PUBLIC
EXHIBIT 47

SAMSUNG 1014

U.S. Patent No. 10,700,178

Samsung/TSMC Product (7nm node)

Claim 1(pre): "An integrated circuit structure, comprising:"

1(pre). An integrated circuit structure, comprising:	The Samsung S20 FE 5G smartphone (hereinafter, the "Samsung/TSMC Product") includes an integrated circuit structure. For example, the Samsung/TSMC Product includes the Qualcomm Snapdragon 865 5G system on chip (hereinafter, the "Qualcomm SoC"). *See* Ex. 20 at 7, Photographs for the TSMC Representative Article, Samsung Galaxy S20 FE - About Phone.

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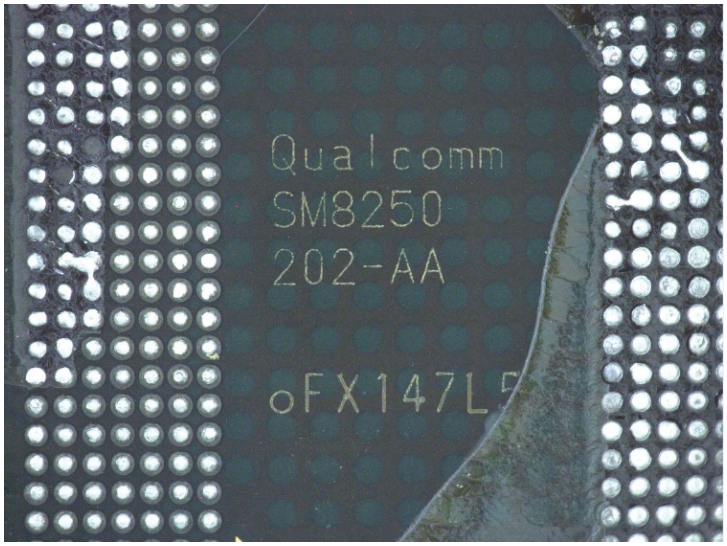
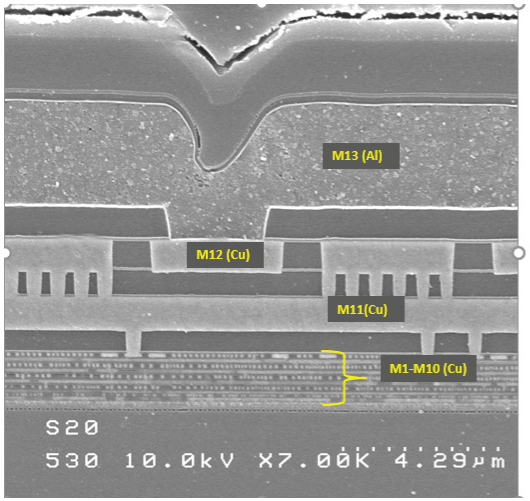
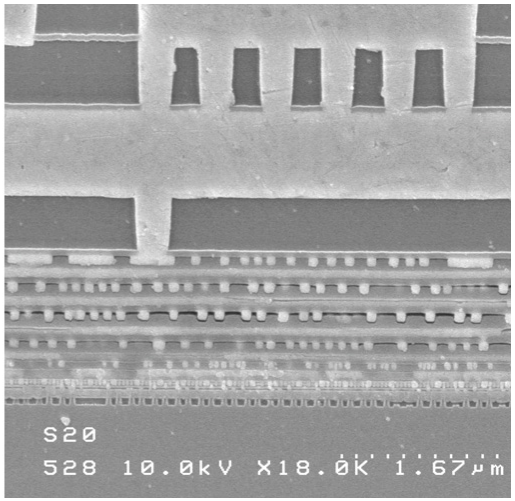
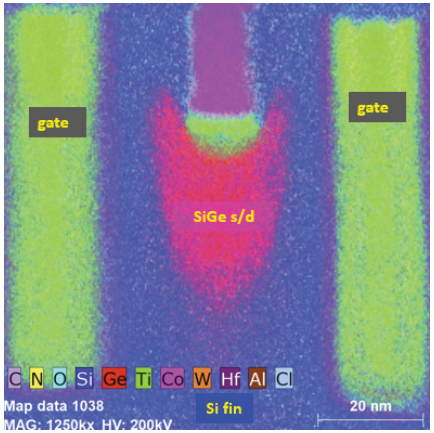
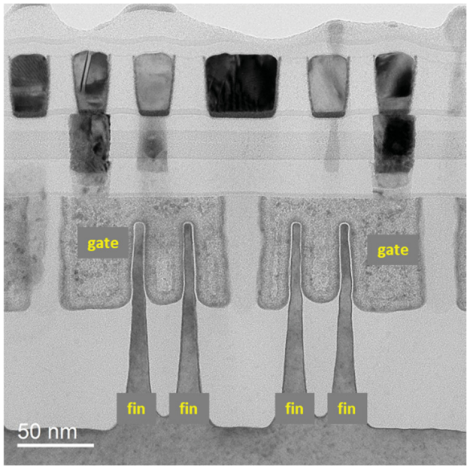
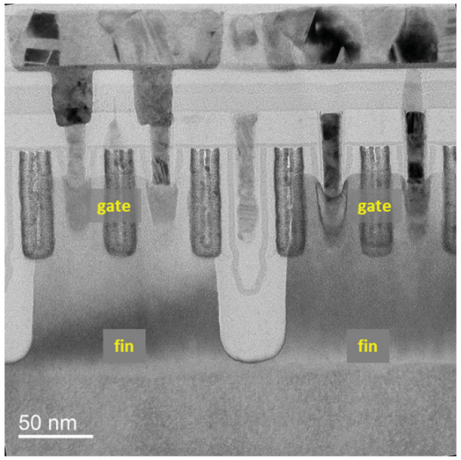
See Ex. 20 at 8, Photographs for the TSMC Representative Article, Samsung Galaxy S20 FE - SoC Model.

