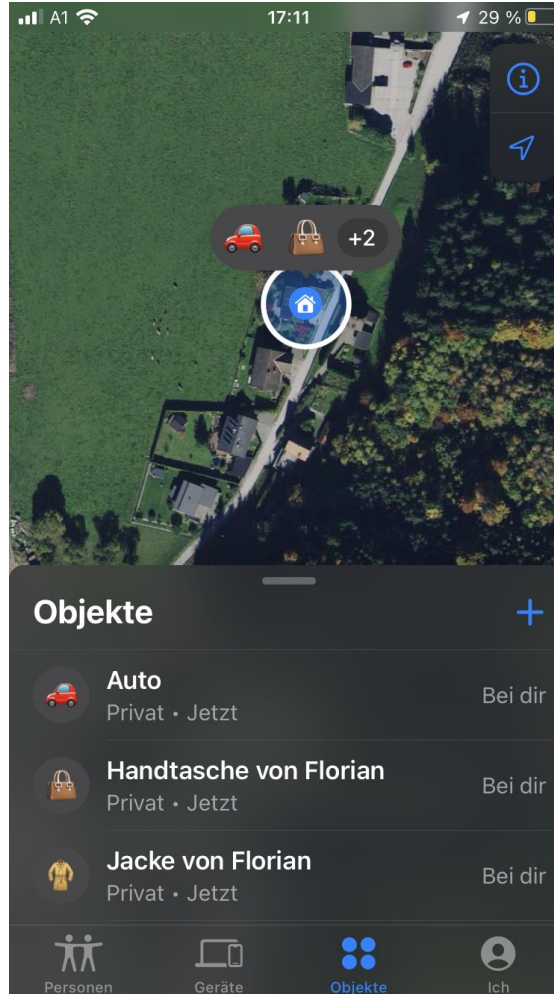


(700.401)

Apple AirTags

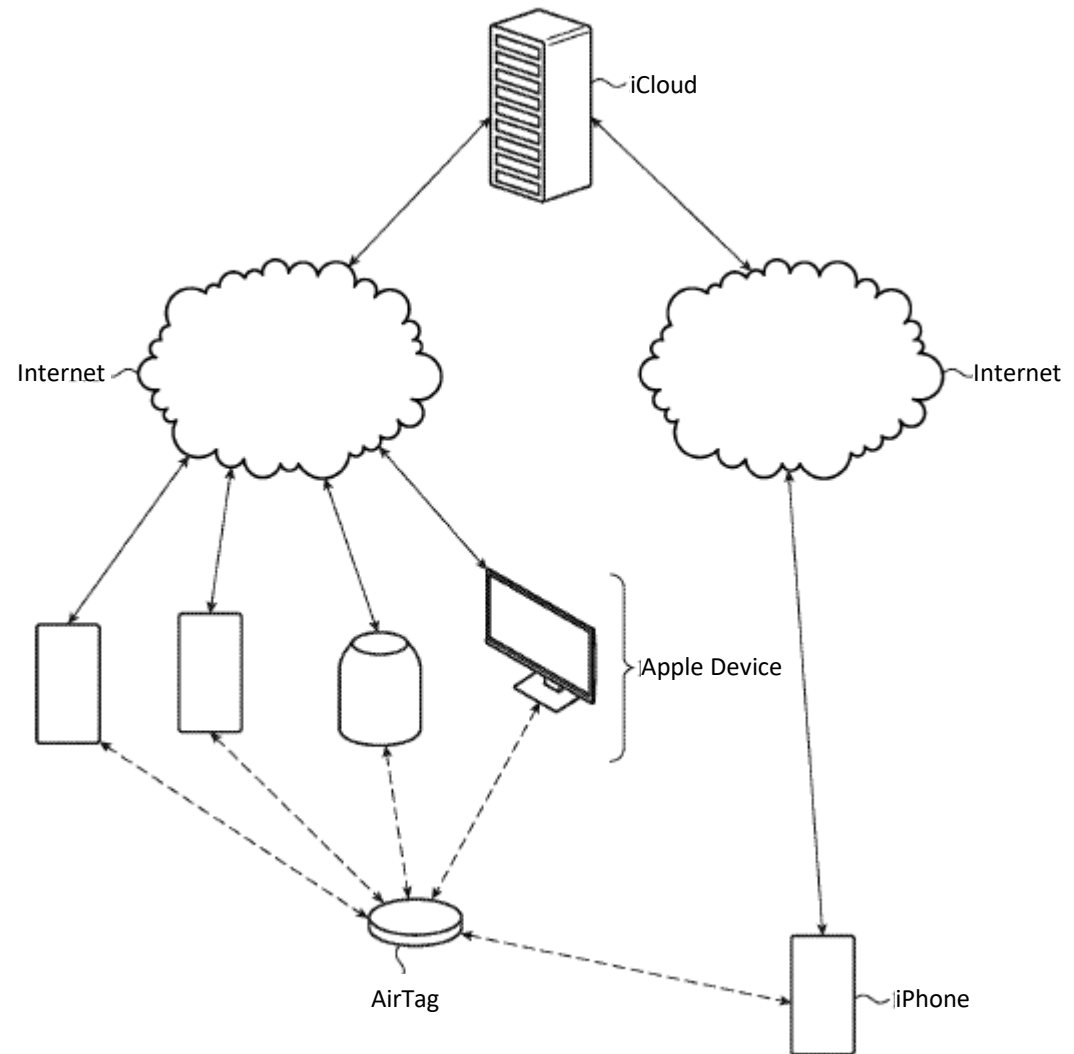
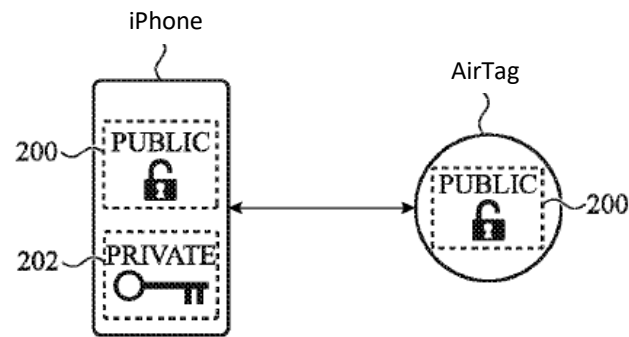
Research Seminar in Mobile Systems

