to turn on or off.
   → You must turn this feature on to adjust GPS services.
4. If presented, review the disclaimer(s) then tap AGREE.

Google Map hardware/software will be not able to locate the Wireless communication device (Exhibit B) if "Location" flag is turned OFF

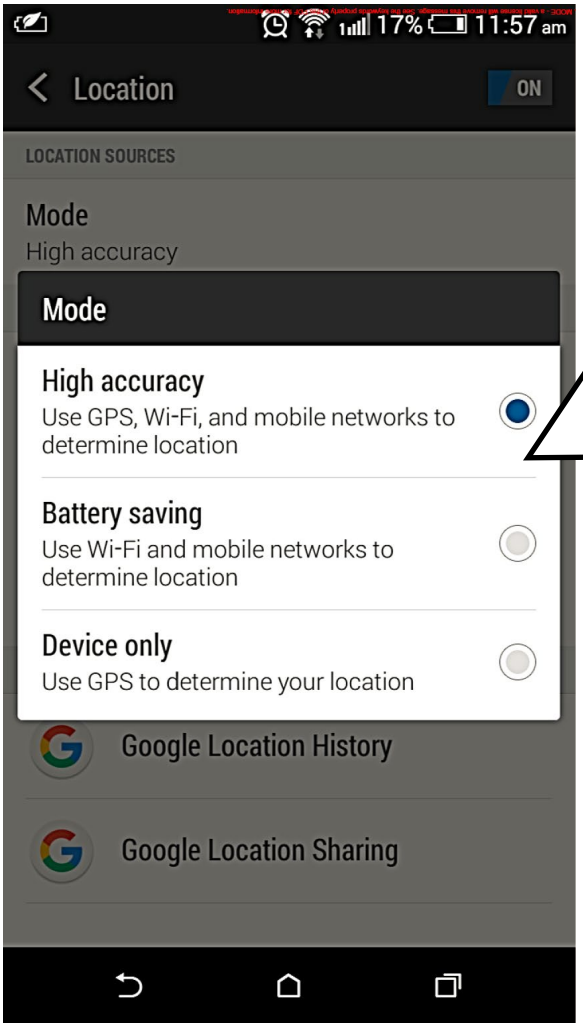
Attachment 20 (Turn ON/OFF the location) at 1.