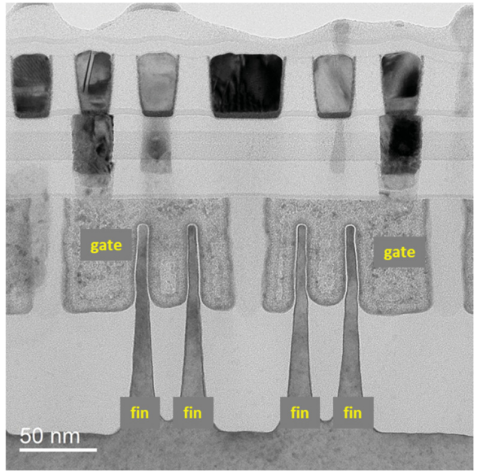
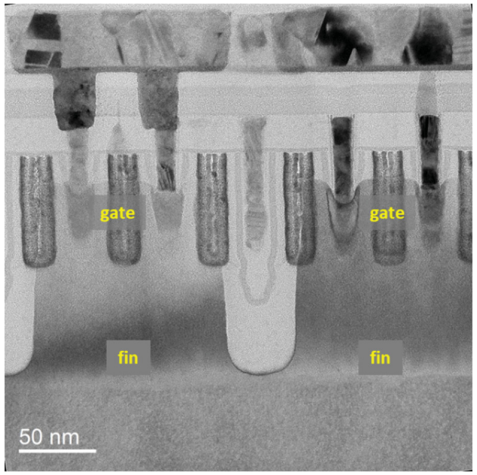
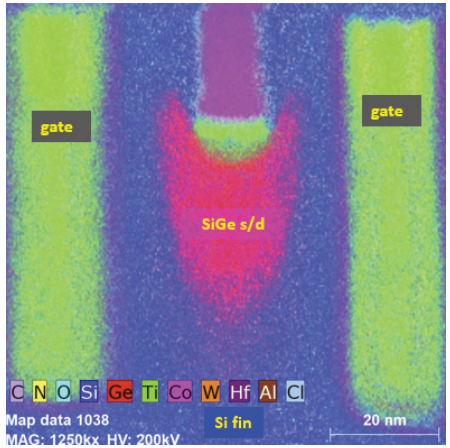


See Ex. 20 at 9, Photographs for the TSMC Representative Article.

