

U.S. Patent No. 10,341,811 (“’811 Patent”)

Accused Instrumentalities

Samsung products, including without limitation Galaxy SmartTag devices, including, but not limited to the SmartTag, SmartTag+, and all variations or iterations thereof; Galaxy Tab tablet devices, including, but not limited to the S9, S9+, S9 Ultra, S8, S8+, S8 Ultra, S6 Lite 2022, S7 FE, S6 Lite, S6 5G, S7+ 5G, S7+, S7 5G, S7, S5e, S6, S4, S3, and all variations or iterations thereof; Galaxy mobile phone devices, including, but not limited to the S8, S8+, S8 Active, S9, S9+, S10, S10+, S10 5G, S10 Lite, S10e, S20, S20+, S20+ BTS Edition, S20 Ultra, S20 FE, S20, S21, S21+, S21 Ultra, S21 FE, S22, S22+, S22 Ultra, S23, S23+, S23 Ultra, Z Fold 5, Z Fold 4, Z Fold 3, Z Fold 2, Fold, Z Flip 5, Z Flip 4, Z Flip 3, Z Flip, A3, A5, A6, A6+, A7, A8, A8+, A8 Star, A9, A2 Core, A10e, A10, A10s, A20, A20s, A30, A30s, A40, A40s, A50, A50s, A60, A70, A70s, A80, A90, A01 Core, A01, A11, A21, A21s, A31, A41, A51, A71, A51 5G, A71 5G, A52s 5G, A73 5G, A23 5G, A02, A02s, A12, A22, A22 5G, A32, A32 5G, A42 5G, A52, A52 5G, A52s 5G, A72, A03 Core, A03, A03s, A13, A13 5G, A23, A23 5G, A33 5G, A53 5G, A73 5G, A04e, A04, A04s, A14, A14 5G, A24, A34 5G, A54 5G, Note 8, Note 9, Note 10, Note 10+, Note 10 Lite, Note 20, Note 20 Ultra, and all variations or iterations thereof (“Accused Products”), infringe at least Claims 1, 4, 5, 15, 18, 19, 24, 25, and 28 of the ’811 Patent.

Each Accused Product infringes the claims in substantially the same way, and the evidence shown in this chart is similarly applicable to each Accused Product. Each claim limitation is literally infringed by each Accused Product. However, to the extent any claim limitation is not met literally, it is nonetheless met under the doctrine of equivalents because the differences between the claim limitation and each Accused Product would be insubstantial, and each Accused Product performs substantially the same function, in substantially the same way, to achieve the same result as the claimed invention. Notably, Samsung has not yet articulated which, if any, particular claim limitations it believes are not met by the Accused Products.

Claim 1

Claim 1	Accused Products
[1pre] 1. A method of determining whether a portable RF communications device is present at a device-specific target location, the method comprising:	To the extent the preamble is limiting, each Accused Product performs a method of determining whether a portable RF communications device is present at a device-specific target location, the method comprising. For example, the Galaxy S22 contains both cellular and WiFi radios, and associated antennas, which are used to determine the geographic location of the phone as described below. <i>See, e.g.:</i>

Claim 1	Accused Products
	Samsung Galaxy S22 5G  - Released 2022, February 25 167g / 168g (mmWave), 7.6mm thickness - Android 12, One UI 4.1.1 128GB/256GB storage, no card slot □ 6.1" 1080x2340 pixels 📷 50MP 4320p https://www.gsmarena.com/samsung_galaxy_s22_5g-11253.php

Claim 1	Accused Products		
	NETWORK	Technology	GSM / CDMA / HSPA / EVDO / LTE / 5G COLLAPSE ▲
		2G bands	GSM 850 / 900 / 1800 / 1900 - SIM 1 & SIM 2 (Dual SIM model only) CDMA 800 / 1900 & TD-SCDMA
		3G bands	HSDPA 850 / 900 / 1700(AWS) / 1900 / 2100 CDMA2000 1xEV-DO
		4G bands	1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28, 32, 38, 39, 40, 41, 66 - International 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 18, 19, 20, 25, 26, 28, 29, 30, 38, 39, 40, 41, 46, 48, 66, 71 - USA
		5G bands	1, 2, 3, 5, 7, 8, 12, 20, 25, 28, 38, 40, 41, 66, 75, 77, 78 SA/NSA/Sub6 - International 1, 3, 5, 7, 8, 20, 28, 38, 41, 66, 71, 260, 261 SA/NSA/Sub6/mmWave - USA
		Speed	HSPA 42.2/5.76 Mbps, LTE-A (7CA) Cat20 2000/200 Mbps, 5G (5+ Gbps DL)
	DISPLAY	Type	Dynamic AMOLED 2X, 120Hz, HDR10+, 1300 nits (peak)
		Size	6.1 inches, 90.1 cm ² (~87.4% screen-to-body ratio)
		Resolution	1080 x 2340 pixels, 19.5:9 ratio (~425 ppi density)
		Protection	Corning Gorilla Glass Victus+
			Always-on display
	PLATFORM	OS	Android 12, One UI 4.1.1
		Chipset	Exynos 2200 (4 nm) - Europe Qualcomm SM8450 Snapdragon 8 Gen 1 (4 nm) - ROW
		CPU	Octa-core (1x2.8 GHz Cortex-X2 & 3x2.50 GHz Cortex-A710 & 4x1.8 GHz Cortex-A510) - Europe Octa-core (1x3.00 GHz Cortex-X2 & 3x2.50 GHz Cortex-A710 & 4x1.80 GHz Cortex-A510) - ROW
		GPU	Xclipse 920 - Europe Adreno 730 - ROW
	COMMS	WLAN	Wi-Fi 802.11 a/b/g/n/ac/6, dual-band, Wi-Fi Direct, hotspot
		Bluetooth	5.2, A2DP, LE
		GPS	Yes, with A-GPS, GLONASS, BDS, GALILEO
		NFC	Yes
		Radio	No
		USB	USB Type-C 3.2, USB On-The-Go
	https://www.gsmarena.com/samsung_galaxy_s22_5g-11253.php		

Claim 1	Accused Products
	 Find My Mobile Lost your phone? Don't panic. Find My Mobile will help you locate your phone or tablet and protect your data. You can even use it to unlock if you forget your pattern, PIN, or password. *To use this service, you must be signed in to your Samsung account on your device. https://findmymobile.samsung.com/ Find My Mobile Because many of us live a significant part of our lives through our Galaxy phones, Find My Mobile has become a necessary precaution. Use the Locate My Device function when you can't find your phone. When it's lost for sure, you have the option to remotely lock your device, block access to Samsung Pay, and even delete Samsung Pay or simply wipe data from the entire device. Requirements * To use the 'Find My Mobile' service, 1) You must have set up your Samsung account on your device. 2) You allow Google to collect your location information and agree to the 'Use wireless networks' term and conditions. https://www.samsung.com/us/support/owners/app/find-my-mobile

Claim 1	Accused Products
	How does Google know my location? Depending on the products you're using and settings you choose, you may provide Google with different types of location information that are critical to making some services work and making others more useful for you. Location can come from real-time signals, like your IP address or device location, and also your past activity on Google sites and services, to tailor experiences for your context. Below are the primary ways we may get information about your location. https://policies.google.com/technologies/location-data?hl=en-US

Claim 1	Accused Products
	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 https://policies.google.com/technologies/location-data?hl=en-US

Claim 1	Accused Products
	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 https://policies.google.com/technologies/location-data?hl=en-US
[1a] with the portable RF communications device automatically:	Each Accused Product performs a method with the portable RF communications device automatically performing the claimed steps.

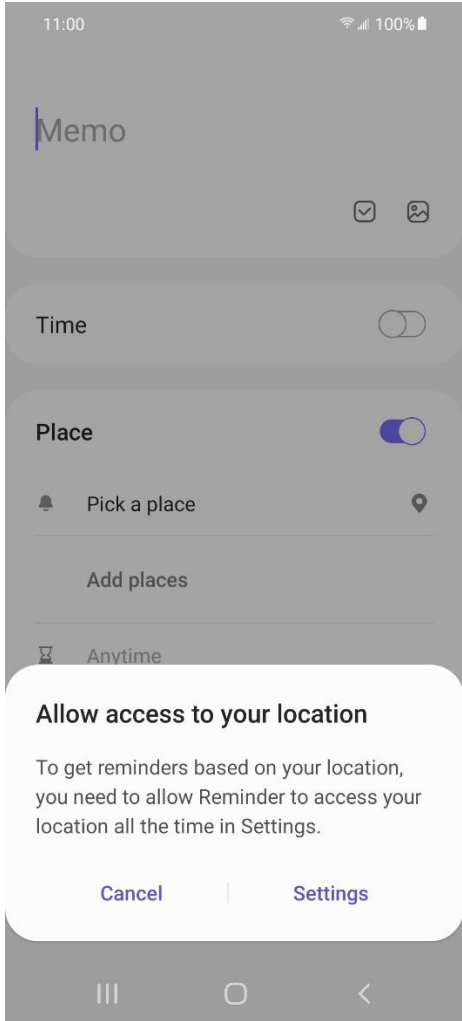
Claim 1	Accused Products
	See claim elements below.
[1b] (a) receiving a first plurality of communications signals, each received from one of a first plurality of antenna stations within range of the portable RF communications device, wherein the antenna stations are fixed-location service-area antenna stations and are substantially continuously operating;	Each Accused Product performs receiving a first plurality of communications signals, each received from one of a first plurality of antenna stations within range of the portable RF communications device, wherein the antenna stations are fixed-location service-area antenna stations and are substantially continuously operating. For example, the Galaxy S22 receives communication signals from a plurality of Wi-Fi network stations and/or a plurality of mobile network stations, each of which is generally in a fixed location and operating continuously (Wi-Fi access point, cell phone tower, etc.). See, e.g.:  Find My Mobile Lost your phone? Don't panic. Find My Mobile will help you locate your phone or tablet and protect your data. You can even use it to unlock if you forget your pattern, PIN, or password. *To use this service, you must be signed in to your Samsung account on your device. https://findmymobile.samsung.com/