Manage your Pixel phone's location settings - Pixel Phone Help

When Location is off

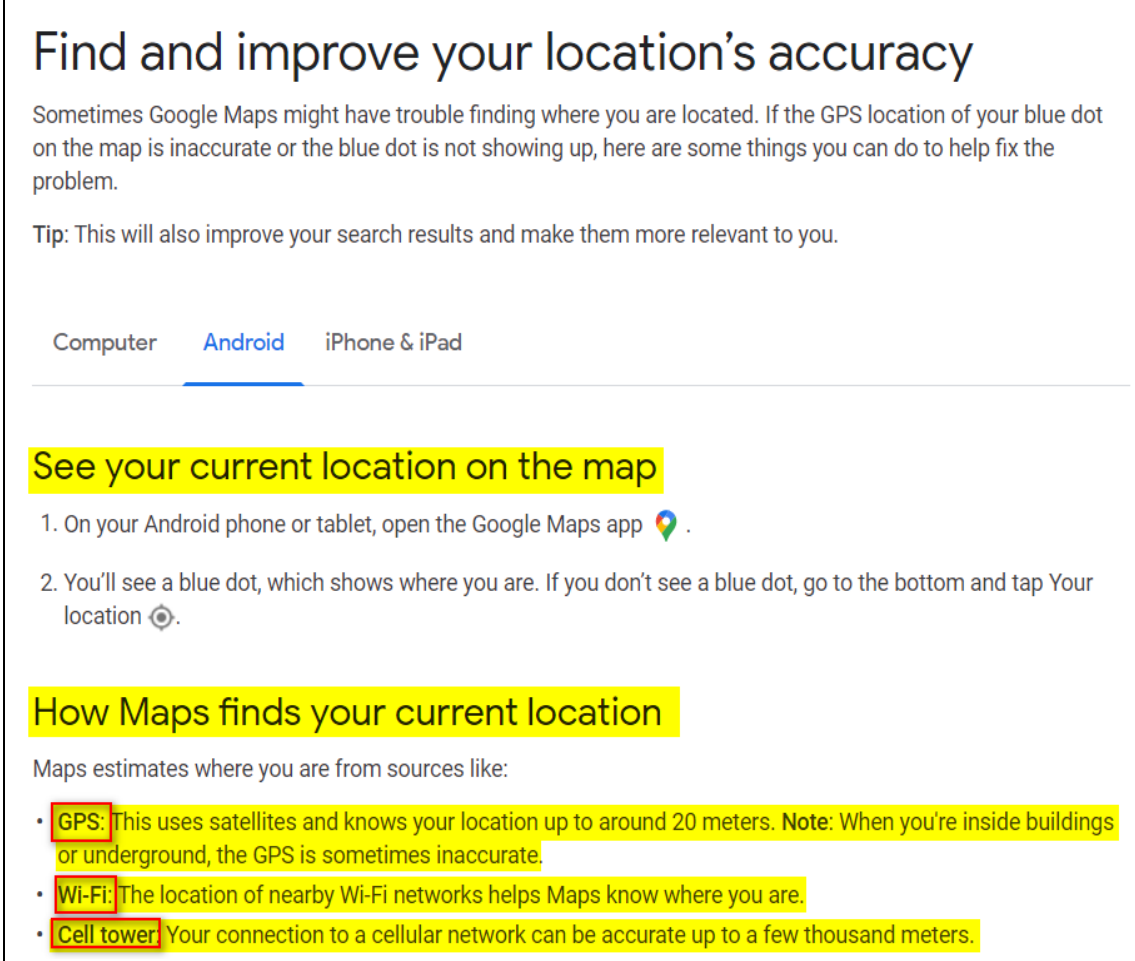
- Your phone's location isn't shared with any apps. Features that use location may not work properly.
- Google Location Services won't collect data to improve location-based services.
- You can get search results and ads based on your IP address.
- You can't see where your phone is if you lose it. Learn about Find My Device.
- You can't share your phone's location with anyone via Google Maps. Your device can still send it to first responders in an emergency. Learn about Location Sharing with Google Maps and sending location in emergencies.
- Even if you have Location History turned on, the places your phone goes won't be saved. Learn about Location History.

Claim 1	Corresponding Structure in Accused Systems
	Attachment 21 (Manage your pixel phone settings) at 1.



By default the "Location setting" is set at "High accuracy" mode, wherein, for example, accuracy of location of a communications device determined based on locations of nearby Wi-Fi network infrastructure (access points or hotspots) is further enhanced or fine-tuned by Google Maps Server additionally using the said communications device's GPS location and the location data obtained from the mobile network (Cell tower information and/or Location of the communications device determined through the Assisted-GPS method by the said mobile network) serving the said communications device.

Attachment 45 (Google Maps_Android app_Location settings) at 1.

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 46 (Find and improve your location's accuracy - Android - Google Maps Help) at 1.**

Claim 1	Corresponding Structure in Accused Systems

From your devices

Many devices, like phones or computers, can work out their precise location. You can allow Google and other apps to provide you with useful features based on where your device is located. For example, if you're running late to meet your friends, you'll probably want to use a navigation app to know the quickest way to get to your destination. To get turn-by-turn directions, you may need to turn on your device's location and give the app the permission to access it. Or for some searches like "coffee shop", "bus stop" or "atm", results will usually be more helpful when precise location is available.

On your Android device, if you choose to turn on your device location, you can use features like navigation, giving an app access to your current location, or find your phone. You can also choose which apps have permission to use your device's location with simple controls that let you turn the permission on or off for individual apps. On Android, you can see when an app is requesting to use your phone's GPS-based location when the top of your screen shows Location . Learn more

Google Location Services

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.