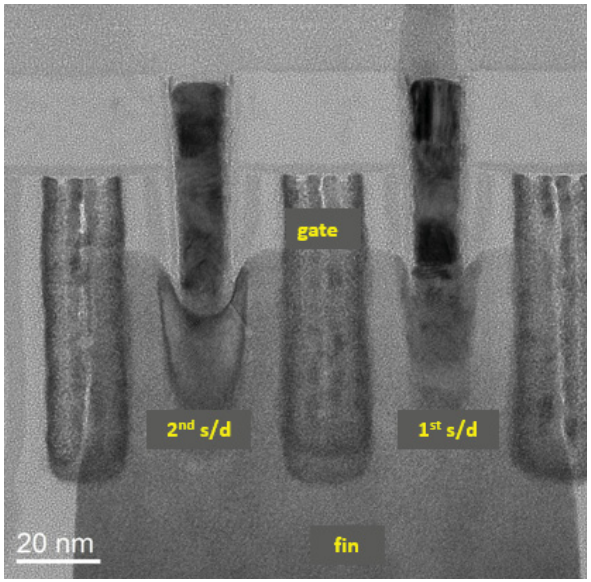
Upon information and belief, the Qualcomm SoC is manufactured using TSMC's 7nm technology node.

5	**Process** — **Process Node and Technology: 7 nm** *See* Ex. 88 at 8, Qualcomm Snapdragon 865 5G Mobile Platform, https://www.qualcomm.com/products/snapdragon-865-5g-mobile-platform. **The Snapdragon 865 Application Processor: TSMC 7nm N7P** With the elephant in the room of the modem configuration being out of the way, we come to the actual Snapdragon 865 application processor. *See* Ex. 89 at 4, Qualcomm Announces Snapdragon 865 and 765(G), https://www.anandtech.com/show/15178/qualcomm-announces-snapdragon-865-and-765-5g-for-all-in-2020-all-the-details.   *See* Ex. 20 at 10 (left) (annotated), 11, Photographs for the TSMC Representative Article.

1(a). a fin comprising silicon;	The Samsung/TSMC Product includes a fin comprising silicon. For example, the Qualcomm SoC includes multiple PMOS transistors that include a silicon fin.  *See* Ex. 20 at 12, Photographs for the TSMC Representative Article (annotated).   *See* Ex. 20 at 13 (left) (annotated), 14 (right) (annotated), Photographs for the TSMC Representative Article.

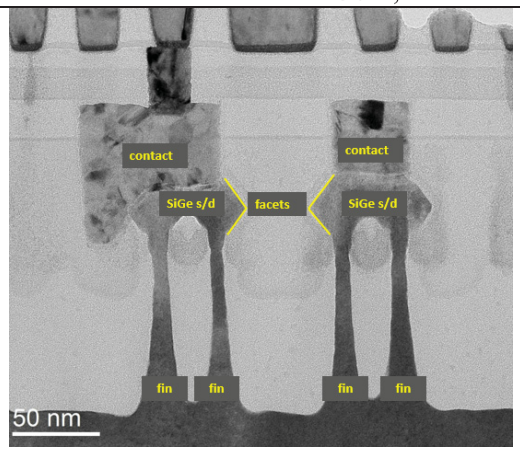
1(b). a gate electrode over the fin;	The Samsung/TSMC Product includes a gate electrode over the fin. For example, the Qualcomm SoC includes a gate electrode over the fin.   *See* Ex. 20 at 13 (left) (annotated), 14 (right) (annotated), Photographs for the TSMC Representative Article.  *See* Ex. 20 at 12, Photographs for the TSMC Representative Article (annotated).

Claim 1(c): "a first source or drain region in the fin proximate a first side of the gate electrode, the first source or drain region comprising two or more facets and a top surface, wherein the first source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%;"

1(c). a first source or drain region in the fin proximate a first side of the gate electrode, the first source or drain region comprising two or more facets and a top surface, wherein the first source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%;	The Samsung/TSMC Product includes a first source or drain region in the fin proximate a first side of the gate electrode, the first source or drain region comprising two or more facets and a top surface, wherein the first source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%. For example, the Qualcomm SoC includes a first source or drain region in the fin proximate a first side of the gate electrode, the first source or drain region comprising two or more facets and a top surface.  *See* Ex. 20 at 15, Photographs for the TSMC Representative Article (annotated).

