

Exhibit A

Infringement of U.S. Patent No. 11,303,011 by Samsung Accused Products

The Samsung Accused Products are described in a variety of documents, including:

- Exemplary Samsung Galaxy S21 product teardown (“S21 Teardown”) , available online at <https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all>

On information and belief, these exemplary products are representative of the Samsung Accused Products as the smartphone antenna modules of the Samsung Accused Products (specifically the Galaxy S21 through S23 generations of phones, including the associated Z models, listed here ~ <https://www.samsung.com/au/support/mobile-devices/how-to-use-powershare-on-your-galaxy-phone/?srsltid=AfmBOooVEPPdyBpK-WClzQNdJFup7WCGAsBQtuurVldbQPlc2JiO9KY>) are substantially identical in both design and function. Samsung introduced the infringing design with the Galaxy S21 generation of phones, and then modified that design with the S24 and S25 generations of phones, as described in Exhibit C. Galaxy smartphones beginning with the S21 up until the S24 generation include materially identical smartphone antenna modules, and thus the S21 Ultra model is representative.

As shown below and in the chart with exemplary support, the Samsung Accused Products infringe at least claims 1 through 4 and 6 of U.S. Patent No. 11,303,011 (the “’011 Patent”). The ’011 Patent was filed on November 25, 2020, issued on April 12, 2022, and is entitled “Smartphone Antenna in Flexible PCB.”

Exhibit A


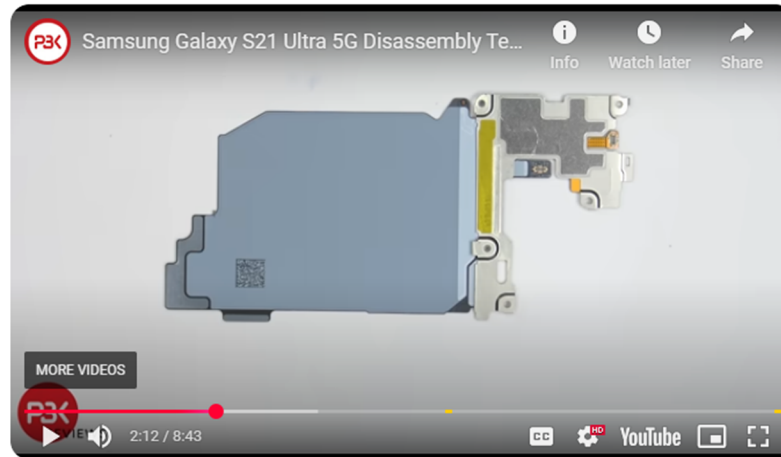
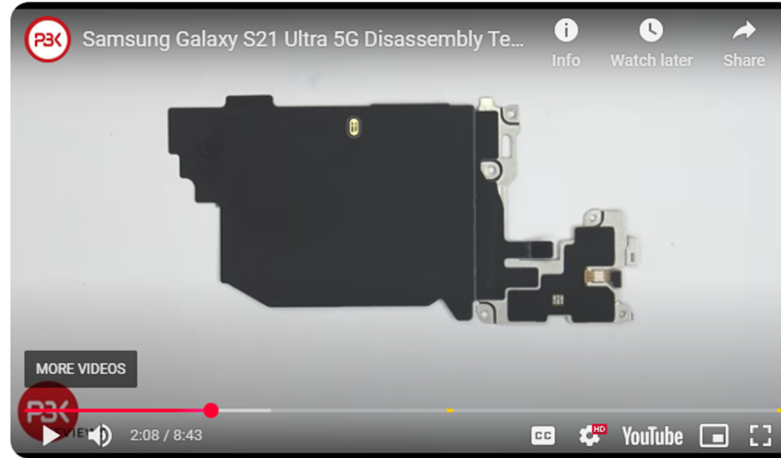
| Claim | Samsung Accused Products |
|--|--|
| 1. A smartphone antenna module comprising: | Accused infringer Samsung Electronics America, LLC and Samsung Electronics Co. Ltd. (together “Samsung”) manufacture, distribute, and sell products that contain a smartphone antenna module. Specifically, Samsung manufactures, distributes, and sells Samsung Galaxy smartphones including at least the Galaxy S21, S21+, S21 Ultra, S21 FE, Z Fold 3, Z Flip 3, S22, S22+, S22 Ultra, Z Fold 4, Z Flip 4, S23, S23+, S23 Ultra, S23 FE, Z Fold 5, and Z Flip 5. |
| a. a substrate having a first major surface and a second major surface facing away from the first major surface; | <p>The smartphone antenna module of the Accused Products includes a substrate having a first major surface and a second major surface facing away from the first major surface. Specifically, the smartphone antenna module includes a flexible printed circuit board (FPCB) with a first and second major surface.</p>  <p>Galaxy S21 Ultra Teardown! - Its bigger than you think....</p> <p>https://www.youtube.com/watch?v=MYSQub76fH8</p> |

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The FPCB has two major surfaces: a first major surface (the “top”) and a second major surface (the “bottom”).