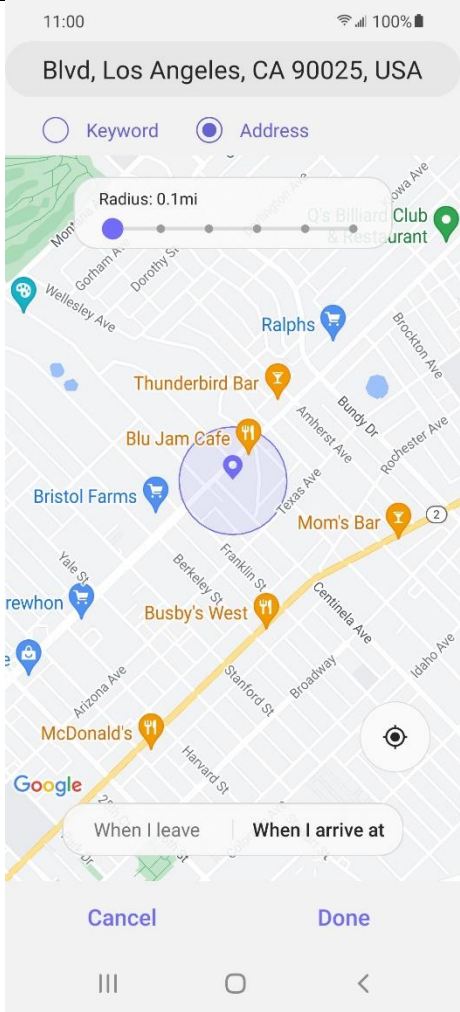
Claim 1	Accused Products
	Find My Mobile Because many of us live a significant part of our lives through our Galaxy phones, Find My Mobile has become a necessary precaution. Use the Locate My Device function when you can't find your phone. When it's lost for sure, you have the option to remotely lock your device, block access to Samsung Pay, and even delete Samsung Pay or simply wipe data from the entire device. Requirements * To use the 'Find My Mobile' service, 1) You must have set up your Samsung account on your device. 2) You allow Google to collect your location information and agree to the 'Use wireless networks' term and conditions. https://www.samsung.com/us/support/owners/app/find-my-mobile How does Google know my location? Depending on the products you're using and settings you choose, you may provide Google with different types of location information that are critical to making some services work and making others more useful for you. Location can come from real-time signals, like your IP address or device location, and also your past activity on Google sites and services, to tailor experiences for your context. Below are the primary ways we may get information about your location. https://policies.google.com/technologies/location-data?hl=en-US

Claim 1	Accused Products
	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 https://policies.google.com/technologies/location-data?hl=en-US

Claim 1	Accused Products
	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 https://policies.google.com/technologies/location-data?hl=en-US
[1c] (b) causing a determination of whether the portable RF communications	Each Accused Product performs causing a determination of whether the portable RF communications device is within proximity of the device-specific target location by electronically comparing at least one number based on signal strengths of each of the first plurality of

Claim 1	Accused Products
device is within proximity of the device-specific target location by electronically comparing at least one number based on signal strengths of each of the first plurality of communications signals with at least one number based on corresponding signal strengths of each of a second plurality of communication signals from a second plurality of antenna stations that have been identified as being within range of the same location as the device-specific target location, which signal strengths have been determined for the same location as the device-specific target location; and	communications signals with at least one number based on corresponding signal strengths of each of a second plurality of communication signals from a second plurality of antenna stations that have been identified as being within range of the same location as the device-specific target location, which signal strengths have been determined for the same location as the device-specific target location. For example, using the Samsung Reminder app included with the Galaxy S22, a user can specify a device-specific target location by creating a location-based reminder. This functionality uses the Google Location Services functionality, as shown by the necessity of providing Location permissions to the Reminder app. The phone then uses signal strength and other network information from nearby Wi-Fi and/or mobile communications signals, based on antennas identified as being within range of the specified location, to determine whether or not the phone is in the same location as the device-specific target location. Similar reminders can also be created through Samsung's Bixby service. For another example, Samsung SmartTag products use Bluetooth to communicate with mobile phones in its proximity, which will scan and find lost items attached with the SmartTag based on Bluetooth device ID and received signal strength. Even when the Samsung SmartTag is out of the proximity of its owner's mobile phone, it can still broadcast Bluetooth beacons that will potentially be captured by anybody's mobile phone that is nearby, which will relay the beacon to Samsung's Find Network in order to be discovered by its owner. Samsung SmartTag+ product further uses UWB to communicate with mobile phones, such as Samsung Galaxy S22 Plus, in its proximity, which will use more precise ranging technology with UWB to get cm level accuracy and step-by-step guide to lead to the tag. For another example, Samsung's SmartThings Find, Search Nearby, and/or Find My systems, when used on a Galaxy S22 or other Samsung Accused Product, enable locating, and navigating to the location of, a user's SmartTag, SmartThings, and/or Android devices. On information and belief, these processes use the same or similar techniques as described in other Samsung and Google documentation, including comparing numbers based on signal strengths in order to determine if the Accused Product is within proximity of the target location.

Claim 1	Accused Products
	<i>See, e.g.:</i>  Screenshot from Samsung Reminder app showing that the app uses Google Services based location determination.

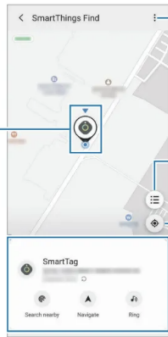
Claim 1	Accused Products
	 Screenshot from Samsung Reminder app showing selection of device-specific location for notification.

Claim 1	Accused Products
	Get reminded. When you create a new reminder with Bixby, you can set a specific time and location for delivery, so you'll get it when you need it.  https://www.samsung.com/global/galaxy/apps/bixby/reminder/

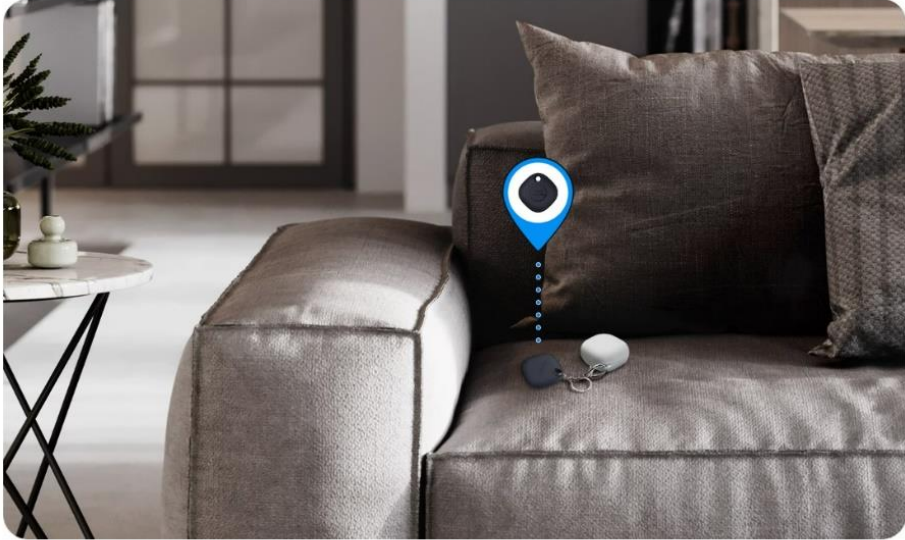
Claim 1	Accused Products
	From your devices Many devices, like phones or computers, can work out their precise location. You can allow Google and other apps to provide you with useful features based on where your device is located. For example, if you're running late to meet your friends, you'll probably 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 https://policies.google.com/technologies/location-data?hl=en-US

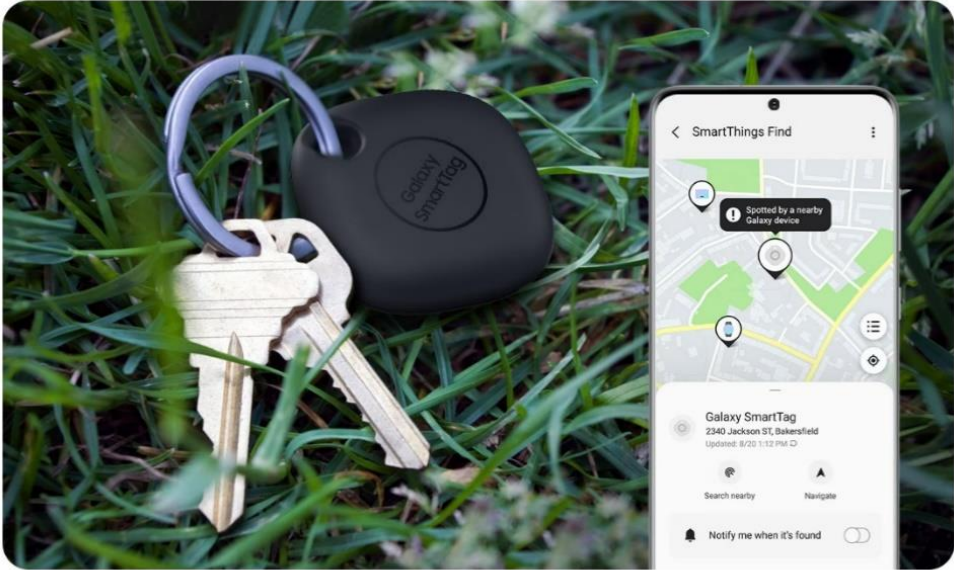
Claim 1	Accused Products
	Google Location Services On most Android devices, Google, as the network location provider, provides a location service called Google Location Services (GLS), known in Android 9 and above as Google Location Accuracy. This service aims to provide a more accurate device location 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 https://policies.google.com/technologies/location-data?hl=en-US In a press release this evening, Samsung announced that the SmartThings Find network has effectively doubled in size over the last year, with 200 million “find nodes” out in the wild. A “find node” is a Galaxy smartphone or