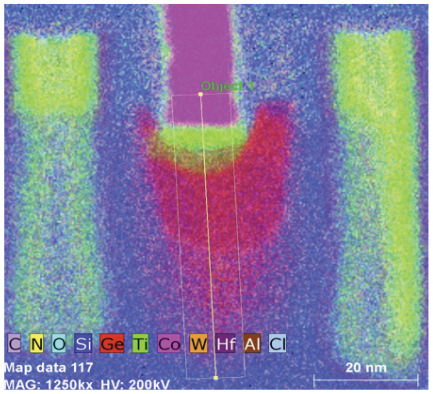
U.S. Patent No. 10,700,178: Claim 1(c)

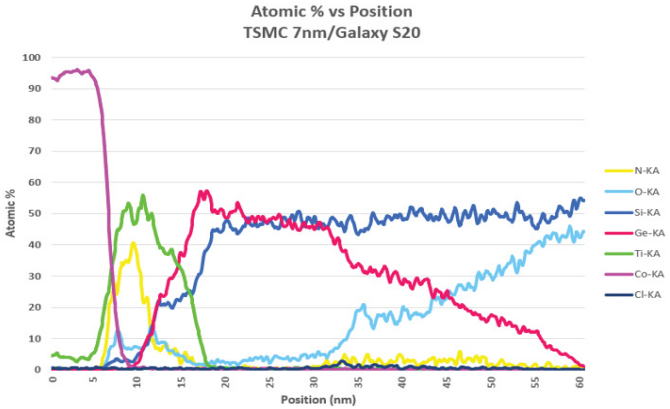
"a first source or drain region in the fin proximate a first side of the gate electrode, the first source or drain region comprising two or more facets and a top surface, wherein the first source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%;"



See Ex. 20 at 16, Photographs for the TSMC Representative Article (annotated).

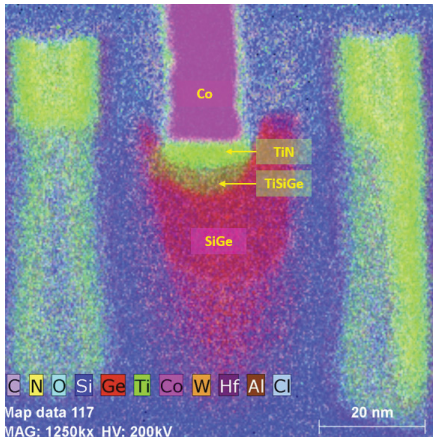
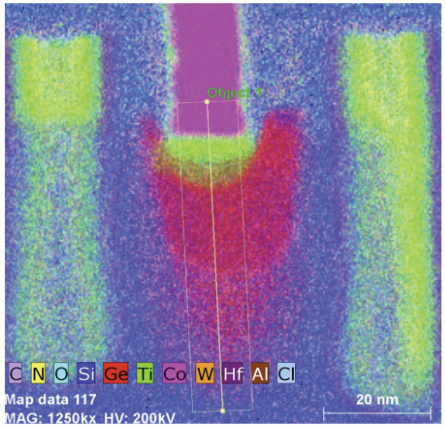
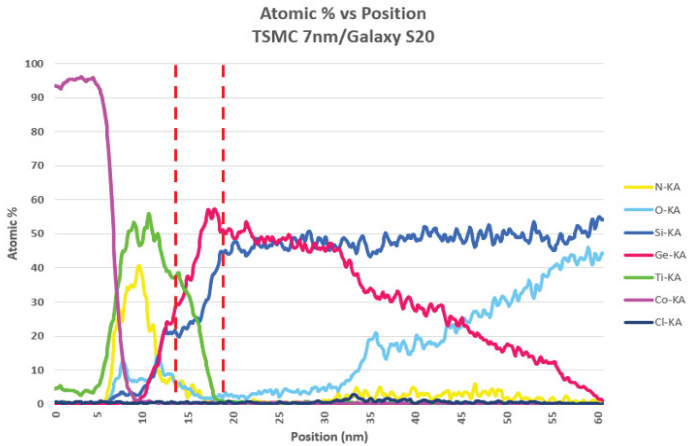
Further, the first source/drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%.