<https://www.youtube.com/watch?v=cU3QXPoFOUI&t=132s>

The below X-ray image of the Galaxy S21 Ultra displays both the first antenna pattern formed on the first major surface *and* the second antenna pattern formed on the second major surface (in other words, the X-ray image shows both sides of the flexible PCB simultaneously as overlapping images).

Exhibit A

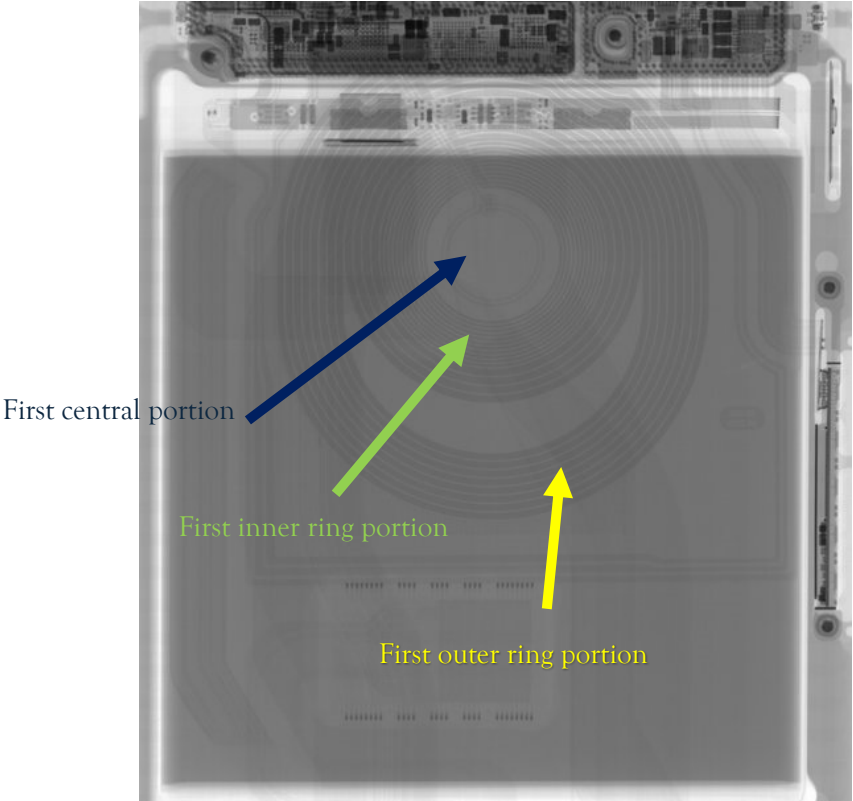
| Claim | Samsung Accused Products |
|--|---|
| | <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>b. the first major surface comprising a first central portion, a first inner ring portion surrounding the first central portion, and a first outer ring portion surrounding the first inner ring portion;</p> | <p>The first major surface (m2 layer) comprises a first central portion, a first inner ring portion surrounding the first central portion, and a first outer ring portion surrounding the first inner ring portion.</p>  <p>First central portion</p> <p>First inner ring portion</p> <p>First outer ring portion</p> |

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| Claim | Samsung Accused Products |
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| | <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>c. the second major surface comprising a second central portion overlapping the first central portion, a second inner ring portion surrounding the second central portion and overlapping the first inner ring portion, and a second outer ring portion surrounding the second inner ring portion and overlapping the first outer ring portion;</p> | <p>The second major surface (m1 layer) contains a second central portion overlapping the first central portion, a second inner ring portion surrounding the second central portion and overlapping the first inner ring portion, and a second outer ring portion surrounding the second inner ring portion and overlapping the first outer ring portion.</p> |