Claim 1	Accused Products
	tablet that is registered to use SmartThings Find and can relay the location of a Galaxy SmartTag to the tag's owner. https://9to5google.com/2022/07/13/samsung-smartthings-find-users/ The Samsung ecosystem runs more and more like a well-oiled machine with each update from the company. Now, the tech giant is announcing that it's expanded its SmartThings Find network by over 100 million nodes in since July 2022, adding up to over 300 million in total. Source: https://www.zdnet.com/article/samsung-expands-smartthings-find-network-to-over-300-million-nodes/, May 4, 2023

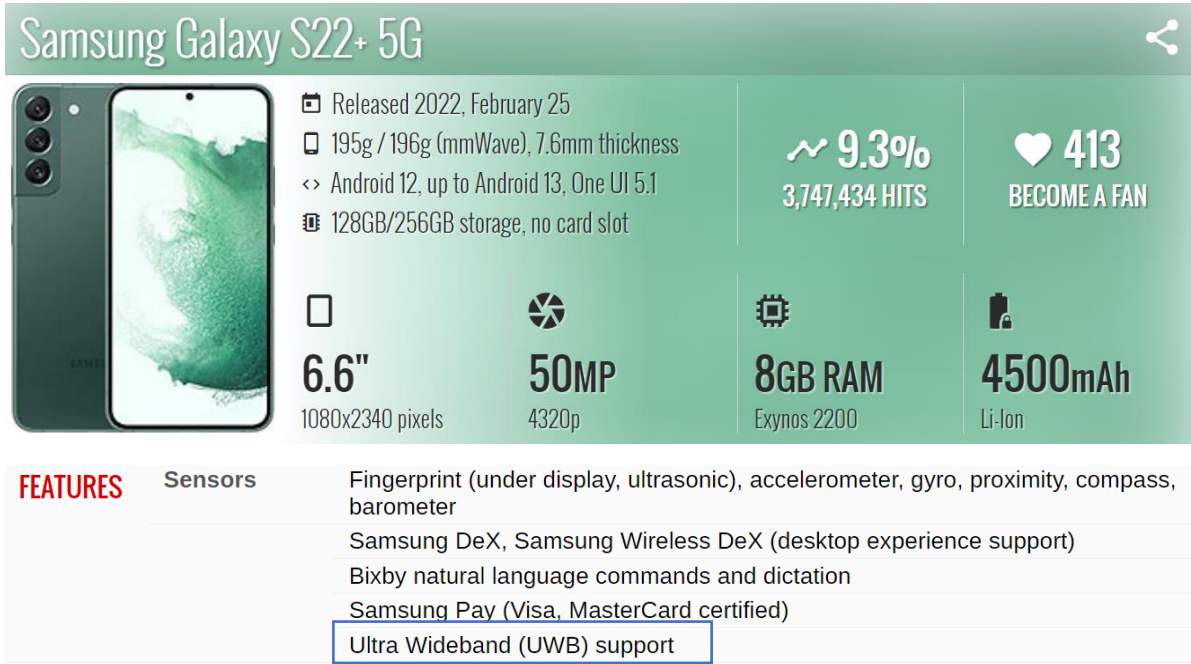
Claim 1	Accused Products
	Using the SmartTag Viewing a SmartTag's location You can remotely view your SmartTag's location from the SmartThings app on your mobile device and find its location by triggering a notification sound on the SmartTag. 1. Launch the SmartThings app on your mobile device. 2. Tap on your SmartTag card and tap View map. Alternatively, tap SmartThings Find. The current location of the device will be displayed on the map.  • The location of the SmartTag is based on GPS and Wi-Fi positioning results of the mobile device connected to the SmartTag or the nearby <u>Android mobile device, which may have some errors due to things like the surrounding environment or GPS failure</u> • If the current location of the SmartTag does not appear, the SmartTag's battery has been discharged or has not been discovered by an Android mobile device that can check the SmartTag's location information. Activate the related feature to get notifications of the SmartTag's location information. • The SmartTag's usage time may vary depending on the user's environment and the usage pattern. • The Ultra-Wideband (UWB) feature may not be available depending on the region. 

Claim 1	Accused Products
	1. Launch the SmartThings app on your mobile device. 2. Tap SmartThings → Find Navigate. <u>Directions to the place where the SmartTag is located will begin.</u>  If a supported navigation app is not installed on your mobile device, install the desired app from the list of supported navigation apps first and get directions. https://manuals.plus/samsung/galaxy-smarttagmarttag-manual#axzz7g8yWgeln Searching for the SmartTag location by signal strength You can find the SmartTag's location by detecting its signal strength. 1. Launch the SmartThings app on your mobile device. 2. Tap SmartThings Find Search nearby. The signal screen of the SmartTag you are looking for will appear. The closer you are to the location of the SmartTag you are looking for, the stronger the signal strength indicated on the screen will be. https://manuals.plus/samsung/galaxy-smarttagmarttag-manual#axzz7g8yWgeln

Claim 1	Accused Products
	Finding the important things in your life Bluetooth powered SmartTags* attach easily to keys, bags, or even the family pet. If you think your lost item is nearby but can't quite find it, tap the ring button on your mobile and follow the familiar sound of your ringtone calling for you at the volume you set.  * Galaxy SmartTags have a Bluetooth range of up to 100m without obstacles. Actual performance may vary depending on the environment where they are used. Source: https://www.samsung.com/us/mobile-accessories/galaxy-smarttag-black-ei-t5300bbegus/

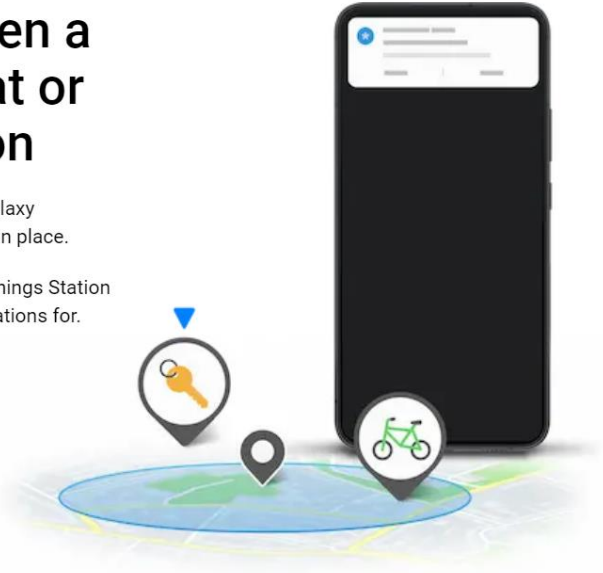
Claim 1	Accused Products
	Locate your things from far away Your tagged item is out of range? No problem! Even when offline, the Galaxy Find Network* can use scanned data to find it for you privately. You can also use other devices you own to locate your items.  * This feature is only available with Galaxy devices. Source: https://www.samsung.com/us/mobile-accessories/galaxy-smarttag-black-ei-t5300bbegus/

Claim 1	Accused Products
	AR Finding walks you step-by-step to lost items AR Finding gives you a uniquely visual way to locate a lost item with a SmartTag+ attached. It even lets you know you're close with a glimmering green light when you're at the destination. It shows you the way on your phone screen through the SmartThings app.  * For Galaxy SmartTag+, Samsung account log-in and registration on SmartThings Find is required. Galaxy SmartTag+ needs to be paired with ultra-wideband(UWB)-enabled Galaxy smartphones with Android 11 or higher to fully function. ** AR Finding works between devices that support UWB technology. UWB is supported in Galaxy S21 Ultra, Galaxy S21+, Galaxy Note20 Ultra and Galaxy Z Fold2. *** Accuracy may be reduced if there's an obstacle between you and the tag, such as when the tag is inside a drawer, behind a wall, or in a car. Source: https://www.samsung.com/us/mobile-accessories/galaxy-smarttag-plus-black-1-pack-eit7300bbegus/ Ultra-wideband (UWB) communication Ultra-wideband communication is a radio technology focused on precise ranging (measuring the location to an accuracy of 10 cm) between devices. This radio technology can use a low-energy density for short range measurements and perform high-bandwidth signaling over a large portion

Claim 1	Accused Products						
	of the radio spectrum. UWB's bandwidth is greater than 500 MHz (or exceeding 20% fractional bandwidth). UWB-enabled mobile devices As of April 2023, these devices support the Android UWB Jetpack library: <table> <tr> <td>Vendor</td><td>Device Model</td></tr> <tr> <td>Google</td><td>Pixel 6 Pro, Pixel 7 Pro</td></tr> <tr> <td>Samsung</td><td>Galaxy Note 20, S21+, S22+, Z Fold 2, 3, 4</td></tr> </table> https://developer.android.com/guide/topics/connectivity/uwb  Source: https://www.gsmarena.com/samsung_galaxy_s22_ultra_5g-11251.php	Vendor	Device Model	Google	Pixel 6 Pro, Pixel 7 Pro	Samsung	Galaxy Note 20, S21+, S22+, Z Fold 2, 3, 4
Vendor	Device Model						
Google	Pixel 6 Pro, Pixel 7 Pro						
Samsung	Galaxy Note 20, S21+, S22+, Z Fold 2, 3, 4						

Claim 1	Accused Products
[1d] (c) as a result of the determination that the portable RF communications device is within proximity of the device-specific target location, initiating, on the portable RF communications device, a location-based action associated with the device-specific target location.	Each Accused Product performs as a result of the determination that the portable RF communications device is within proximity of the device-specific target location, initiating, on the portable RF communications device, a location-based action associated with the device-specific target location. For example, each Accused Product will take a predetermined action, such as displaying a notification, ending navigation, or performing a location-specific action, when it is determined that the device is within proximity of the target location. For another example, Any Android based mobile device can call a generic geofencing API to detect and notify any applications whenever the device enters the vicinity of a defined location. <i>See, e.g.:</i>

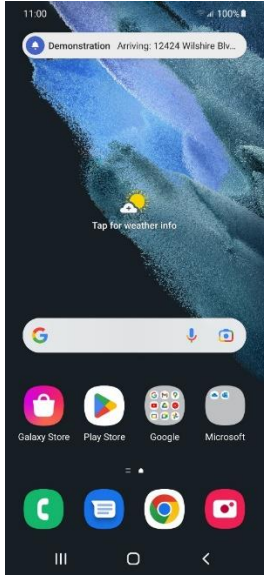
Claim 1	Accused Products
	Screenshot of notification (at top) from Samsung Reminder app upon arriving at the predetermined location <i>See also, e.g.,</i> evidence and explanation above and below.