You can disable Google Location Services at any time in your device's location settings. Your device's location will continue to work even if GLS is turned off, but the device will rely only on GPS to estimate device location for apps with the necessary permission. Google Location Services is distinct from your device's location setting. Learn more

The settings and permissions on Android control whether your device sensors (like GPS) or network-based location (like GLS) are used to determine your location and which apps have access to that location. They do not impact how websites and apps might estimate your location in other ways, such as from your IP Address.

Attachment 44 (How Google uses location information – Privacy & Terms – Google) at 2 &3.

Wireless communication device receive the location of the Wireless communication device (Exhibit B) on Google Map from Wireless communication networks (e.g. Verizon, AT&T, T-Mobile, etc.)

Claim 1	Corresponding Structure in Accused Systems
	Turn your phone's location accuracy on or off 1. Open your device's Settings app. 2. Tap Location > Advanced > Google Location Accuracy. 3. Turn Improve Location Accuracy on or off. When Google Location Accuracy is on 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 When Google Location Accuracy is off When you turn off Google Location Accuracy, your phone uses only GPS to find location. GPS can be slower and less accurate than other sources. Let your phone scan for nearby networks or devices To help apps get better location info, you can let your phone scan for nearby Wi-Fi access points or Bluetooth devices. 1. Open your device's Settings app. 2. Tap Location > Wi-Fi and Bluetooth scanning. 3. Turn Wi-Fi scanning or Bluetooth scanning on or off. **Attachment 21 (Manage your Pixel phone's location settings) at 2.**

Claim 1	Corresponding Structure in Accused Systems

If you use an older Android version

Choose location settings (Android 9.0)

To change location settings:

1. Open your device's Settings app.
2. Tap **Security & Location** > **Location**.
   - If you have a work profile, tap **Advanced**.

Then, choose an option:

- **Turn Location on or off**: Tap **Location**.
- **Scan for nearby networks**: Tap **Advanced** > **Scanning**. Turn **Wi-Fi scanning** or **Bluetooth scanning** on or off.
- **Turn emergency location service on or off**: Tap **Advanced** > **Google Emergency Location Service**. Turn **Emergency Location Service** on or off.

Choose location mode (Android 4.4—8.1)

You can choose your location mode based on accuracy, speed, and battery use.

1. Open your phone's Settings app.
2. Tap **Security & Location** > **Location**. If you don't see "Security & Location," tap **Location**.
3. Tap **Mode**. Then pick:
   - **High accuracy:** Use GPS, Wi-Fi, mobile networks, and sensors to get the most accurate location. Use Google Location Services to help estimate your phone's location faster and more accurately.
   - **Battery saving:** Use sources that use less battery, like Wi-Fi and mobile networks. Use Google Location Services to help estimate your phone's location faster and more accurately.
   - **Device only:** Use only GPS. Don't use Google Location Services to provide location information. This can estimate your phone's location more slowly and use more battery.

Choose location access (Android 4.1—4.3)

You can control what location information your phone can use.

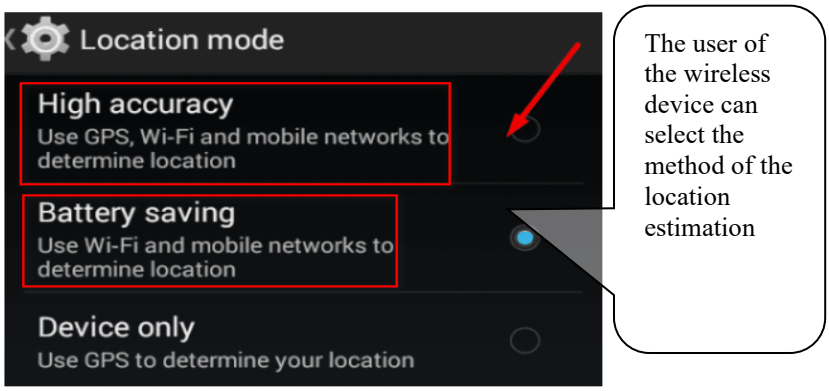
1. Open your phone's Settings app.
2. Under "Personal," tap **Location access**.
3. At the top of the screen, turn **Access to my location** on or off.
   - **When location access is on, pick either or both of:**
     - **GPS satellites:** Lets your phone estimate its location from satellite signals, like a GPS device in a car.
     - **Wi-Fi & mobile network location:** Lets your phone use Google Location Services to help estimate its location faster, with or without GPS.
   - **When location access is off:**
     Your phone can't find its precise location or share it with any apps.