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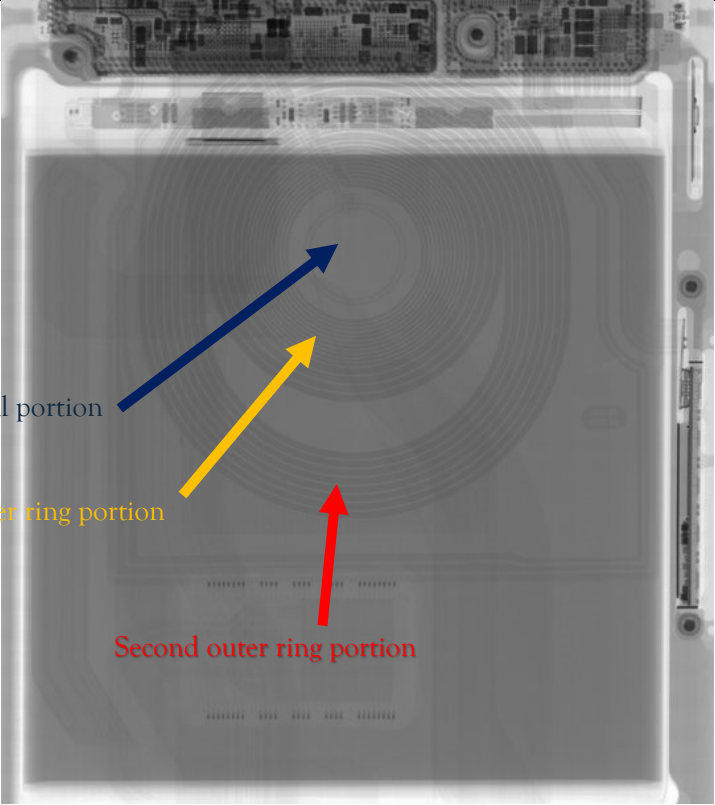
| Claim | Samsung Accused Products |
|-------|--|
| |  <p>Second central portion</p> <p>Second inner ring portion</p> <p>Second outer ring portion</p> <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |

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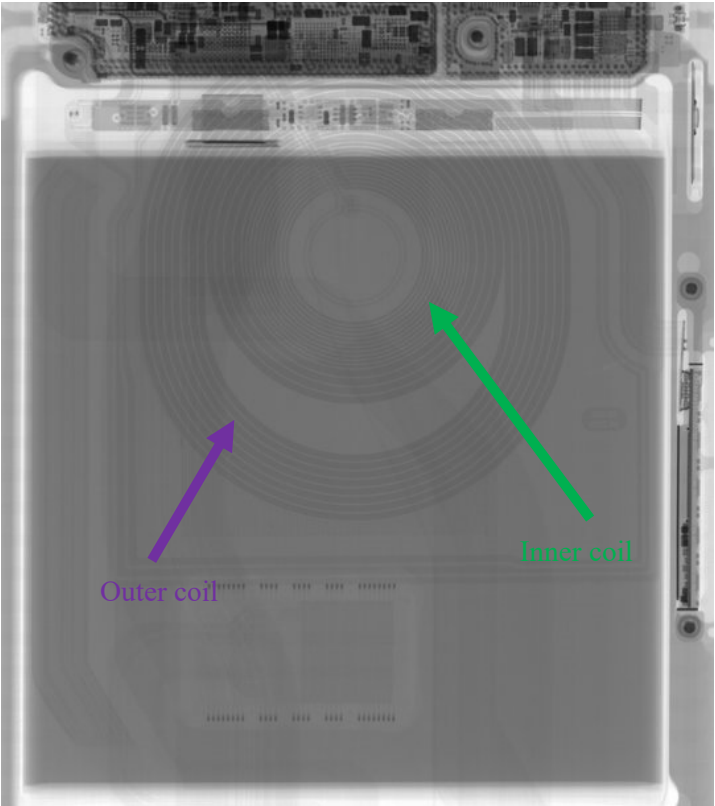
| Claim | Samsung Accused Products |
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| <p>d. a first antenna pattern formed on the first major surface and comprising an inner coil formed on the first inner ring portion and an outer coil on the first outer ring portion;</p> | <p>The first antenna pattern is formed on the first major surface (m2) and comprises an inner coil formed on the first inner ring portion and an outer coil on the first outer ring portion.</p>  <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional</p> |