Claim 1	Accused Products
	Get notified when a device arrives at or leaves a location You can get notifications when your Galaxy SmartTag arrives at a or leaves a certain place. To use this feature, you need a SmartThings Station in the place you want to receive notifications for.  Source: https://smarthingsfind.samsung.com/login Sometimes users want to use a particular app when they are in a specific type of location, such as an airport, or a supermarket. However, users have to navigate to that app and then take a specific action within it while they are near the area of interest. The geofencing API allows you to define perimeters, also referred to as geofences, which surround the areas of interest. Your app gets a notification when the device crosses a geofence, which allows you to provide a useful experience when users are in the vicinity.

Claim 1	Accused Products
	 Source: https://developers.google.com/location-context/geofencing/

Claim 4

Claim 4	Accused Products
4. The method of claim 1 wherein the location-based action comprises launching a computer program application on the portable RF communications device.	Each Accused Product performs the method of claim 1 wherein the location-based action comprises launching a computer program application on the portable RF communications device. For example, the Samsung Reminder app allows a user to specify a location while creating a location-based reminder. The phone then uses signal strength and other network information from nearby Wi-Fi and/or mobile communications signals, based on antennas identified as being within range of the specified location, to determine whether the phone is arriving or leaving the location chosen by the user. Based on this determination, the phone launches the Samsung Reminder app. For another example, any Android based mobile device can call a generic geofencing API to detect and notify applications, including launching applications as appropriate, when the device enters the vicinity of a defined location.

Claim 4	Accused Products
	<i>See, e.g.:</i>  Screenshot showing, at top, notification from Samsung Reminder app that the phone arriving at the location as specified by the user.

Claim 5

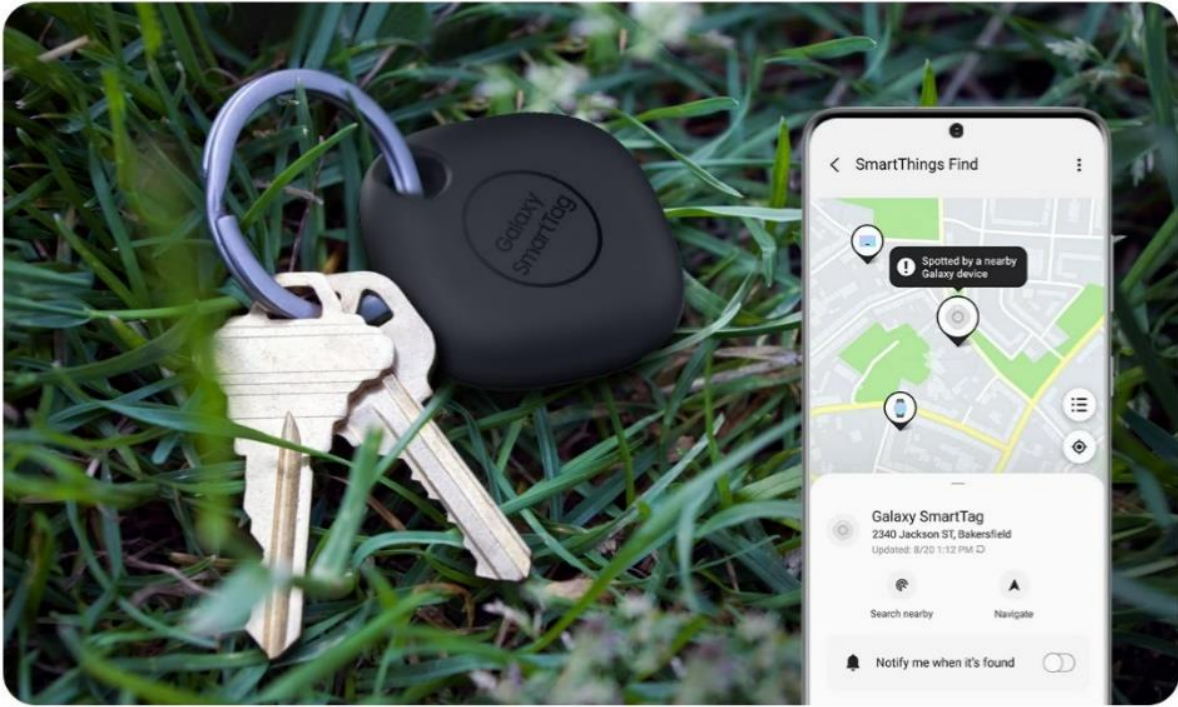
Claim 5	Accused Products
5. The method of claim 1 wherein part (b) is performed depending on the rate of change of the user's location.	Each Accused Product performs the method of claim 1 wherein part (b) is performed depending on the rate of change of the user's location. For example, each Accused Product's location settings can be configured, by the user or an application, to update location based on the user's speed (rate of change of location).

Claim 5	Accused Products
	<i>See, e.g.:</i> If your app needs to request location or receive permission updates, the device needs to enable the appropriate system settings, such as GPS or Wi-Fi scanning. Rather than directly enabling services such as the device's GPS, your app specifies the required level of accuracy/power consumption and desired update interval, and the device automatically makes the appropriate changes to system settings. These settings are defined by the LocationRequest data object. Update interval setInterval() - This method sets the rate in milliseconds at which your app prefers to receive location updates. Note that the location updates may be somewhat faster or slower than this rate to optimize for battery usage, or there may be no updates at all (if the device has no connectivity, for example). Source: https://developer.android.com/training/location/change-location-settings Starting updates based on the user's activity state. Example: Requesting updates only when the user is driving or riding a bike. Use the Activity Recognition API in conjunction with fused location provider updates. Request updates when the targeted activity is detected, and remove updates when the user stops performing that activity. Source: https://developer.android.com/guide/topics/location/battery

Claim 14

Claim 14	Accused Products
14. The method of claim 1 wherein the determination of whether the portable RF communications device is within proximity of the device-specific target location is	Each Accused Product performs the method of claim 1 wherein the determination of whether the portable RF communications device is within proximity of the device-specific target location is performed at a location remote from the portable RF communications device. For example, in one alternative implementation all or part of the geolocation determination is performed by a remote API. For a further example, the Galaxy Find Network can make

Claim 14	Accused Products
performed at a location remote from the portable RF communications device.	determinations while the device is offline, indicating that the determination is made at a remote location. <i>See, e.g.:</i> The Geolocation API is a service that accepts an HTTPS request with the cell tower and WiFi access points that a mobile client can detect. Source: https://developers.google.com/maps/documentation/geolocation/overview Google Maps Platform web services are an interface for requesting Maps API data from external services and using the data within your Maps applications. These services are designed to be used in conjunction with a map, as per the License Restrictions in the Google Maps Platform Terms of Service. Geolocation requests are sent using POST to the following URL: https://www.googleapis.com/geolocation/v1/geolocate?key=YOUR_API_KEY Source: https://developers.google.com/maps/documentation/geolocation/web-service-best-practices

Claim 14	Accused Products
	Locate your things from far away Your tagged item is out of range? No problem. <u>Even when offline, the Galaxy Find Network* can use scanned data to find it for you privately.</u> You can also use other devices you own to locate your items.  * This feature is only available with Galaxy devices. Source: https://www.samsung.com/us/mobile-accessories/galaxy-smarttag-black-ei-t5300bbegus/ https://smarthingsfind.samsung.com/login

Claim 15

Claim 15	Accused Products
[15pre]. A portable RF communications device comprising an antenna, a user interface, and a storage device, wherein the storage device contains computer program code that, when executed by the portable device, controls the portable device to cause the portable device to perform a location-determining method, the method comprising automatically:	To the extent the preamble is limiting, each Accused Product includes a portable RF communications device comprising an antenna, a user interface, and a storage device, wherein the storage device contains computer program code that, when executed by the portable device, controls the portable device to cause the portable device to perform a location-determining method, the method comprising automatically. For example, the Galaxy S22 contains both cellular and WiFi radios, and associated antennas, which are used to determine the geographic location of the phone as described below. Furthermore, the Galaxy S22 contains a touchscreen user interface. Furthermore, the Galaxy S22 contains one or more storage device, including a NAND Flash memory chip, that contains the Android operating system, the Samsung One UI system, and additional software that performs the location determining method described below. <i>See, e.g.:</i>

Claim 15	Accused Products
	Samsung Galaxy S22 5G  - Released 2022, February 25 167g / 168g (mmWave), 7.6mm thickness - Android 12, One UI 4.1.1 128GB/256GB storage, no card slot □ 6.1" 1080x2340 pixels 📷 50MP 4320p https://www.gsmarena.com/samsung_galaxy_s22_5g-11253.php