Tip: If you have a tablet that more than one person uses, each person can have different location access settings.

Attachment 40 (Manage your Pixel phone's location settings) at 3 & 4.

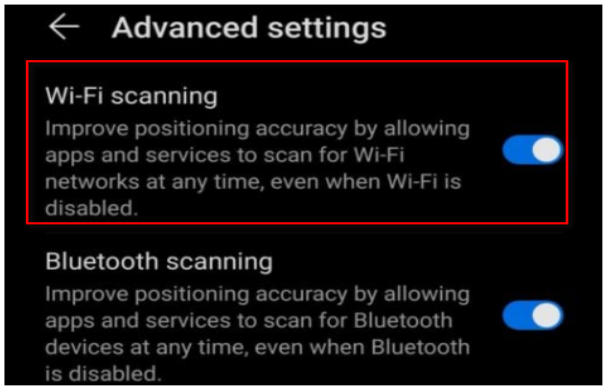
Claim 1	Corresponding Structure in Accused Systems

1. On your Android device, go to **Settings**
2. Tap **Location** and re-enable your location services
3. Select **Mode High accuracy**



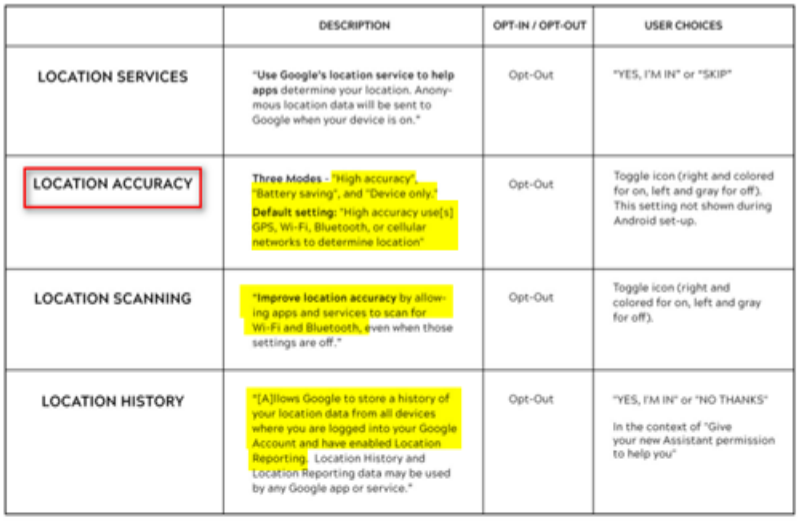
On some phone models, this option can be found under the Advanced Settings option.

Select **Advanced Settings** and enable your device to improve positioning accuracy by allowing apps to scan for Wi-Fi networks and Bluetooth devices at any time, even if Wi-Fi or Bluetooth is disabled.



Attachment 33 (Google Maps Not Updating Location) at 4.

Claim 1	Corresponding Structure in Accused Systems



	DESCRIPTION	OPT-IN / OPT-OUT	USER CHOICES
LOCATION SERVICES	"**Use Google's location service to help apps** determine your location. Anonymous location data will be sent to Google when your device is on."	Opt-Out	"YES, I'M IN" or "SKIP"
LOCATION ACCURACY	**Three Modes** - "High accuracy", "Battery saving", and "Device only." **Default setting:** "High accuracy use[s] GPS, Wi-Fi, Bluetooth, or cellular networks to determine location"	Opt-Out	Toggle icon (right and colored for on, left and gray for off). This setting not shown during Android set-up.
LOCATION SCANNING	"**Improve location accuracy** by allowing apps and services to scan for Wi-Fi and Bluetooth, even when those settings are off."	Opt-Out	Toggle icon (right and colored for on, left and gray for off).
LOCATION HISTORY	"[A]llows Google to store a history of your location data from all devices where you are logged into your Google Account and have enabled Location Reporting. Location History and Location Reporting data may be used by any Google app or service."	Opt-Out	"YES, I'M IN" or "NO THANKS" In the context of "Give your new Assistant permission to help you"