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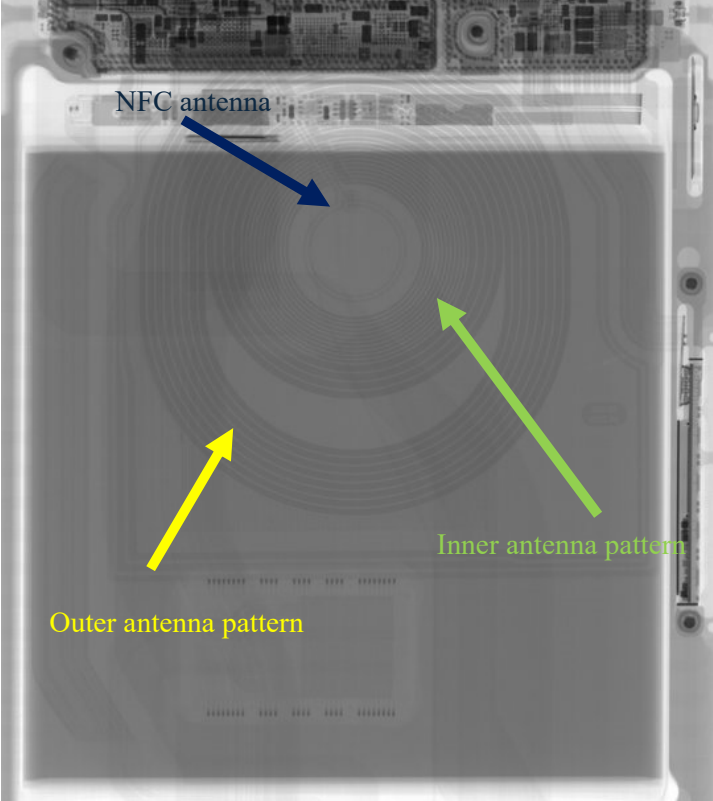
| Claim | Samsung Accused Products |
|--|---|
| | information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions. |
| e. a second antenna pattern formed on the second major surface and comprising an NFC antenna pattern formed on the second central portion, an inner antenna pattern formed on the second inner ring portion, and an outer antenna pattern formed on the second outer ring portion; | <p>The second antenna pattern is formed on the second major surface and comprises an NFC antenna pattern formed on the second central portion, an inner antenna pattern formed on the second inner ring portion, and an outer antenna pattern formed on the second outer ring portion.</p>  <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> |

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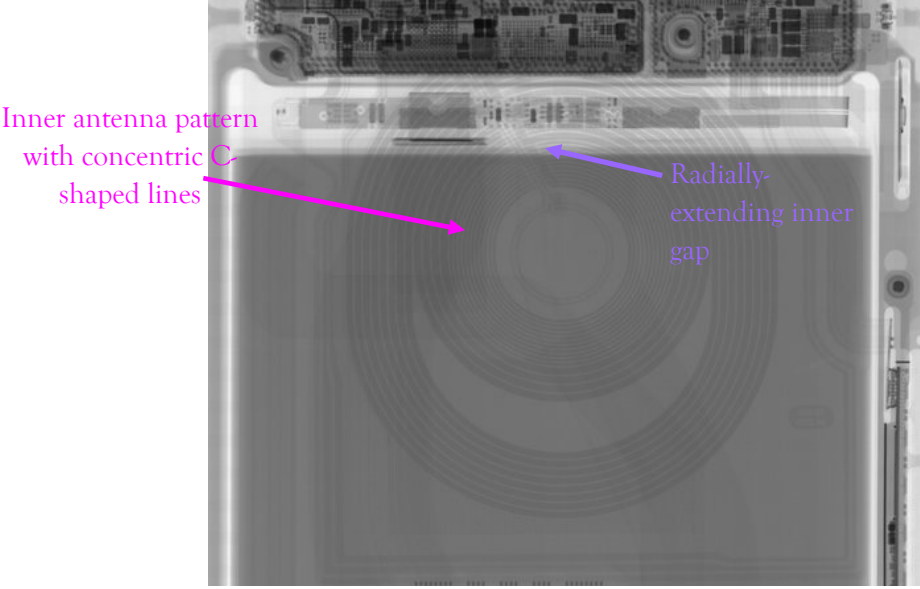
| Claim | Samsung Accused Products |
|--|---|
| | <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>f. the inner antenna pattern comprising a plurality of concentric C-shaped lines forming a radially-extending inner gap on the second inner ring portion;</p> | <p>The inner antenna pattern comprises a plurality of concentric C-shaped lines forming a radially extending inner gap on the second inner ring portion.</p>  |

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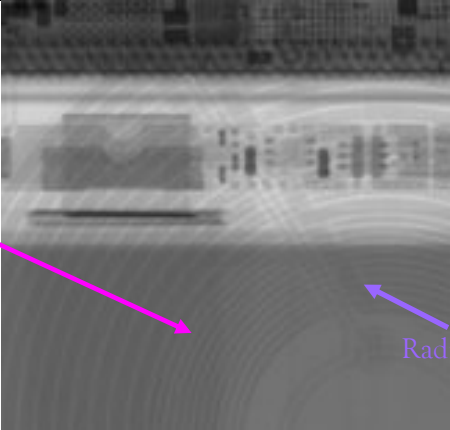
| Claim | Samsung Accused Products |
|--|--|
| | <div style="color: magenta;"> <p>Inner antenna pattern with concentric C- shaped lines</p> </div>  <div style="color: purple;"> <p>Radially-extending inner gap</p> </div> <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>g. the outer antenna pattern comprising a plurality of concentric C-shaped lines forming a radially-extending outer gap on the second outer ring portion;</p> | <p>The outer antenna pattern comprises a plurality of concentric C-shaped lines forming a radially-extending outer gap on the second outer ring portion.</p> |