Claim 15	Accused Products		
	NETWORK	Technology	GSM / CDMA / HSPA / EVDO / LTE / 5G COLLAPSE ▲
		2G bands	GSM 850 / 900 / 1800 / 1900 - SIM 1 & SIM 2 (Dual SIM model only) CDMA 800 / 1900 & TD-SCDMA
		3G bands	HSDPA 850 / 900 / 1700(AWS) / 1900 / 2100 CDMA2000 1xEV-DO
		4G bands	1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28, 32, 38, 39, 40, 41, 66 - International 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 18, 19, 20, 25, 26, 28, 29, 30, 38, 39, 40, 41, 46, 48, 66, 71 - USA
		5G bands	1, 2, 3, 5, 7, 8, 12, 20, 25, 28, 38, 40, 41, 66, 75, 77, 78 SA/NSA/Sub6 - International 1, 3, 5, 7, 8, 20, 28, 38, 41, 66, 71, 260, 261 SA/NSA/Sub6/mmWave - USA
		Speed	HSPA 42.2/5.76 Mbps, LTE-A (7CA) Cat20 2000/200 Mbps, 5G (5+ Gbps DL)
	DISPLAY	Type	Dynamic AMOLED 2X, 120Hz, HDR10+, 1300 nits (peak)
		Size	6.1 inches, 90.1 cm ² (~87.4% screen-to-body ratio)
		Resolution	1080 x 2340 pixels, 19.5:9 ratio (~425 ppi density)
		Protection	Corning Gorilla Glass Victus+
			Always-on display
	PLATFORM	OS	Android 12, One UI 4.1.1
		Chipset	Exynos 2200 (4 nm) - Europe Qualcomm SM8450 Snapdragon 8 Gen 1 (4 nm) - ROW
		CPU	Octa-core (1x2.8 GHz Cortex-X2 & 3x2.50 GHz Cortex-A710 & 4x1.8 GHz Cortex-A510) - Europe Octa-core (1x3.00 GHz Cortex-X2 & 3x2.50 GHz Cortex-A710 & 4x1.80 GHz Cortex-A510) - ROW
		GPU	Xclipse 920 - Europe Adreno 730 - ROW
	COMMS	WLAN	Wi-Fi 802.11 a/b/g/n/ac/6, dual-band, Wi-Fi Direct, hotspot
		Bluetooth	5.2, A2DP, LE
		GPS	Yes, with A-GPS, GLONASS, BDS, GALILEO
		NFC	Yes
		Radio	No
		USB	USB Type-C 3.2, USB On-The-Go
	https://www.gsmarena.com/samsung_galaxy_s22_5g-11253.php		

Claim 15	Accused Products
	 Find My Mobile Lost your phone? Don't panic. Find My Mobile will help you locate your phone or tablet and protect your data. You can even use it to unlock if you forget your pattern, PIN, or password. *To use this service, you must be signed in to your Samsung account on your device. https://findmymobile.samsung.com/ Find My Mobile Because many of us live a significant part of our lives through our Galaxy phones, Find My Mobile has become a necessary precaution. Use the Locate My Device function when you can't find your phone. When it's lost for sure, you have the option to remotely lock your device, block access to Samsung Pay, and even delete Samsung Pay or simply wipe data from the entire device. Requirements * To use the 'Find My Mobile' service, 1) You must have set up your Samsung account on your device. 2) You allow Google to collect your location information and agree to the 'Use wireless networks' term and conditions. https://www.samsung.com/us/support/owners/app/find-my-mobile

Claim 15	Accused Products
	How does Google know my location? Depending on the products you're using and settings you choose, you may provide Google with different types of location information that are critical to making some services work and making others more useful for you. Location can come from real-time signals, like your IP address or device location, and also your past activity on Google sites and services, to tailor experiences for your context. Below are the primary ways we may get information about your location. https://policies.google.com/technologies/location-data?hl=en-US

Claim 15	Accused Products
	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 https://policies.google.com/technologies/location-data?hl=en-US

Claim 15	Accused Products
	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 https://policies.google.com/technologies/location-data?hl=en-US
[15a] (a) receiving a first plurality of communications signals, each received from	The computer program code in each Accused Product performs a method comprising automatically receiving a first plurality of communications signals, each received from one of a first plurality of antenna stations within range of the portable RF communications device, wherein

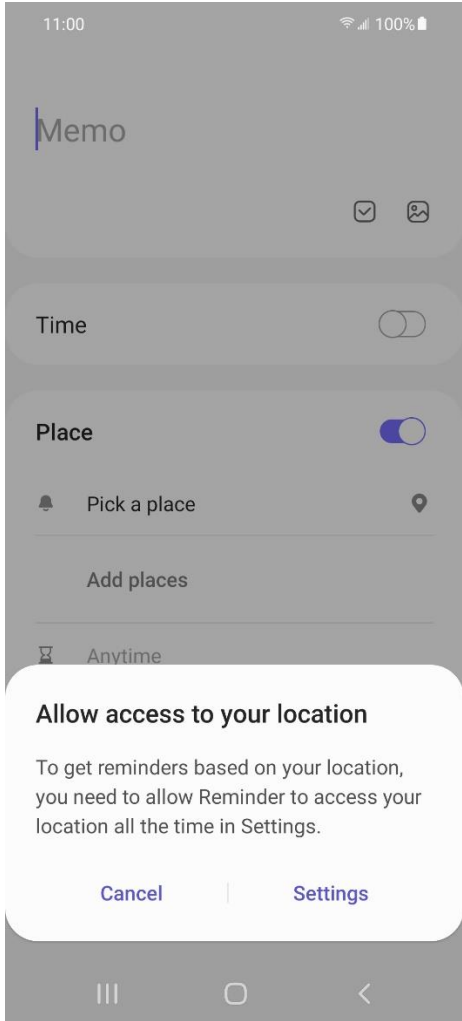
Claim 15	Accused Products
one of a first plurality of antenna stations within range of the portable RF communications device, wherein the antenna stations are fixed-location service-area antenna stations and are substantially continuously operating;	the antenna stations are fixed-location service-area antenna stations and are substantially continuously operating. For example, the Galaxy S22 receives communication signals from a plurality of Wi-Fi network stations and/or a plurality of mobile network stations, each of which is generally in a fixed location and operating continuously (Wi-Fi access point, cell phone tower, etc.). <i>See, e.g.:</i>  Find My Mobile Lost your phone? Don't panic. Find My Mobile will help you locate your phone or tablet and protect your data. You can even use it to unlock if you forget your pattern, PIN, or password. *To use this service, you must be signed in to your Samsung account on your device. https://findmymobile.samsung.com/ Find My Mobile Because many of us live a significant part of our lives through our Galaxy phones, Find My Mobile has become a necessary precaution. Use the Locate My Device function when you can't find your phone. When it's lost for sure, you have the option to remotely lock your device, block access to Samsung Pay, and even delete Samsung Pay or simply wipe data from the entire device. Requirements * To use the 'Find My Mobile' service, 1) You must have set up your Samsung account on your device. 2) You allow Google to collect your location information and agree to the 'Use wireless networks' term and conditions. https://www.samsung.com/us/support/owners/app/find-my-mobile

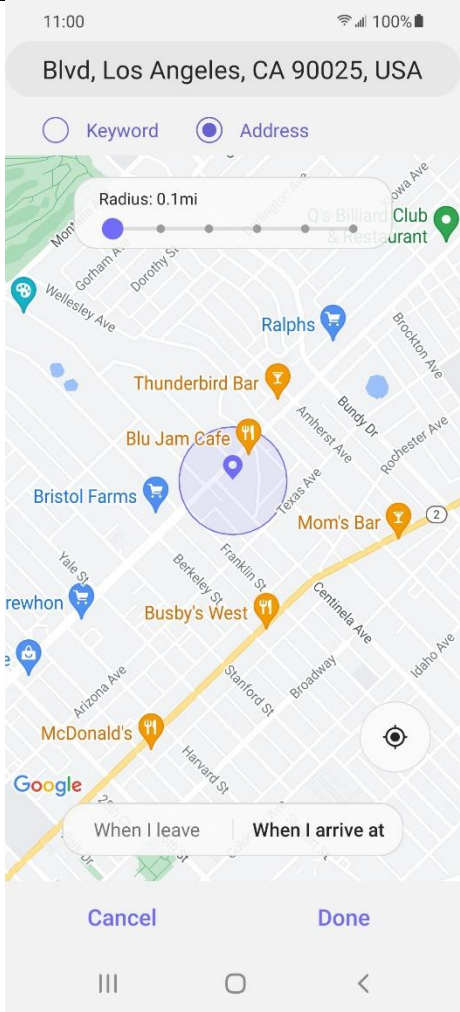
Claim 15	Accused Products
	How does Google know my location? Depending on the products you're using and settings you choose, you may provide Google with different types of location information that are critical to making some services work and making others more useful for you. Location can come from real-time signals, like your IP address or device location, and also your past activity on Google sites and services, to tailor experiences for your context. Below are the primary ways we may get information about your location. https://policies.google.com/technologies/location-data?hl=en-US

Claim 15	Accused Products
	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 https://policies.google.com/technologies/location-data?hl=en-US

Claim 15	Accused Products
	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 https://policies.google.com/technologies/location-data?hl=en-US
[15b] (b) causing a determination of whether the portable RF communications	The computer program code in each Accused Product performs a method comprising automatically causing a determination of whether the portable RF communications device is within proximity of the device-specific target location by electronically comparing at least one