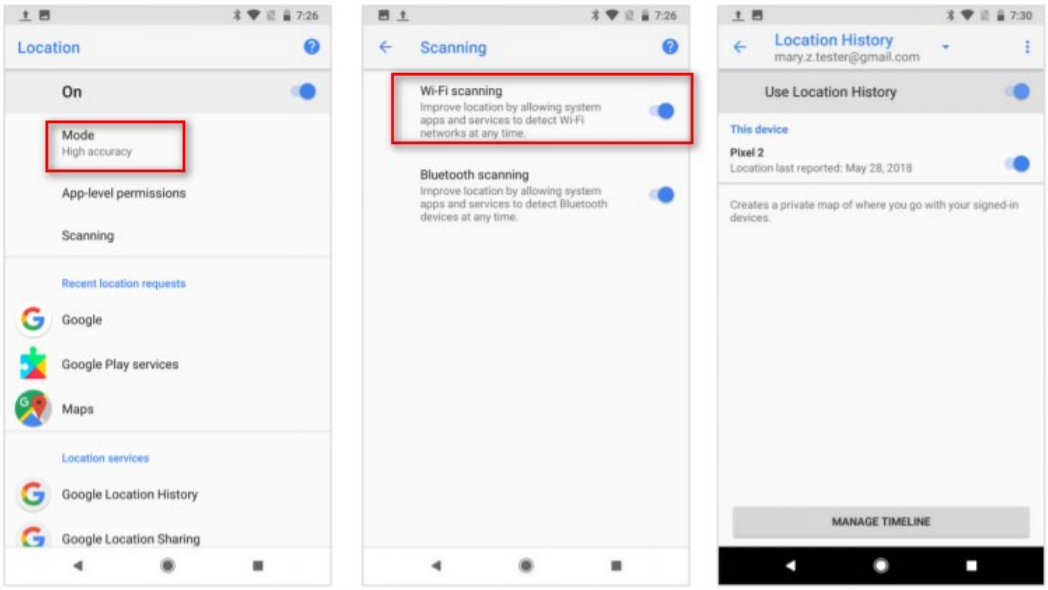
Figure 1: Four Android settings and services that relate to location information collection. [1]

Google Location Services

Google Location Services (GLS) operate at a device level and rely on sensors such as GPS, Wi-Fi, the cellular radio, and other technologies included in mobile devices to position a user in the world. If a user keeps the default settings prompted by Google, Location Services is enabled, Location Accuracy will be set to "High Accuracy" [2] and Location Scanning will be enabled for both Wi-Fi base stations and Bluetooth Beacons, regardless of a user's choice to turn Wi-Fi or Bluetooth on. The implications of user choices among the various Location Services settings are significant, but not intuitive, including:

- With Location Services turned on, Location Accuracy set to "Device only" and Location Scanning turned off, an Android device will only use GPS to provide the location of an Android device.
- When Location Accuracy is set to "High accuracy" and Location Scanning is enabled (the default setting for new device setup), an Android device will use sources including Wi-Fi, Bluetooth, and cellular radio to improve the accuracy of the device's position.

Attachment 38 (Google, Android and Location Tracking) at 2.

Claim 1	Corresponding Structure in Accused Systems
	After completing the setup process users can validate and control settings for device location via the Settings app and navigating to Google settings, then Location (Figure 4).  Figure 4: Location settings after Android device setup process As demonstrated in Figure 4, if users accept Google's defaults during the setup process, the Android device is configured with Location Services enabled, Wi-Fi and Bluetooth scanning engaged, and Location History active. **Attachment 38 (Google, Android and Location Tracking) at 5.**

Claim 1	Corresponding Structure in Accused Systems

Users can choose to disable GLS during the set-up process. However, if a user attempts to disable GLS, a warning dialogue box prompts an extreme scenario: "device location for all apps is turned off and you may not be able to locate your device if it is lost." (Figure 5) Note as well, the action prompt is to "Turn on Location" – reversing the user choice triggering the warning. Further, as described immediately below, many Google and third party apps will not function unless GLS is turned on. Therefore, Google forces user into an impossible ultimatum, have their every move constantly monitored, tracked, and stored or lose the functionality of their expensive smartphone.