Introduction



Tracking: Location

- no GPS
- Bluetooth (100m)
- 1'231 million iPhones 2021 [3]



Tracking: Location contd.

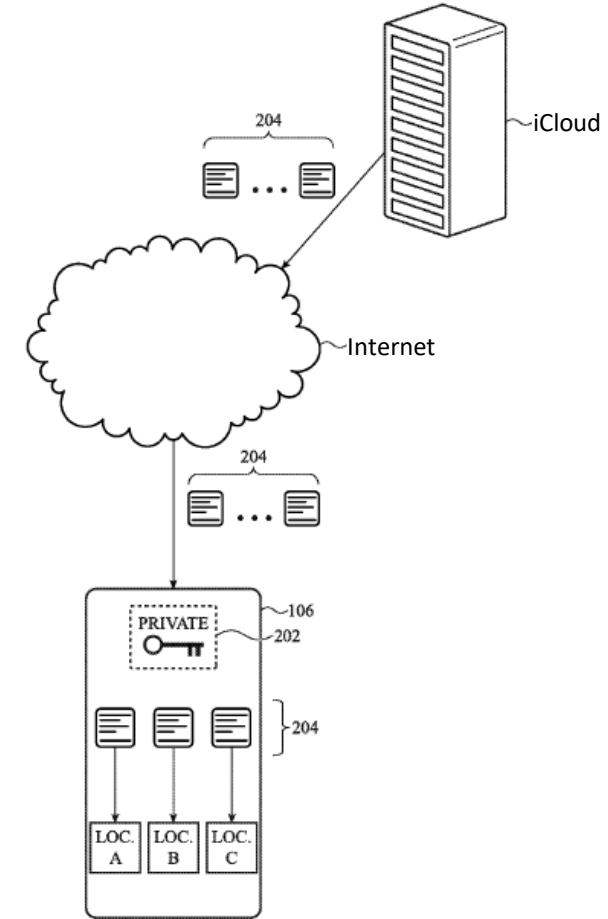
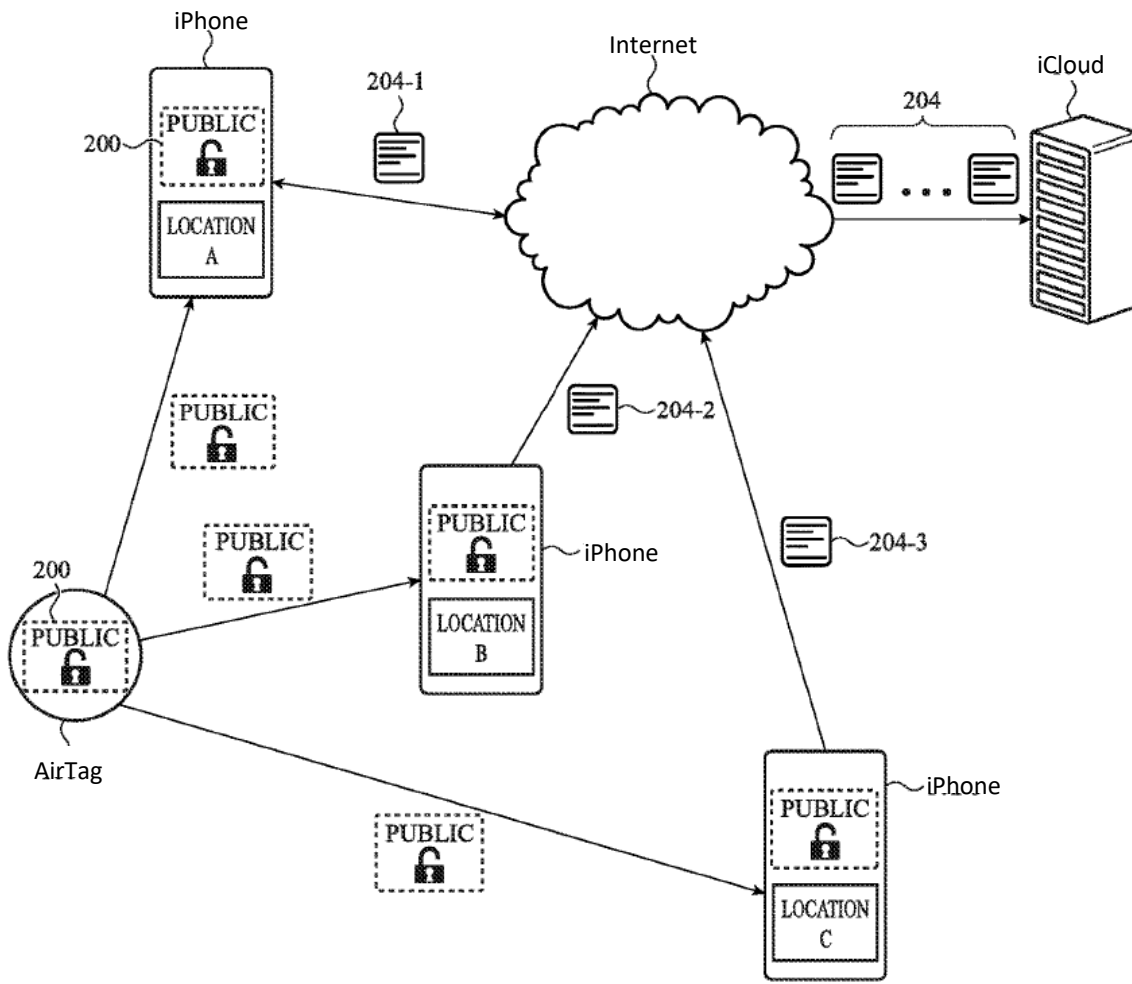
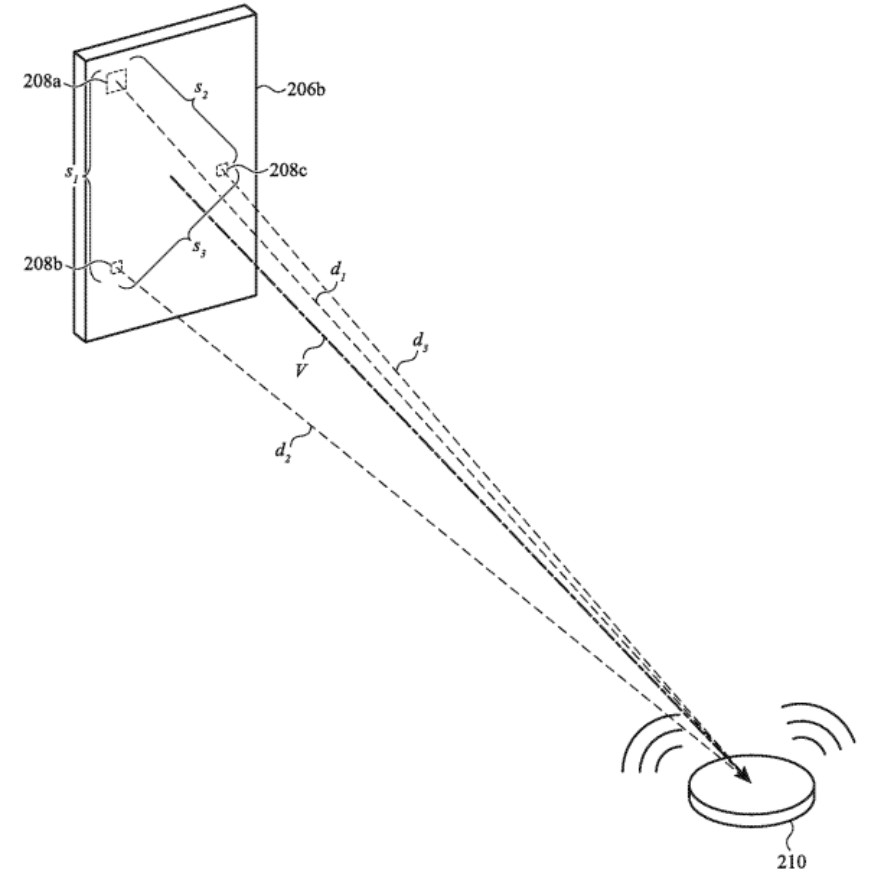