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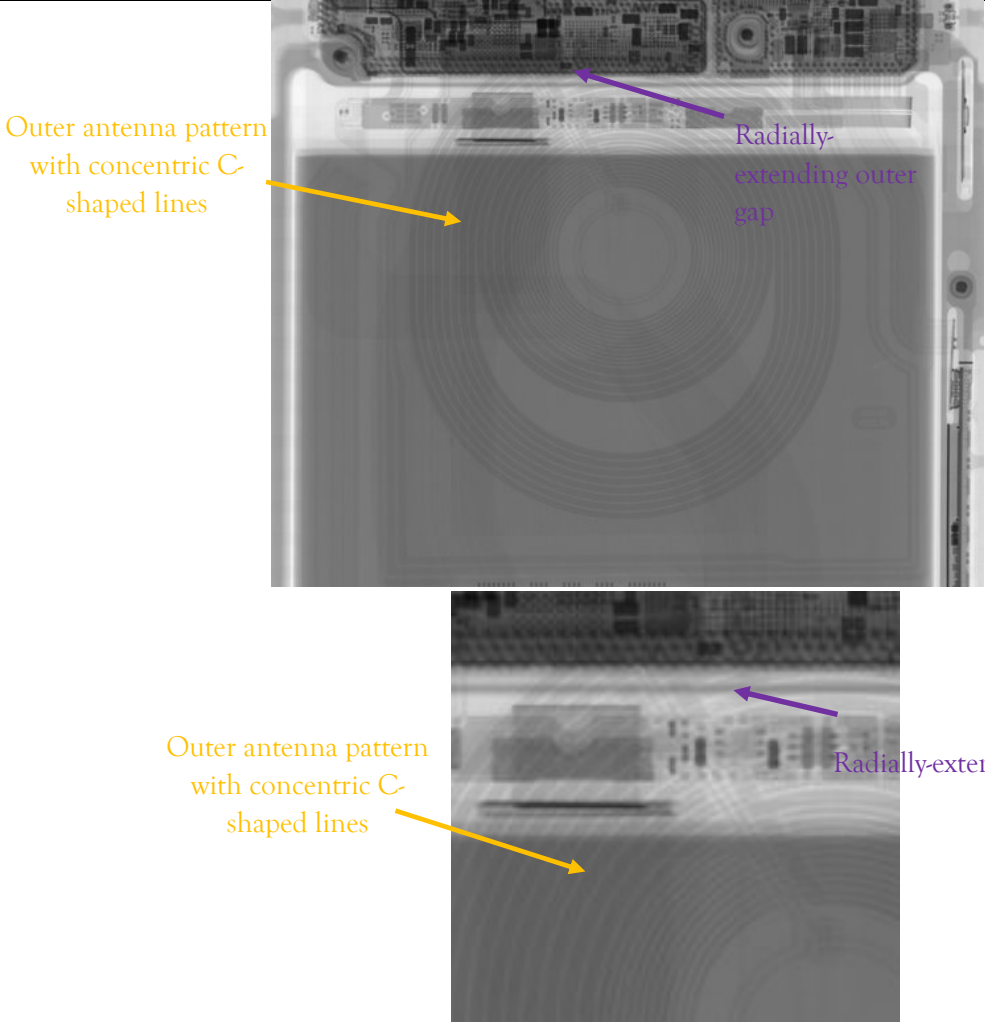
| Claim | Samsung Accused Products |
|-------|--|
| |  <p>Outer antenna pattern with concentric C-shaped lines</p> <p>Radially-extending outer gap</p> <p>Outer antenna pattern with concentric C-shaped lines</p> <p>Radially-extending outer gap</p> <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> |