Claim 15	Accused Products
device is within proximity of the device-specific target location by electronically comparing at least one number based on signal strengths of each of the first plurality of communications signals with at least one number based on corresponding signal strengths of each of a second plurality of communication signals from a second plurality of antenna stations that have been identified as being within range of the same location as the device-specific target location, which signal strengths have been determined for the same location as the device-specific target location; and	number based on signal strengths of each of the first plurality of communications signals with at least one number based on corresponding signal strengths of each of a second plurality of communication signals from a second plurality of antenna stations that have been identified as being within range of the same location as the device-specific target location, which signal strengths have been determined for the same location as the device-specific target location. For example, using the Samsung Reminder app included with the Galaxy S22, a user can specify a device-specific target location by creating a location-based reminder. This functionality uses the Google Location Services functionality, as shown by the necessity of providing Location permissions to the Reminder app. The phone then uses signal strength and other network information from nearby Wi-Fi and/or mobile communications signals, based on antennas identified as being within range of the specified location, to determine whether or not the phone is in the same location as the device-specific target location. Similar reminders can also be created through Samsung's Bixby service. For another example, Samsung SmartTag products use Bluetooth to communicate with mobile phones in its proximity, which will scan and find lost items attached with the SmartTag based on Bluetooth device ID and received signal strength. Even when the Samsung SmartTag is out of the proximity of its owner's mobile phone, it can still broadcast Bluetooth beacons that will potentially be captured by anybody's mobile phone that is nearby, which will relay the beacon to Samsung's Find Network in order to be discovered by its owner. Samsung SmartTag+ product further uses UWB to communicate with mobile phones, such as Samsung Galaxy S22 Plus, in its proximity, which will use more precise ranging technology with UWB to get cm level accuracy and step-by-step guide to lead to the tag. For another example, Samsung's SmartThings Find, Search Nearby, and/or Find My systems, when used on a Galaxy S22 or other Samsung Accused Product, enable locating, and navigating to the location of, a user's SmartTag, SmartThings, and/or Android devices. On information and belief, these processes use the same or similar techniques as described in other Samsung and Google documentation, including comparing numbers based on signal strengths in order to determine if the Accused Product is within proximity of the target location.

Claim 15	Accused Products
	<i>See, e.g.:</i>  Screenshot from Samsung Reminder app showing that the app uses Google Services based location determination.

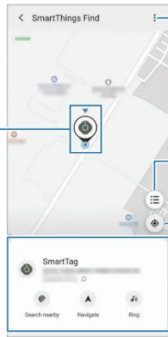
Claim 15	Accused Products
	 Screenshot from Samsung Reminder app showing selection of device-specific location for notification.

Claim 15	Accused Products
	Get reminded. When you create a new reminder with Bixby, you can set a specific time and location for delivery, so you'll get it when you need it.  https://www.samsung.com/global/galaxy/apps/bixby/reminder/

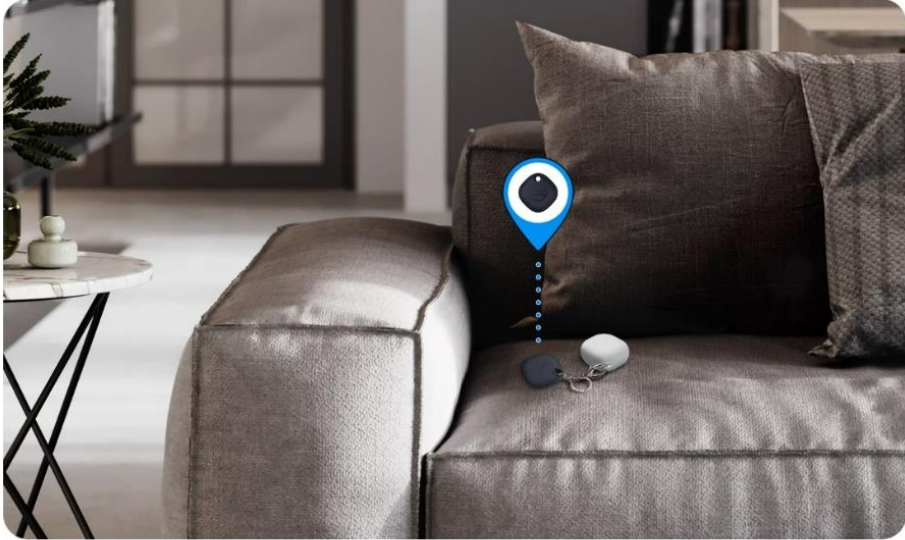
Claim 15	Accused Products
	From your devices Many devices, like phones or computers, can work out their precise location. You can allow Google and other apps to provide you with useful features based on where your device is located. For example, if you're running late to meet your friends, you'll probably 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 https://policies.google.com/technologies/location-data?hl=en-US

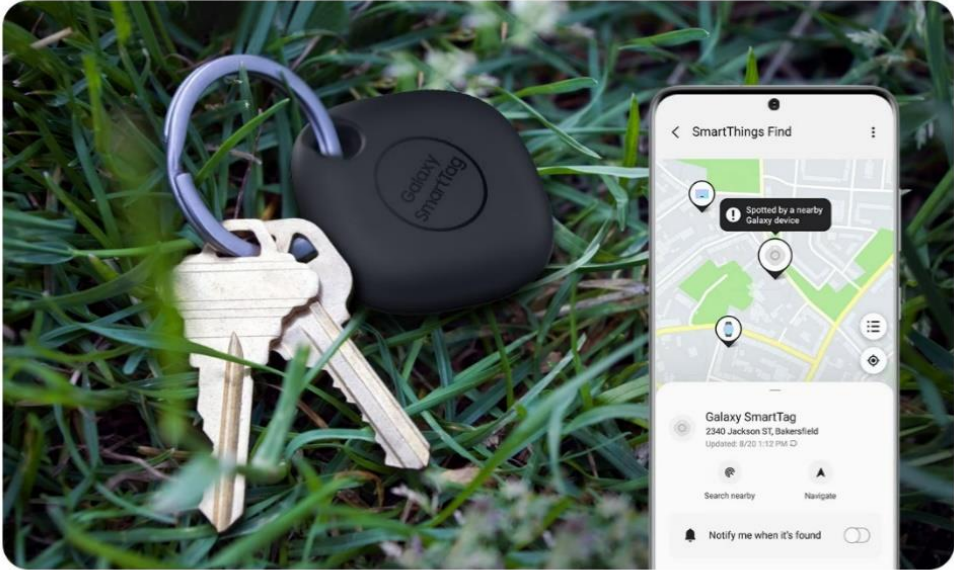
Claim 15	Accused Products
	Google Location Services On most Android devices, Google, as the network location provider, provides a location service called Google Location Services (GLS), known in Android 9 and above as Google Location Accuracy. This service aims to provide a more accurate device location 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 https://policies.google.com/technologies/location-data?hl=en-US In a press release this evening, Samsung announced that the SmartThings Find network has effectively doubled in size over the last year, with 200 million “find nodes” out in the wild. A “find node” is a Galaxy smartphone or

Claim 15	Accused Products
	tablet that is registered to use SmartThings Find and can relay the location of a Galaxy SmartTag to the tag's owner. https://9to5google.com/2022/07/13/samsung-smartthings-find-users/ The Samsung ecosystem runs more and more like a well-oiled machine with each update from the company. Now, the tech giant is announcing that it's expanded its SmartThings Find network by over 100 million nodes in since July 2022, adding up to over 300 million in total. Source: https://www.zdnet.com/article/samsung-expands-smartthings-find-network-to-over-300-million-nodes/, May 4, 2023

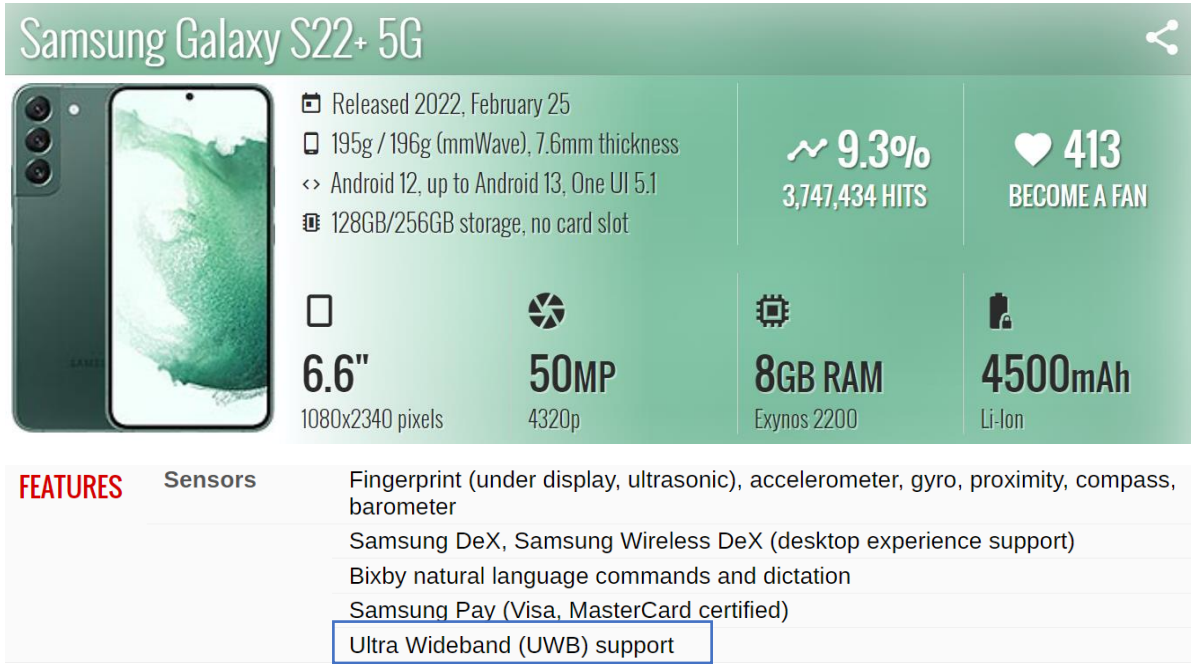
Claim 15	Accused Products
	Using the SmartTag Viewing a SmartTag's location You can remotely view your SmartTag's location from the SmartThings app on your mobile device and find its location by triggering a notification sound on the SmartTag. 1. Launch the SmartThings app on your mobile device. 2. Tap on your SmartTag card and tap View map. Alternatively, tap SmartThings Find. The current location of the device will be displayed on the map.  • The location of the SmartTag is based on GPS and Wi-Fi positioning results of the mobile device connected to the SmartTag or the nearby <u>Android mobile device, which may have some errors due to things like the surrounding environment or GPS failure</u> • If the current location of the SmartTag does not appear, the SmartTag's battery has been discharged or has not been discovered by an Android mobile device that can check the SmartTag's location information. Activate the related feature to get notifications of the SmartTag's location information. • The SmartTag's usage time may vary depending on the user's environment and the usage pattern. • The Ultra-Wideband (UWB) feature may not be available depending on the region. 