FIG. 2C

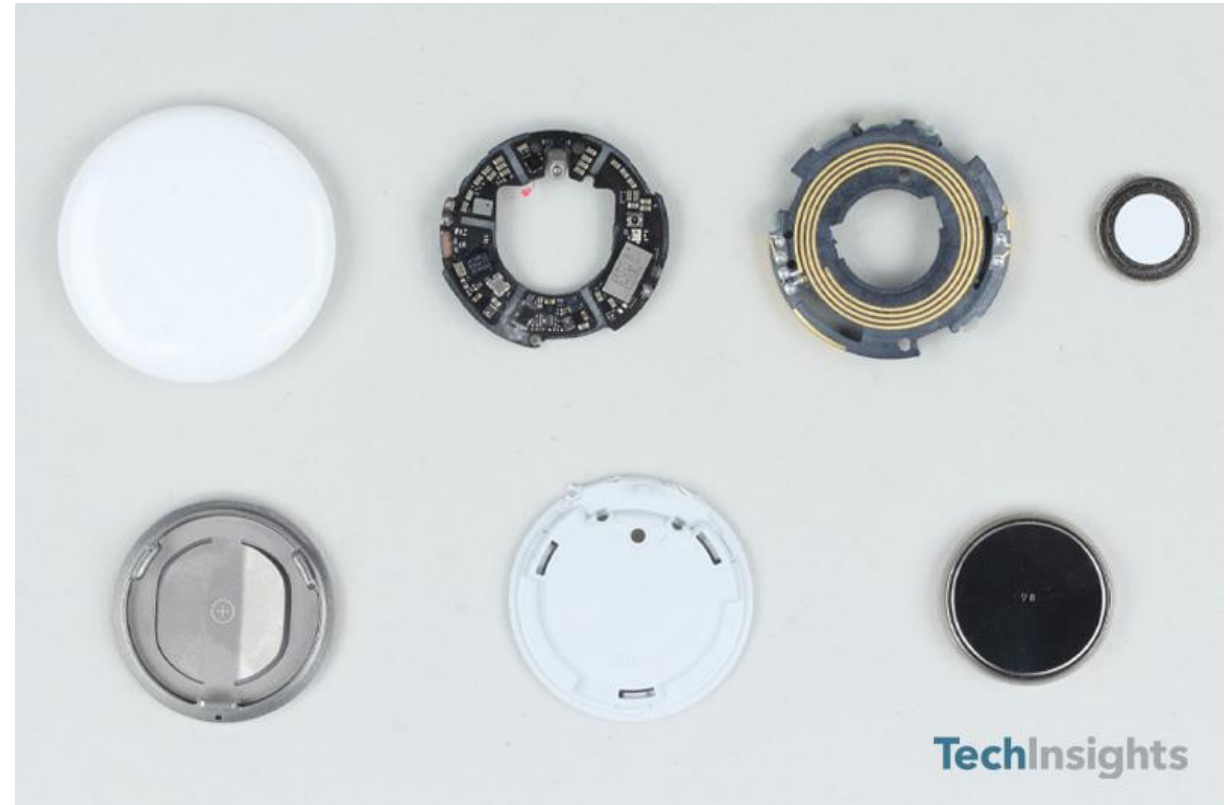
Tracking: Precision Finding

- only compatible with iPhone 11, 12 and 13
- Ultra-Wideband (500MHz – several GHz)
- orientation and distance