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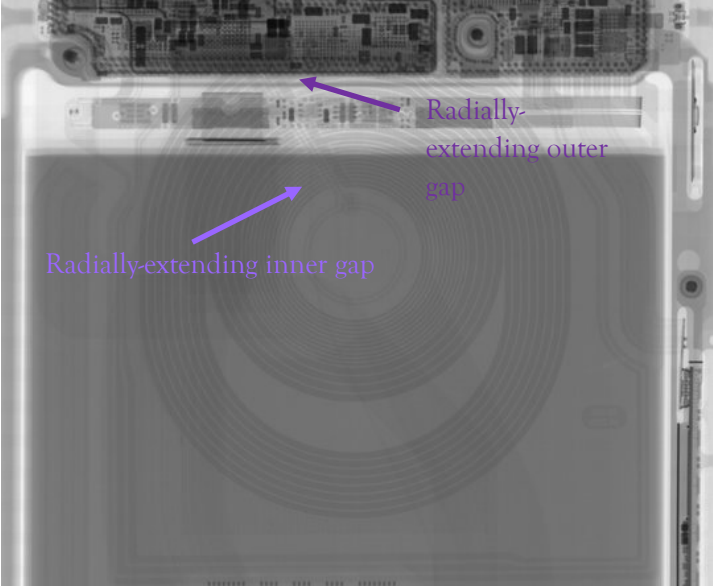
| Claim | Samsung Accused Products |
|--|--|
| | <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>h. wherein the radially-extending outer gap on the second outer ring portion and the radially-extending inner gap on the second inner ring portion are connected and aligned in a radial direction;</p> | <p>The radially-extending outer gap on the second outer ring portion and the radially-extending inner gap on the second inner ring portion are connected and aligned in a radial direction.</p>  <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that</p> |

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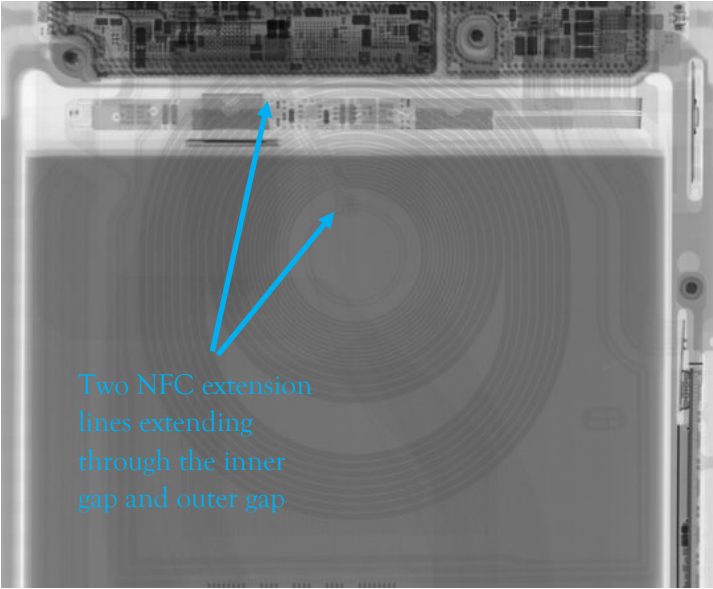
| Claim | Samsung Accused Products |
|---|--|
| | the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions. |
| i. two NFC extension lines formed on the second major surface, in which the two NFC antenna extension lines extend along the radial direction through both the radially-extending inner gap and the radially extending outer gap; | <p>Two NFC extension lines are formed on the second major surface (m1) and the NFC antenna extension lines extend along the radial direction through both the radially-extending inner gap and the radially extending outer gap.</p>  <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional</p> |

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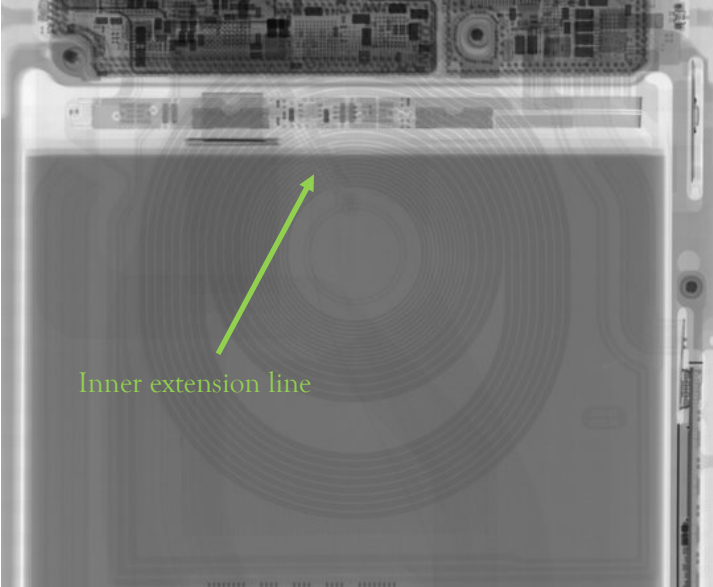
| Claim | Samsung Accused Products |
|---|--|
| | information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions. |
| j. an inner extension line formed on the second major surface, in which the inner extension line extends along the radial direction through both the radially-extending inner gap and the radially-extending outer gap; | <p>The inner extension line is formed on the second major surface (m1), and it extends along the radial direction through both the radially-extending inner gap and the radially-extending outer gap.</p>  <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |

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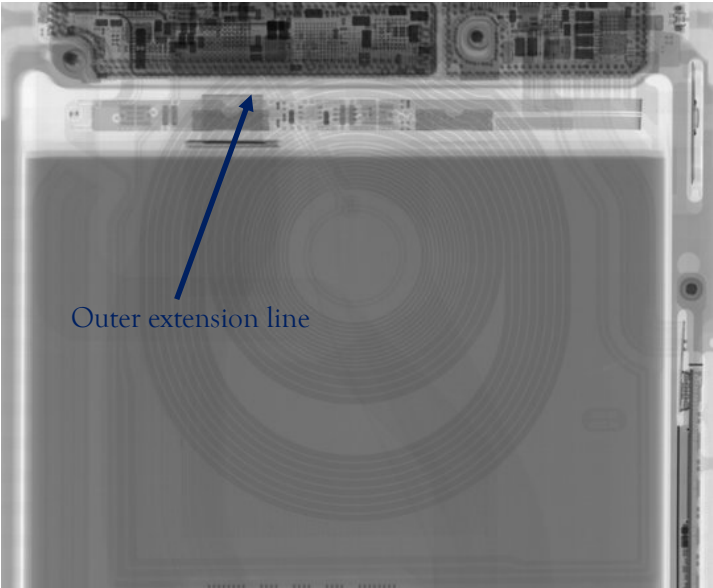
| Claim | Samsung Accused Products |
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| <p>k. an outer extension line formed on the second major surface, in which the outer extension line connects to the outer antenna pattern and extends along the radial direction through the radially-extending outer gap;</p> | <p>The outer extension line is formed on the second major surface (m1), connects to the outer antenna pattern and extends along a radial direction through the radially-extending outer gap.</p>  <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>l. wherein the two NFC antenna extension lines,</p> | <p>The two NFC antenna extension lines (cyan), the inner extension line (yellow-green), and the outer extension line (blue) extend substantially in parallel.</p> |

Exhibit A

| Claim | Samsung Accused Products |
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| <p>the inner extension line, and the outer extension line are extending substantially in parallel;</p> | <div> </div> <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>m. wherein each of the two NFC extension lines, the inner extension line, and the outer extension</p> | <p>The two NFC extension lines (cyan), the inner extension line (yellow-green), and the outer extension line (blue) are formed on the second major surface (m1) and overlap with the outer coil (purple) formed on the first outer ring portion of the first major surface (m2).</p> |

Exhibit A

| Claim | Samsung Accused Products |
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| <p>line formed on the second major surface overlaps the outer coil formed on the first outer ring portion of the first major surface;</p> | <div> <p>The image is an X-ray of a smartphone antenna module. It shows concentric circular traces. A blue arrow points to the top horizontal line, labeled 'Outer extension line'. A green arrow points to a line closer to the center, labeled 'Inner extension line'. A purple arrow points to the outermost circular ring, labeled 'Outer coil'. A cyan arrow points to two lines near the center, labeled 'Two NFC extension lines'.</p> </div> <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>n. wherein the inner coil and the outer coil are electrically connected in parallel.</p> | <p>In the smartphone antenna module of the Samsung Accused Products, the inner coil and outer coil are electrically connected in parallel. Specifically, the inner and outer coils are wired to form a parallel connection that occurs either directly within the smartphone antenna module, or the parallel connection is formed by wiring after connection to the smartphone. For example, the inner coil and outer coil both</p> |

Exhibit A

| Claim | Samsung Accused Products |
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| | <p>have two extension lines connected to either end, which is necessary for forming a parallel connection, as opposed to a serial connection which only requires a single extension line for each.</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| 2. The smartphone antenna module of claim 1, wherein the first antenna pattern and the second antenna pattern are electrically connected with each other through a plurality of vias. | <p>The first antenna pattern and the second antenna pattern are connected to each other through a plurality of vias.</p> <p>On informed belief, the following documents describe the Samsung Accused Products. At either end of the antenna patterns, there are vias that electrically connect the second antenna pattern to the first antenna pattern:</p> |