If a user disables Location Services but then attempts to use a location aware app or service on their device, she will see the dialogue box shown in Figure 6. If the user clicks "OK" the service is enabled for the entire device and permanently, rather than enabling Location Services only for that particular app or service requesting the functionality.

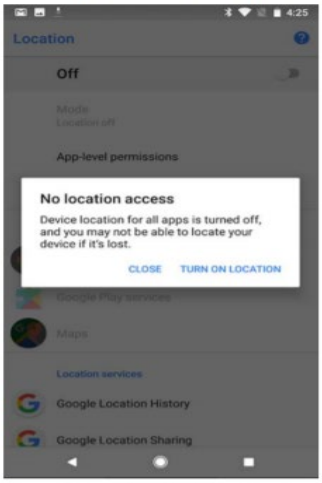


Figure 5: Location Services Warning

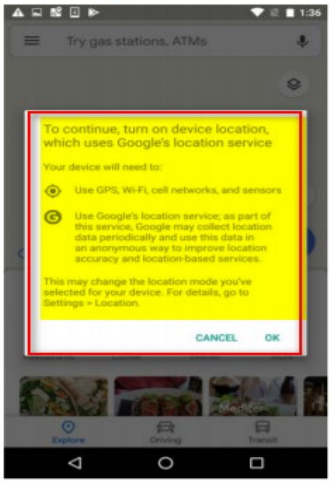


Figure 6: Re-Enable Location Services

Attachment 38 (Google, Android and Location Tracking) at 6.

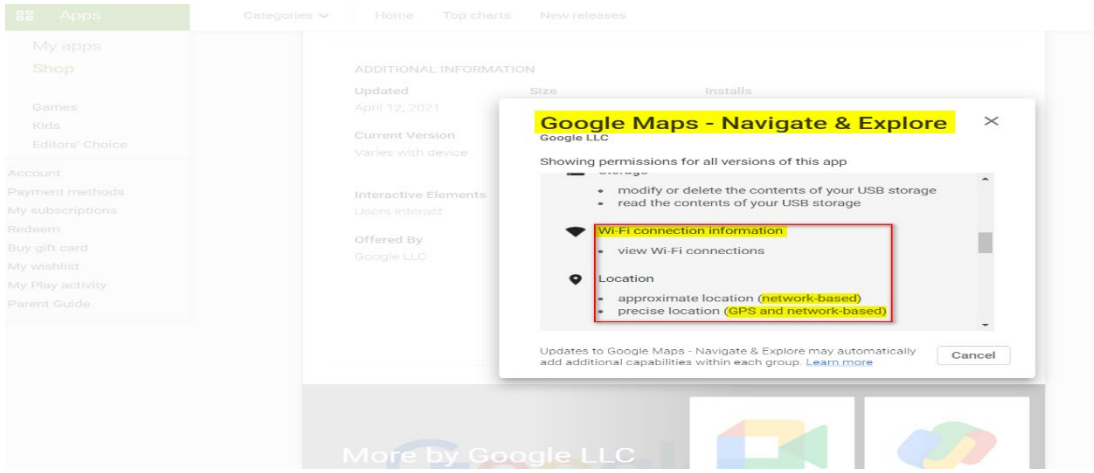
We collect information about your location when you use our services, which helps us offer features like driving directions for your weekend getaway or showtimes for movies playing near you.

Your location can be determined with varying degrees of accuracy by:

- GPS
- IP address
- Sensor data from your device
- Information about things near your device, such as Wi-Fi access points, cell towers, and Bluetooth-enabled devices

The types of location data we collect depend in part on your device and account settings. For example, you can turn your Android device's location on or off using the device's settings app. You can also turn on Location History if you want to create a private map of where you go with your signed-in devices.

Attachment 29 (Google Privacy Policy) at 4.