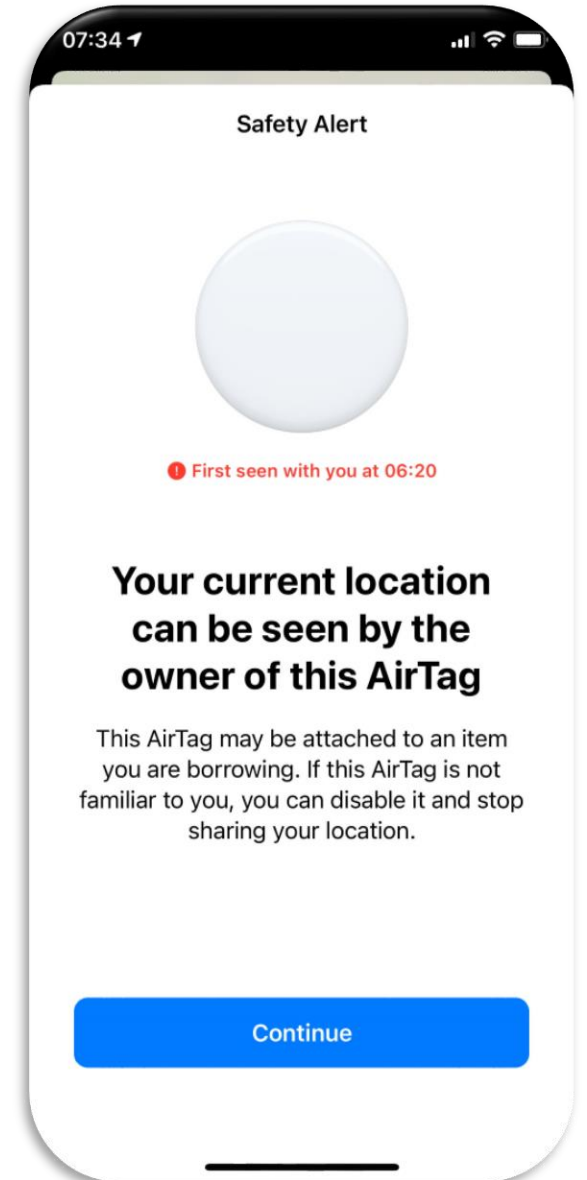
Hardware: Cost Factors

- 35,00€ on apple.com
- ~10€ manufacturing cost
- replaceable battery



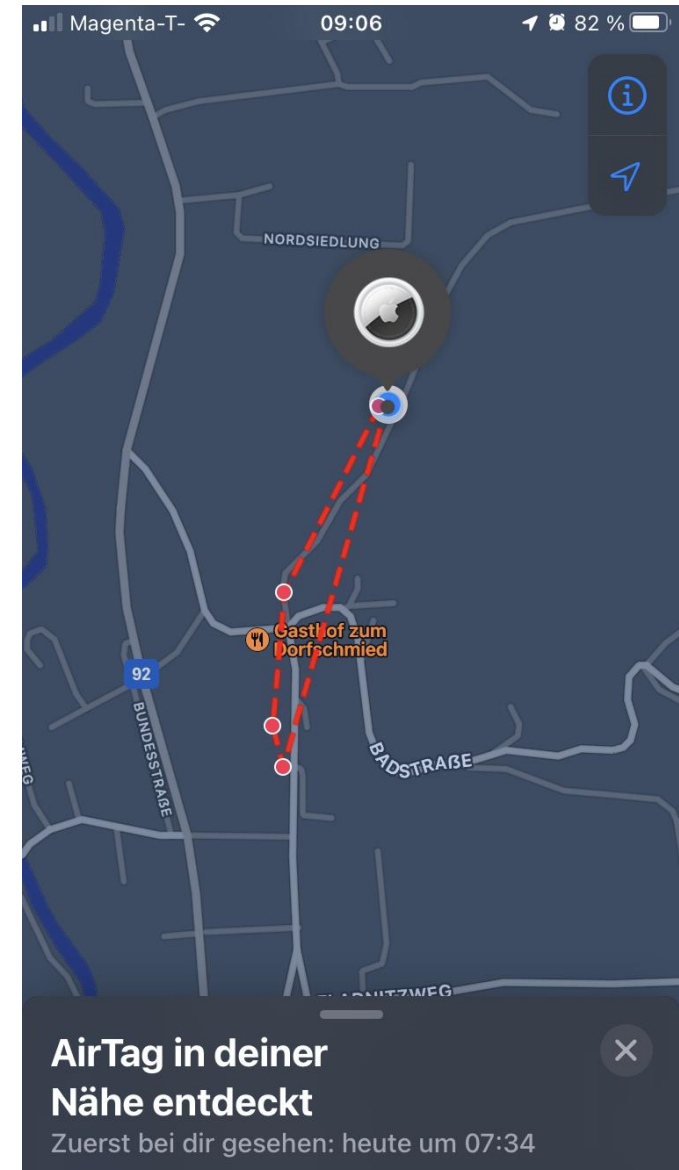
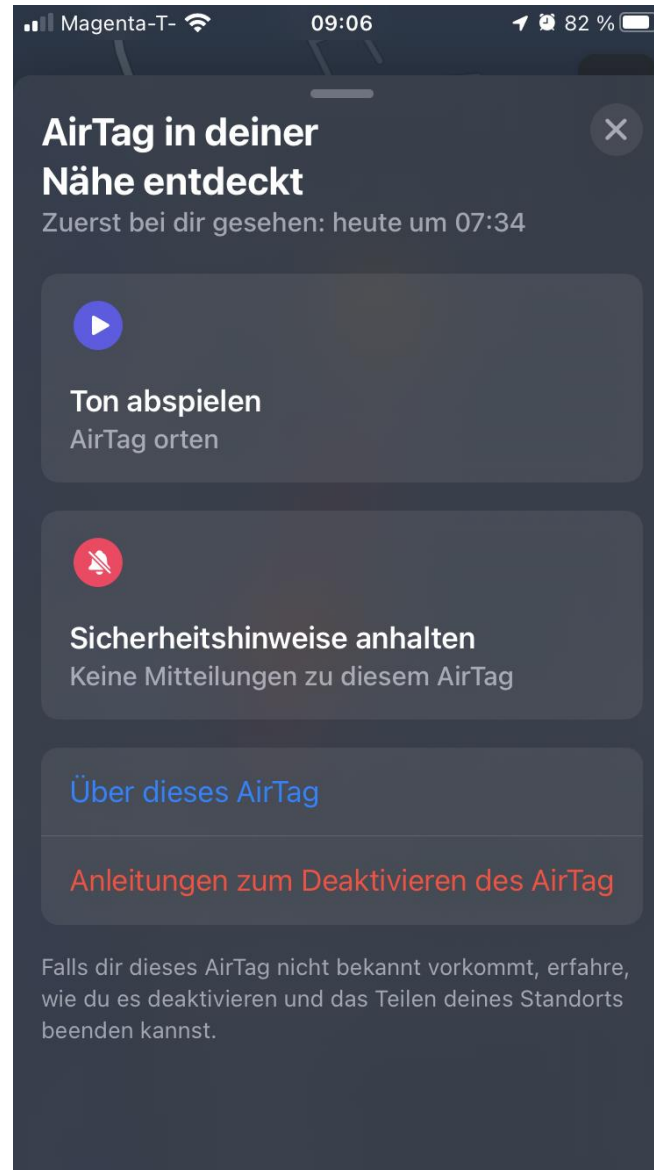
Security and Privacy

- No location history stored on Air Tag
- “Helper” devices stay anonymous
- Tracking others?