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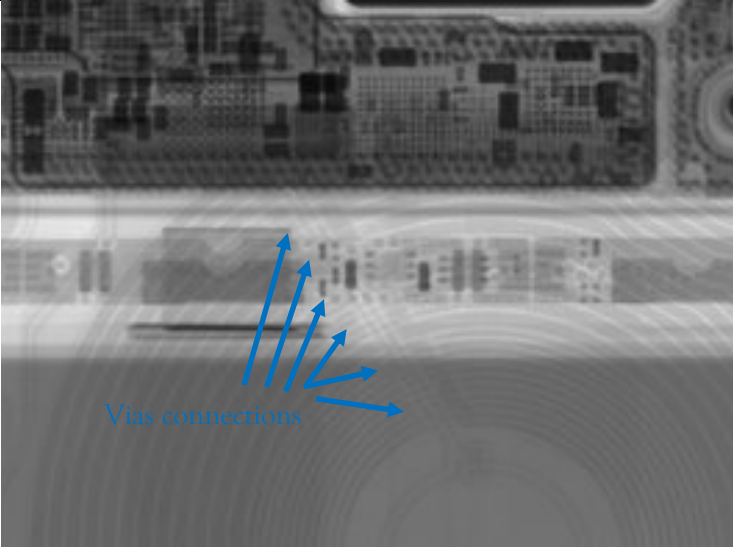
| Claim | Samsung Accused Products |
|--|--|
| |  <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>3. The smartphone antenna module of claim 1, wherein the inner extension line is referred to as a first inner</p> | <p>The second inner extension line is formed on the second major surface (m1), and it extends along the radial direction through the radially-extending outer gap.</p> |

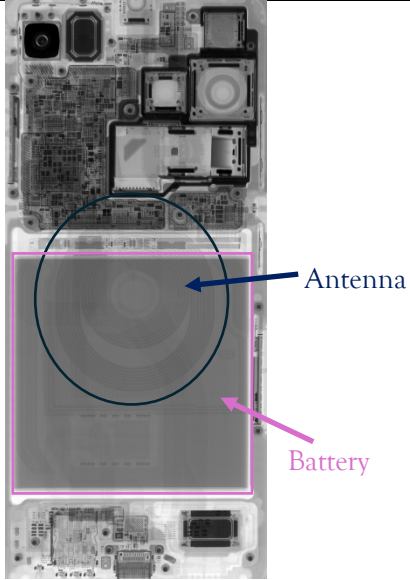
Exhibit A

| Claim | Samsung Accused Products |
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| <p>extension line, wherein the smartphone antenna module further comprises a second inner extension line formed on the second major surface, in which the second inner extension line connects to the inner antenna pattern and extends along the radial direction through the radially-extending outer gap.</p> | <div> <p>The image is an X-ray view of a smartphone's internal antenna module. It shows a complex network of conductive traces. A blue arrow points to a specific line labeled 'Second inner extension line'. This line is part of a larger antenna structure that includes an inner antenna pattern and an outer gap. The traces are arranged in a radial pattern, extending from the center towards the edges of the module.</p> </div> <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |
| <p>4. The smartphone antenna module of claim 1, wherein the inner coil includes a wire having a</p> | <p>The width of the wire of the inner coil is different than the width of the wire of the outer coil.</p> |

Exhibit A

| Claim | Samsung Accused Products |
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| <p>width different from that of a wire line of the outer coil.</p> | <div> </div> <p> https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all </p> <p> Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions. </p> |
| <p>6. A smartphone comprising: a battery; and the smartphone antenna</p> | <p>Each of the infringing devices is a smartphone comprising a battery and the smartphone antenna module of claim 1.</p> |

Exhibit A

| Claim | Samsung Accused Products |
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| <p>module of claim 1, wherein the inner coil and the outer coil are configured for wireless charging.</p> | <div>A vertical photograph of the internal components of a Samsung Galaxy S21 Ultra. The image shows the main board, camera module, and battery. A blue circle highlights a circular component labeled 'Antenna' with a blue arrow. A pink rectangle highlights the battery area, labeled 'Battery' with a pink arrow.</div> <p>https://www.ifixit.com/News/49419/samsung-galaxy-s21-ultra-teardown-x-ray-wallpapers-for-the-phone-that-has-it-all</p> <p>Discovery will provide detailed information regarding the implementation and identification of specific components of the Samsung Accused Products. Publicly available documentation makes it evident that the Samsung Accused Products are configured in the way set forth in the asserted claims. As additional information is obtained through discovery related to the Samsung Accused Products, AQ will supplement these contentions.</p> |