Claim 1	Corresponding Structure in Accused Systems
	 **Attachment 39 (Google Map_Permissions) at 1.**

11. Defendant makes, uses, offers to sell, and/or sells within or imports into the U.S., wireless-network systems, devices and methods; and related components, applications, programs, functionality, and services that use identified locations of wireless devices to provide tracking such that Defendant infringes claims 1–24 of the '147 patent, literally or under the doctrine of equivalents.

12. Defendant put the inventions claimed by the '147 Patent, including systems, devices and methods, into service, i.e., used them and controlled them as a whole as well as on an element by element basis. But for Defendant's actions, the claimed-inventions embodiments involving Defendant's products and services would never have been put into service. Defendant controlled the systems, devices, and methods to provide the benefits of location data, mapping, navigation, traffic updates, tracking, and other features of the claim inventions as set out in the evidence charts above.

13. Defendant derives benefits from claim elements met by third party wireless communication networks such as Verizon, AT&T, and T-Mobile (identified by name in the evidence charts above). Those benefits include performing the specifically identified functions of those wireless communication networks (e.g., communicate location of a wireless mobile communications device). Defendant obtains those benefits by putting those functionalities into use, i.e. controlling them, as per the evidence charts mentioned above.

14. Moreover, Defendant obtains the benefits, which are necessary to the operation of the claimed inventions, from the wireless communications networks it puts into use of at least:

- Receiving information indicative of a location of the wireless mobile communications device;
- Receiving updates of navigation information in conformity with traffic congestion information.

15. Other benefits tied to the use of the wireless communications networks include:

- Use of the acquired location data to benefit and improve the operation of the Google Maps application;
- Use of the acquired location data to benefit Google's other services, such as application purchases, targeted marketing and support of other Google apps to drive up the purchase of other apps;
- Use of the acquired location data to facilitate transactions involving Google;
- Use of the acquired locations data to make Google Maps functional to drive sales of Google wireless devices and other third party devices pre-loaded with Google Maps.

16. Defendant has and continues to knowingly induce infringement. Defendants have actively encouraged or instructed others (e.g., its customers and other parties such as AT&T, Verizon, and T-Mobile, and Sprint), and continues to do so, on how to use its products and services (e.g., wireless-network components and related applications and programs that use identified locations of wirelessdevices to provide tracking of mobile devices) such as to cause infringement of claims 1–24 of the '147 patent, literally or under the doctrine of equivalents.

17. Google has the specific intent to cause direct infringement by Google's customers and

other parties such as AT&T, Verizon, T-Mobile or Sprint, as evidenced by Google's selling, offering for sale, marketing, advertising, preloading or making available for download or purchase the Google Maps application as well as making the Google Maps application and the Google Maps servers available to its customers and other parties. Google benefits from each and every claimed element and functionality, including those provided by the wireless communications networks, because without each of them being put into service, Google would not be able to operate the Google Maps application and all its features.

18. Defendant has known and should have known of the '147 patent, by at least the date of the patent's issuance, or from the issuance of the '284 patent, which followed the date that the patent's underlying application was cited to Defendants by the U.S. Patent and Trademark Office during prosecution of one of Defendant's patent applications, such that Defendant knew and should have known that it was and would be inducing infringement.

19. Defendant has and continues to contributorily infringe. Defendant has actively encouraged or instructed others (e.g., its customers and other parties such as AT&T, Verizon, and T-Mobile, and Sprint), and continues to do so, on how to use its products and services e.g., wireless-network components and related applications and programs that use identified locations of wireless devices to provide tracking of mobile devices) such as to cause infringement of one or more of claims 1–24 of the '147 patent, literally or under the doctrine of equivalents.

20. Google's customers and/or other parties, such as AT&T, Verizon, T-Mobile or Sprint, directly infringe by putting the entire system into use and benefitting from each and every element or functionality of the system. For example, Google's customer may use the Google Maps application to communicate location information via the wireless communications device, the wireless network, the base station, and the Google Server. Google provides material components of the system, including, for example, the Google Maps application that is saved on the wireless communications device and the Google

server or computer because these components allow Google's customer to communicate the location information between the wireless communications device and the Google Server.