Unwanted Tracking

- “AirTag Found Moving With You” (Release)
- Warning Sound (Release)
- Precision Finding (Feb 22)
- Android app (Dec 21)



Future of AirTags

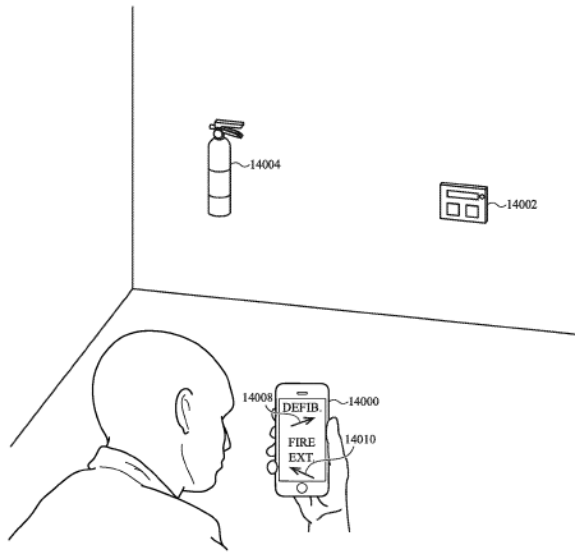


FIG. 140

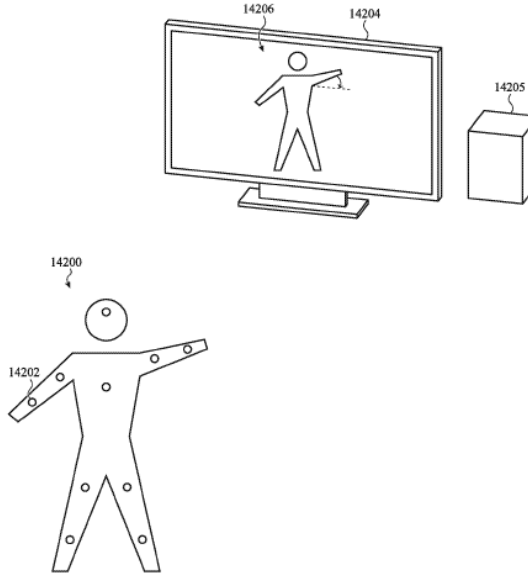


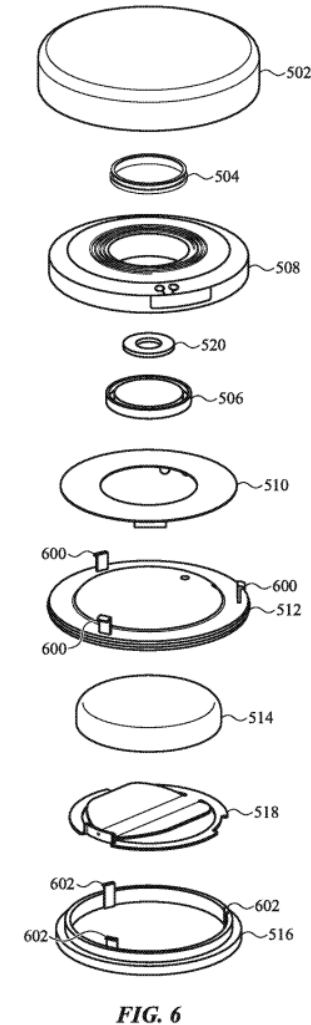
FIG. 142



Patent: US 2020/0337162 A1

Mounting Base for a wirelessly located Tag

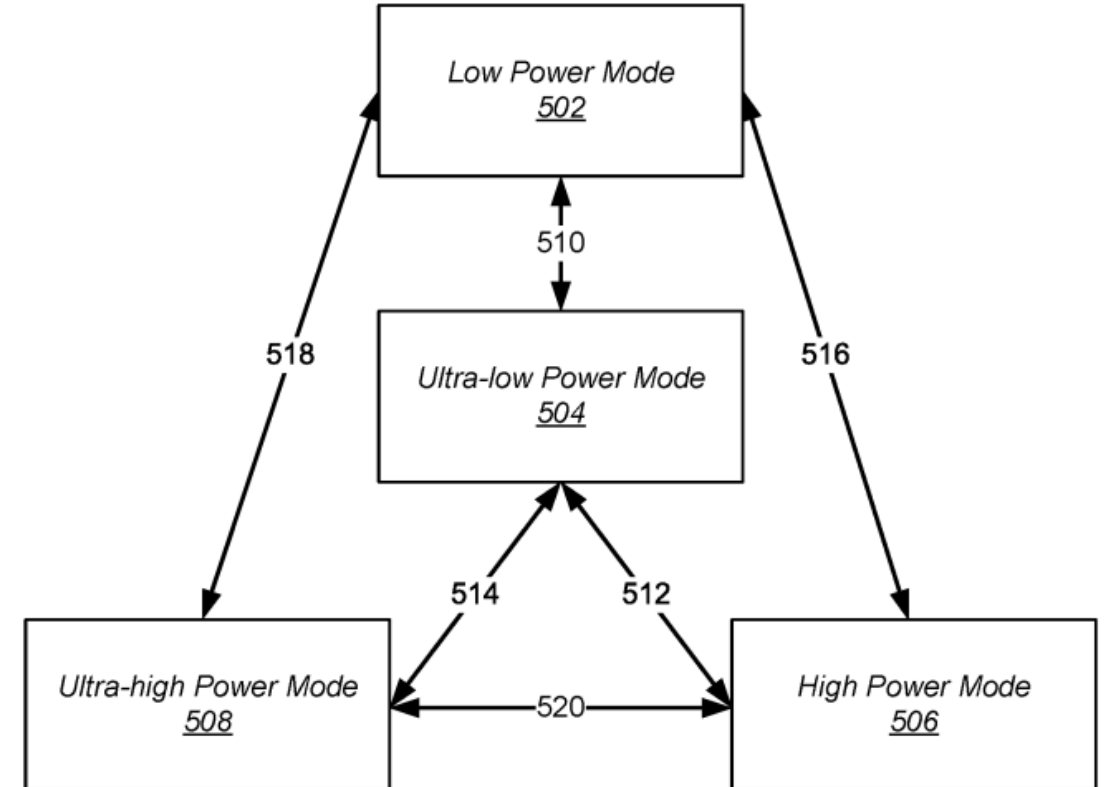
- much about Hardware/Cases
- Communication
- Locating
- Future Plans?



Patent: US 2020/0272221 A1

Multi-Interface Transponder Device – Power Management

- Communication (Power Management)
- Operation Modes



Sources

- US 2020/0272221 A1, Multi-Interface Transponder Device – Power Management
- US 2020/0337162 A1, Mounting Base for a Wirelessly Locatable Tag
- <https://www.businessofapps.com/data/apple-statistics/>
- <https://www.apple.com/airtag/>
- <https://www.techinsights.com/blog/apple-airtag-teardown>

Patent Search



The screenshot shows the USPTO search interface. At the top, the title "US PATENT & TRADEMARK OFFICE" is in blue, followed by "PATENT APPLICATION FULL TEXT AND IMAGE DATABASE" in red. Below this are navigation buttons: "Help", "Home", "Boolean", "Manual", and "Number", all in blue. A "View Shopping Cart" button is also present. A status message reads "Data current through May 12, 2022." The search section includes a "Query" label with a "[Help]" link. There are two search term fields, "Term 1:" and "Term 2:", each followed by an "in Field" dropdown menu currently set to "All Fields". Between these fields is a dropdown menu for logical operators, currently set to "AND". Below the search fields is a "Select years" label with a "[Help]" link and a dropdown menu currently set to "2001-present". To the right of the years dropdown are two buttons: "Search" and "Zurücksetzen".

US PATENT & TRADEMARK OFFICE
PATENT APPLICATION FULL TEXT AND IMAGE DATABASE

[Help](#) [Home](#) [Boolean](#) [Manual](#) [Number](#)

[View Shopping Cart](#)

Data current through May 12, 2022.

Query [\[Help\]](#)

Term 1: in Field 1:

Term 2: in Field 2:

Select years [\[Help\]](#)

- <https://appft.uspto.gov/>

Patent Search contd.

- Applicant: Apple