Claim 15	Accused Products
	1. Launch the SmartThings app on your mobile device. 2. Tap SmartThings → Find Navigate. <u>Directions to the place where the SmartTag is located will begin.</u>  If a supported navigation app is not installed on your mobile device, install the desired app from the list of supported navigation apps first and get directions. https://manuals.plus/samsung/galaxy-smarttagmarttag-manual#axzz7g8yWgeln Searching for the SmartTag location by signal strength You can find the SmartTag's location by detecting its signal strength. 3. Launch the SmartThings app on your mobile device. 4. Tap SmartThings Find Search nearby. The signal screen of the SmartTag you are looking for will appear. The closer you are to the location of the SmartTag you are looking for, the stronger the signal strength indicated on the screen will be. https://manuals.plus/samsung/galaxy-smarttagmarttag-manual#axzz7g8yWgeln

Claim 15	Accused Products
	Finding the important things in your life Bluetooth powered SmartTags* attach easily to keys, bags, or even the family pet. If you think your lost item is nearby but can't quite find it, tap the ring button on your mobile and follow the familiar sound of your ringtone calling for you at the volume you set.  * Galaxy SmartTags have a Bluetooth range of up to 100m without obstacles. Actual performance may vary depending on the environment where they are used. Source: https://www.samsung.com/us/mobile-accessories/galaxy-smarttag-black-ei-t5300bbegus/

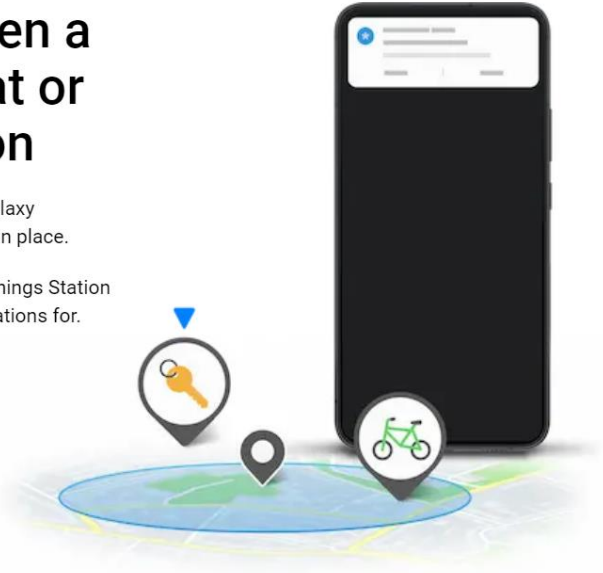
Claim 15	Accused Products
	Locate your things from far away Your tagged item is out of range? No problem! Even when offline, the Galaxy Find Network* can use scanned data to find it for you privately. You can also use other devices you own to locate your items.  * This feature is only available with Galaxy devices. Source: https://www.samsung.com/us/mobile-accessories/galaxy-smarttag-black-ei-t5300bbegus/

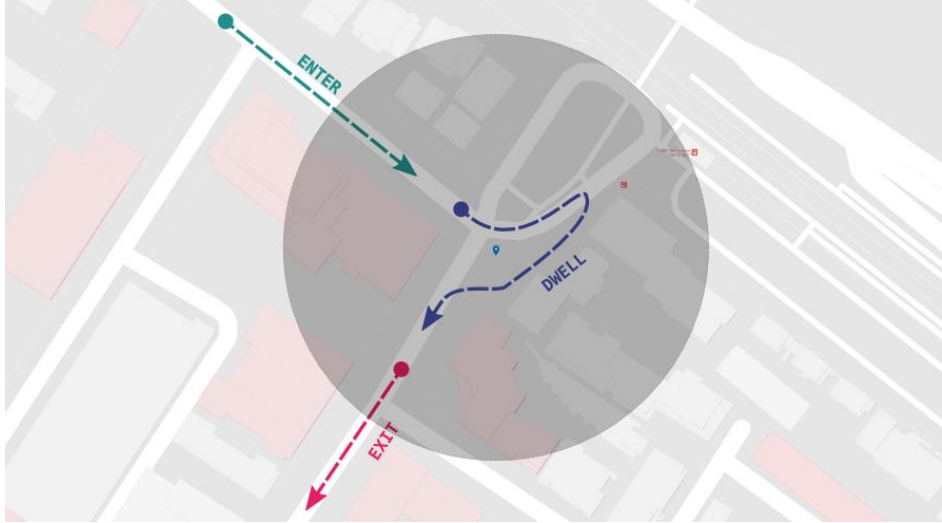
Claim 15	Accused Products
	AR Finding walks you step-by-step to lost items AR Finding gives you a uniquely visual way to locate a lost item with a SmartTag+ attached. It even lets you know you're close with a glimmering green light when you're at the destination. It shows you the way on your phone screen through the SmartThings app.  * For Galaxy SmartTag+, Samsung account log-in and registration on SmartThings Find is required. Galaxy SmartTag+ needs to be paired with ultra-wideband(UWB)-enabled Galaxy smartphones with Android 11 or higher to fully function. ** AR Finding works between devices that support UWB technology. UWB is supported in Galaxy S21 Ultra, Galaxy S21+, Galaxy Note20 Ultra and Galaxy Z Fold2. *** Accuracy may be reduced if there's an obstacle between you and the tag, such as when the tag is inside a drawer, behind a wall, or in a car. Source: https://www.samsung.com/us/mobile-accessories/galaxy-smarttag-plus-black-1-pack-eit7300bbegus/ Ultra-wideband (UWB) communication Ultra-wideband communication is a radio technology focused on precise ranging (measuring the location to an accuracy of 10 cm) between devices. This radio technology can use a low-energy density for short range measurements and perform high-bandwidth signaling over a large portion

Claim 15	Accused Products						
	of the radio spectrum. UWB's bandwidth is greater than 500 MHz (or exceeding 20% fractional bandwidth). UWB-enabled mobile devices As of April 2023, these devices support the Android UWB Jetpack library: <table> <tr> <td>Vendor</td><td>Device Model</td></tr> <tr> <td>Google</td><td>Pixel 6 Pro, Pixel 7 Pro</td></tr> <tr> <td>Samsung</td><td>Galaxy Note 20, S21+, S22+, Z Fold 2, 3, 4</td></tr> </table> https://developer.android.com/guide/topics/connectivity/uwb  The screenshot shows the Samsung Galaxy S22+ 5G product page. It includes a list of specifications: Released 2022, February 25; 195g / 196g (mmWave), 7.6mm thickness; Android 12, up to Android 13, One UI 5.1; 128GB/256GB storage, no card slot. It also displays performance metrics: 9.3% (3,747,434 HITS) and 413 fans. Key features are listed: 6.6" (1080x2340 pixels) display, 50MP (4320p) camera, 8GB RAM (Exynos 2200), and 4500mAh (Li-Ion) battery. A 'FEATURES' section lists: Sensors (Fingerprint (under display, ultrasonic), accelerometer, gyro, proximity, compass, barometer), Samsung DeX, Samsung Wireless DeX (desktop experience support), Bixby natural language commands and dictation, Samsung Pay (Visa, MasterCard certified), and Ultra Wideband (UWB) support (highlighted with a blue box). Source: https://www.gsmarena.com/samsung_galaxy_s22_ultra_5g-11251.php	Vendor	Device Model	Google	Pixel 6 Pro, Pixel 7 Pro	Samsung	Galaxy Note 20, S21+, S22+, Z Fold 2, 3, 4
Vendor	Device Model						
Google	Pixel 6 Pro, Pixel 7 Pro						
Samsung	Galaxy Note 20, S21+, S22+, Z Fold 2, 3, 4						

Claim 15	Accused Products
[15c] (c) as a result of the determination that the portable RF communications device is within proximity of the device-specific target location, initiating, on the portable RF communications device, a location-based action associated with the device-specific target location.	The computer program code in each Accused Product performs a method comprising automatically, as a result of the determination that the portable RF communications device is within proximity of the device-specific target location, initiating, on the portable RF communications device, a location-based action associated with the device-specific target location. For example, each Accused Product will take a predetermined action, such as displaying a notification, ending navigation, or performing a location-specific action, when it is determined that the device is within proximity of the target location. For another example, Any Android based mobile device can call a generic geofencing API to detect and notify any applications whenever the device enters the vicinity of a defined location. <i>See, e.g.:</i>

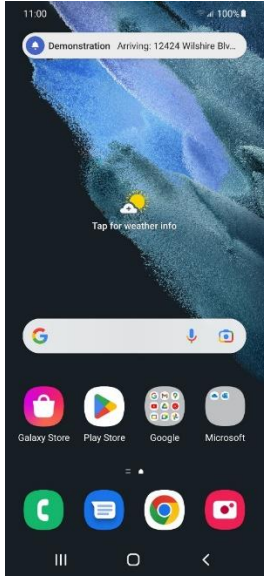
Claim 15	Accused Products
	Screenshot of notification (at top) from Samsung Reminder app upon arriving at the predetermined location <i>See also, e.g.,</i> evidence and explanation above and below.