21. Additionally, Google sells, offers to sell, advertises, markets, preloads or makes available for download or purchase the Google Maps application to encourage the Google customers and other parties such as AT&T, Verizon, T-Mobile or Sprint to use the Google Maps application preloaded on the wireless communications device or to downloaded using iOS of Android applications store, and by touting its features and benefits to the application users such as navigation and geographic location benefits. Google also instructs its customers on how to use navigation data, to obtain location, as well as toggle location privacy setting on or off within the Google Maps application by providing user manuals, guides and instructions on how to do so.

22. Further, Google Maps application and Google Server are not staple article of commerce because there is no substantial non-infringing use of these products and features other than to practice the claimed invention. Google benefits from each and every claimed element and functionality because without each of them being put into service, Google would not be able to operate the Google Maps application and all its features. Thus, Google maps would not have the economic benefit of being able to sell or license the Google Maps applications to customers and other parties.

23. Defendant has known and should have known that it's products and service, including but not limited to Google Maps application and Google servers or computers, are especially made or especially adopted for use in an infringement. Moreover, Defendant has known of the '147 patent and the technology underlying it from at least the date of issuance of the patent or from the issuanceof the '284 patent, which followed the date that the patent's underlying application was cited to Defendants by the U.S. Patent and Trademark Office during prosecution of one of Defendant's patent applications, such that Defendant knew and should have known that it was and would be contributorily infringing.

24. Google's actions constituted and continue to constitute willful infringement of the asserted claims of the '147 Patent. Google knew of the patent-in suit at least as of at least the date of

issuance of the patent or from the issuanceof the '284 patent, which followed the date that the patent's underlying application was cited to Defendants by the U.S. Patent and Trademark Office during prosecution of one of Defendant's patent applications. After acquiring that knowledge, Google continued to directly infringe the asserted claims of the patent-in-suit, as previously explained in this complaint. Google has also knowingly continued to indirectly infringe the asserted claims, both by inducement infringement and by contributory infringement, as previously explained in this complaint. Google thus knew or should have known that its conduct amounted to infringement of the '147 Patent.

25. Defendants have caused and will continue to cause Traxcell damage by infringing the '147 patent.

IV. PRAYER FOR RELIEF

WHEREFORE, Traxcell respectfully requests that this Court:

i. enter judgment that Defendants have infringed the Patent-in-Suit;

ii. award Traxcell damages in an amount sufficient to compensate it for Defendants' infringement of the Patents-in-Suit, in an amount no less than a reasonable royalty, together with prejudgment and post-judgment interest and costs under 35 U.S.C. § 284;

iii. award Traxcell an accounting for acts of infringement not presented at trial and an award by the Court of additional damage for any such acts of infringement;

iv. declare this case to be "exceptional" under 35 U.S.C. § 285 and award Traxcell its attorneys' fees, expenses, and costs incurred in this action;

v. declare Defendants infringement to be willful and treble the damages, including attorneys' fees, expenses, and costs incurred in this action and an increase in the damage award pursuant to 35 U.S.C. §284;

vi. a decree addressing future infringement that either (i) awards a permanent injunction

enjoining Defendants and their agents, servants, employees, affiliates, divisions, and subsidiaries, and those in association with Defendants, from infringing the claims of the Patents-in-Suit or (ii) award damages for future infringement in lieu of an injunction, in an amount consistent with the fact that for future infringement the Defendants will be adjudicated infringers of a valid patent, and trebles that amount in view of the fact that the future infringement will be willful as a matter of law; and,

vii. award Traxcell such other and further relief as this Court deems just and proper.

JURY DEMAND

Traxcell hereby requests a trial by jury on issues so triable by right.

Respectfully submitted,

Ramey & Schwaller, LLP

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CERTIFICATE OF SERVICE

Pursuant to the Federal Rules of Civil Procedure and LR5, I hereby certify that all counsel of record who have appeared in this case are being served on this day of March 2, 2022, with a copy of the foregoing via email and ECF filing.

/s/ William P. Ramey, III
William P. Ramey, III