- AirTag: 0 results
- tag: 85 results
- Location: 1372 results
- Wireless: 1372
- 19'107 applications by Apple Inc.

Searching PGPUB Production Database March 15th - September 30th 2001...

Results of Search in PGPUB Production Database March 15th - September 30th 2001 for:
ABST/"tag" AND AANM/Apple: 85 applications.

Hits 1 through 50 out of 85

Final 35 Hits

Jump To

Refine Search

ABST/"tag" AND AANM/Apple

PUB. APP. NO.	Title
1 20220121349	Device, Method, and Graphical User Interface for Managing Content Items and Associated Metadata
2 20220116697	IDENTIFICATION OF CUSHIONING MEMBERS IN PERSONAL AUDIO DEVICES
3 20220079521	Wearable Tags
4 20220006143	BATTERY CONNECTION SYSTEM FOR A WIRELESSLY LOCATABLE TAG
5 20220004837	ENCLOSURE FOR A WIRELESSLY LOCATABLE TAG
6 20220004836	MOUNTING BASE FOR A WIRELESSLY LOCATABLE TAG
7 20220004835	AUDIO OUTPUT SYSTEM FOR A WIRELESSLY LOCATABLE TAG
8 20220004834	ANTENNA ASSEMBLY FOR A WIRELESSLY LOCATABLE TAG
9 20220004725	HOLDING ACCESSORY FOR A WIRELESSLY LOCATABLE TAG
10 20220003831	BIOMECHANICAL SENSING SYSTEM USING WIRELESSLY LOCATABLE TAGS
11 20220000251	FASTENER WITH A CONSTRAINED RETENTION RING
12 20210288932	Shared Content Presentation With Integrated Messaging
13 20210274200	PRIORITY-BASED VIDEO ENCODING AND TRANSMISSION
14 20210099021	Inductive Power Transmitter
15 20210084402	IDENTIFICATION OF CUSHIONING MEMBERS IN PERSONAL AUDIO DEVICES
16 20210083315	SYSTEM AND METHOD FOR REDUCING ELECTRICAL INTERFERENCE OF A BATTERY CELL
17 20210055883	Cache Memory with Transient Storage for Cache Lines
18 20200337162	MOUNTING BASE FOR A WIRELESSLY LOCATABLE TAG
19 20200334787	TAGGING CLIPPED PIXELS FOR PYRAMID PROCESSING IN IMAGE SIGNAL PROCESSOR
20 20200334425	Integrated Sensing Tag-Based Wireless Sensing Within Electronic Devices
21 20200333421	FASTENER WITH A CONSTRAINED RETENTION RING
22 20200302685	Generating a Three-Dimensional Model Using a Portable Electronic Device Recording
23 20200302121	Multi-Language Grouping of Content Items Based on Semantically Equivalent Topics
24 20200301973	Personalization Aggregate Content Item Recommendations
25 20200275369	Multi-Interface Transponder Device - Altering Power Modes