Claim 15	Accused Products
	Get notified when a device arrives at or leaves a location You can get notifications when your Galaxy SmartTag arrives at a or leaves a certain place. To use this feature, you need a SmartThings Station in the place you want to receive notifications for.  Source: https://smarthingsfind.samsung.com/login Sometimes users want to use a particular app when they are in a specific type of location, such as an airport, or a supermarket. However, users have to navigate to that app and then take a specific action within it while they are near the area of interest. The geofencing API allows you to define perimeters, also referred to as geofences, which surround the areas of interest. Your app gets a notification when the device crosses a geofence, which allows you to provide a useful experience when users are in the vicinity.

Claim 15	Accused Products
	 Source: https://developers.google.com/location-context/geofencing/

Claim 18

Claim 18	Accused Products
18. The portable RF communications device of claim 15 wherein the location-based action comprises launching a computer program application on the portable RF communications device.	Each Accused Product comprises the portable RF communications device of claim 15 wherein the location-based action comprises launching a computer program application on the portable RF communications device. For example, the Samsung Reminder app allows a user to specify a location while creating a location-based reminder. The phone then uses signal strength and other network information from nearby Wi-Fi and/or mobile communications signals, based on antennas identified as being within range of the specified location, to determine whether the phone is arriving or leaving the location chosen by the user. Based on this determination, the phone launches the Samsung Reminder app.

Claim 18	Accused Products
	For another example, any Android based mobile device can call a generic geofencing API to detect and notify applications, including launching applications as appropriate, when the device enters the vicinity of a defined location. <i>See, e.g.:</i>  Screenshot showing, at top, notification from Samsung Reminder app that the phone arriving at the location as specified by the user.

Claim 19

Claim 19	Accused Products
19. The portable RF communications device of claim 15 wherein part (b) is	Each Accused Product comprises the portable RF communications device of claim 15 wherein part (b) is performed depending on the rate of change of the user's location.

Claim 19	Accused Products
performed depending on the rate of change of the user's location.	For example, each Accused Product's location settings can be configured, by the user or an application, to update location based on the user's speed (rate of change of location). <i>See, e.g.:</i> If your app needs to request location or receive permission updates, the device needs to enable the appropriate system settings, such as GPS or Wi-Fi scanning. Rather than directly enabling services such as the device's GPS, your app specifies the required level of accuracy/power consumption and desired update interval, and the device automatically makes the appropriate changes to system settings. These settings are defined by the LocationRequest data object. Update interval setInterval() - This method sets the rate in milliseconds at which your app prefers to receive location updates. Note that the location updates may be somewhat faster or slower than this rate to optimize for battery usage, or there may be no updates at all (if the device has no connectivity, for example). Source: https://developer.android.com/training/location/change-location-settings Starting updates based on the user's activity state. Example: Requesting updates only when the user is driving or riding a bike. Use the Activity Recognition API in conjunction with fused location provider updates. Request updates when the targeted activity is detected, and remove updates when the user stops performing that activity. Source: https://developer.android.com/guide/topics/location/battery

Claim 24

Claim 24	Accused Products
24. The portable RF communications device of claim 15 wherein the device-specific target location	Each Accused Product comprises the portable RF communications device of claim 15 wherein the device-specific target location is a shop and the location-based action relates to a coupon redeemable at the shop.

Claim 24	Accused Products
is a shop and the location-based action relates to a coupon redeemable at the shop.	For example, each Accused Product performs location-based advertising for shops. <i>See, e.g.:</i> Geofencing One of the best tactics to increase customer retention. Given that you have some way of contacting your customer (email, phone number, push notification) and you're able to detect their location (website: IP recognition, mobile: GPS), you can send a number of highly converting promo codes. Here are some ideas: • Sending a promo code with an SMS when a customer enters a specific boundary. • An email with a QR promo code when a customer visits a place for the nth time. • A push notification with a coupon for 10% off their favorite product. But what is geofencing exactly? It's a service that uses location data to track users and trigger a personalized notification whenever they enter the desired area. The boundaries of such an area are called the geofence, and it can be set up using API around any geographic location. The perimeter might be small (for local stores located in busy places or in shopping malls), but it might also cover tens of miles (for example: the whole city center). Source: https://www.voucherify.io/blog/6-examples-of-creative-and-personalized-location-based-promotions Location-based advertising (LBA) is a form of advertising that integrates mobile advertising with location-based services. The technology is used to pinpoint consumers location and provide location-specific advertisements on their mobile devices. Source: https://en.wikipedia.org/wiki/Location-based_advertising

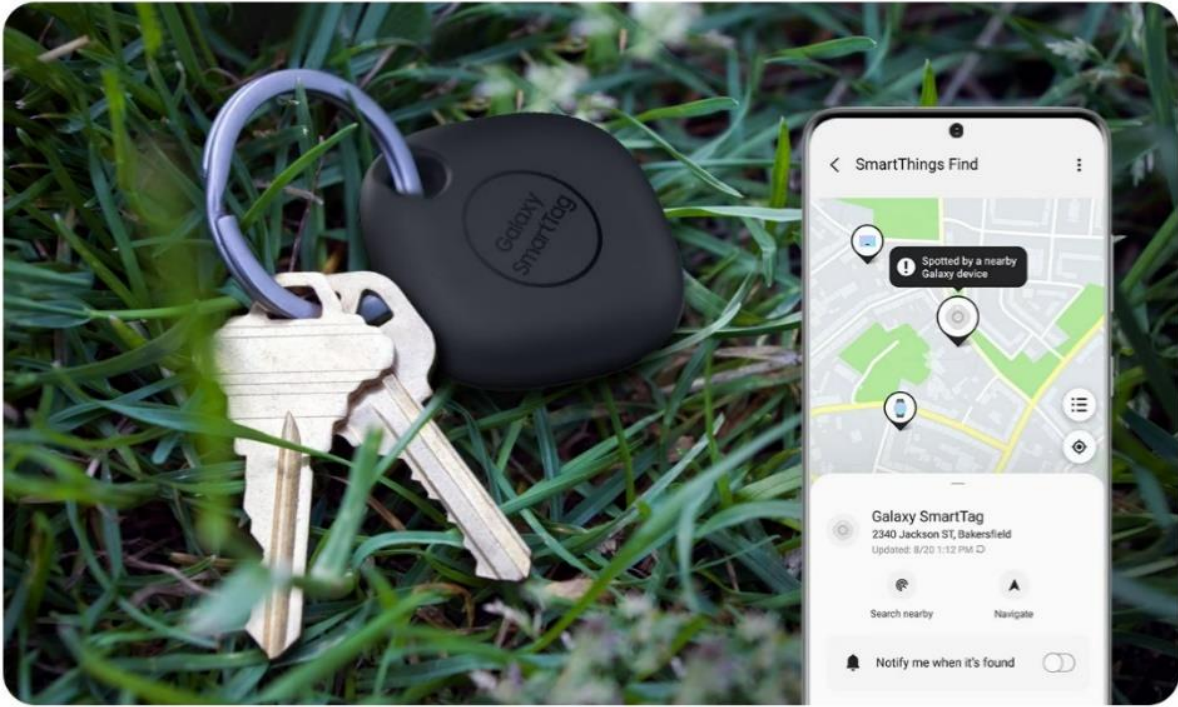
Claim 25

Claim 25	Accused Products
25. The portable RF communications device of claim 15 wherein the location-based action causes incoming calls on the portable RF communications device to be directed to a landline telephone within proximity of the device-specific target location.	Each Accused Product comprises the portable RF communications device of claim 15 wherein the location-based action causes incoming calls on the portable RF communications device to be directed to a landline telephone within proximity of the device-specific target location. <i>See, e.g.:</i> Automatic Call Forwarding An app with automatic call forward functionality triggered by the wifi network your phone is connected to and accelerometer. No need to remember to activate/deactivate call forwarding again. When you are back home and your phone is connected to the home wifi, your phone will automatically forward calls to your home phone. Likewise, when you leave home, call forwarding will be automatically deactivated. Source: https://play.google.com/store/apps/details?id=com.rowena.callmanager&hl=en_US&gl=US

Claim 28

Claim 28	Accused Products
28. The portable RF communications device of claim 15 wherein the determination of whether the portable RF communications device is within proximity of the device-specific target location is performed at a location remote from the	Each Accused Product comprises the portable RF communications device of claim 15 wherein the determination of whether the portable RF communications device is within proximity of the device-specific target location is performed at a location remote from the portable RF communications device. For example, in one alternative implementation all or part of the geolocation determination is performed by a remote API. For a further example, the Galaxy Find Network can make determinations while the device is offline, indicating that the determination is made at a remote location. <i>See, e.g.:</i>

Claim 28	Accused Products
portable RF communications device.	The Geolocation API is a service that accepts an HTTPS request with the cell tower and WiFi access points that a mobile client can detect. Source: https://developers.google.com/maps/documentation/geolocation/overview Google Maps Platform web services are an interface for requesting Maps API data from external services and using the data within your Maps applications. These services are designed to be used in conjunction with a map, as per the License Restrictions in the Google Maps Platform Terms of Service. Geolocation requests are sent using POST to the following URL: https://www.googleapis.com/geolocation/v1/geolocate?key=YOUR_API_KEY Source: https://developers.google.com/maps/documentation/geolocation/web-service-best-practices

Claim 28	Accused Products
	Locate your things from far away Your tagged item is out of range? No problem! <u>Even when offline, the Galaxy Find Network* can use scanned data to find it for you privately</u> You can also use other devices you own to locate your items.  * This feature is only available with Galaxy devices. Source: https://www.samsung.com/us/mobile-accessories/galaxy-smarttag-black-ei-t5300bbegus/ https://smarthingsfind.samsung.com/login