Patent Search contd.

US PATENT & TRADEMARK OFFICE PATENT APPLICATION FULL TEXT AND IMAGE DATABASE



(6 of 85)

United States Patent Application

20220004836

Kind Code

A1

Perkins; Ryan C. ; et al.

January 6, 2022

MOUNTING BASE FOR A WIRELESSLY LOCATABLE TAG

Abstract

A mounting base for use with a wirelessly locatable *tag* may include a base portion defining a latching member configured to engage a wirelessly locatable *tag* to releasably retain the wirelessly locatable *tag* to the mounting base, a contact block attached to the base portion and configured to be positioned at least partially within a battery cavity of the wirelessly locatable *tag*, the contact block defining a top side and a peripheral side. The mounting base may further include a first conductive member positioned along the peripheral side of the contact block and configured to contact a first battery contact in the battery cavity of the wirelessly locatable *tag*, a second conductive member outwardly biased from the top side of the contact block, the second conductive member configured to contact a second battery contact in the battery cavity of the *tag*, and a power cable coupled to the base portion.

Inventors: Perkins; Ryan C.; (San Francisco, CA) ; Thompson; Paul J.; (San Francisco, CA)

Applicant: Name City State Country Type

Apple Inc. Cupertino CA US

Appl. No.: 17/478680

Filed: September 17, 2021

Related U.S. Patent Documents



US 20220004836A1

(19) United States

(12) Patent Application Publication
Perkins et al.

(10) Pub. No.: US 2022/0004836 A1
(43) Pub. Date: Jan. 6, 2022

(54) MOUNTING BASE FOR A WIRELESSLY LOCATABLE TAG

63/101,242, filed on Sep. 26, 2019, provisional application No. 63/101,229, filed on Sep. 26, 2019.

Publication Classification

(71) Applicant: Apple Inc., Cupertino, CA (US)

(51) Int. Cl.
G06K 19/077 (2006.01)
H01Q 1/22 (2006.01)
G06K 19/07 (2006.01)

(72) Inventors: Ryan C. Perkins, San Francisco, CA (US); Paul J. Thompson, San Francisco, CA (US)

(21) Appl. No.: 17/478,680

(22) Filed: Sep. 17, 2021

(52) U.S. Cl.
CPC ... G06K 19/07758 (2013.01); G06K 19/0702 (2013.01); G06K 19/0701 (2013.01); H01Q 1/2208 (2013.01)

Related U.S. Application Data

(63) Continuation of application No. PCT/US2020/028424, filed on Apr. 16, 2020.

(60) Provisional application No. 62/835,469, filed on Apr. 17, 2019, provisional application No. 62/855,768, filed on May 31, 2019, provisional application No. 62/894,640, filed on Aug. 30, 2019, provisional application No. 63/101,179, filed on Sep. 26, 2019, provisional application No. 62/922,248, filed on Sep. 26, 2019, provisional application No. 63/101,180, filed on Sep. 26, 2019, provisional application No. 63/101,212, filed on Sep. 26, 2019, provisional application No. 62/922,250, filed on Sep. 26, 2019, provisional application No. 63/101,182, filed on Sep. 26, 2019, provisional application No. 62/922,249, filed on Sep. 26, 2019, provisional application No.

ABSTRACT

A mounting base for use with a wirelessly locatable tag may include a base portion defining a latching member configured to engage a wirelessly locatable tag to releasably retain the wirelessly locatable tag to the mounting base, a contact block attached to the base portion and configured to be positioned at least partially within a battery cavity of the wirelessly locatable tag, the contact block defining a top side and a peripheral side. The mounting base may further include a first conductive member positioned along the peripheral side of the contact block and configured to contact a first battery contact in the battery cavity of the wirelessly locatable tag, a second conductive member outwardly biased from the top side of the contact block, the second conductive member configured to contact a second battery contact in the battery cavity of the tag, and a power cable coupled to the base portion.