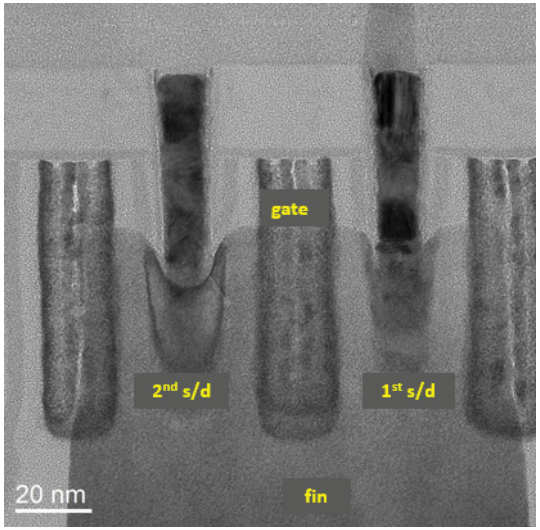


See Ex. 20 at 17 (left), 18, Photographs for the TSMC Representative Article.

Claim 1(d): "a first germanide layer over the top surface of the first source or drain region, the first germanide layer comprising silicon, germanium and titanium;"

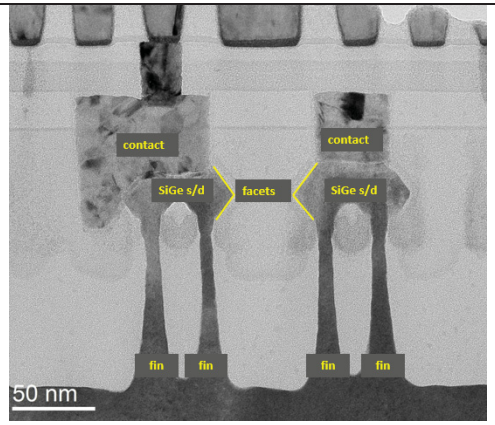
1(d). a first germanide layer over the top surface of the first source or drain region, the first germanide layer comprising silicon, germanium and titanium;	The Samsung/TSMC Product includes a first germanide layer over the top surface of the first source or drain region, the first germanide layer comprising silicon, germanium and titanium. For example, the Qualcomm SoC includes a germanide layer comprising silicon, germanium and titanium over the top surface of the first source/drain region.  *See* Ex. 20 at 19, Photographs for the TSMC Representative Article   *See* Ex. 20 at 17 (left), 18 (right) (annotated), Photographs for the TSMC Representative Article.

Claim 1(e): "a second source or drain region in the fin proximate a second side of the gate electrode opposite the first side, the second source or drain region comprising two or more facets and a top surface, wherein the second source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%; and"

1(e). a second source or drain region in the fin proximate a second side of the gate electrode opposite the first side, the second source or drain region comprising two or more facets and a top surface, wherein the second source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%; and	The Samsung/TSMC Product includes a second source or drain region in the fin proximate a second side of the gate electrode opposite the first side, the second source or drain region comprising two or more facets and a top surface, wherein the second source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%. For example, the Qualcomm SoC includes a second source or drain region in the fin proximate a second side of the gate electrode, the second source or drain region comprising two or more facets and a top surface.  *See* Ex. 20 at 15, Photographs for the TSMC Representative Article (annotated).

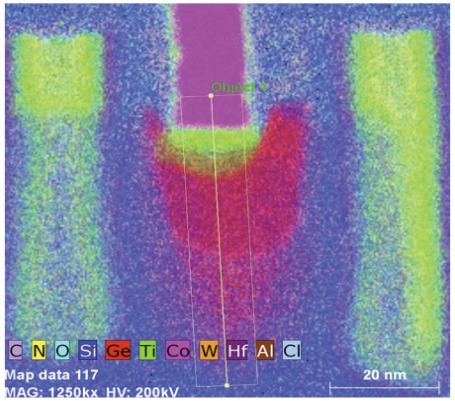
U.S. Patent No. 10,700,178: Claim 1(e)

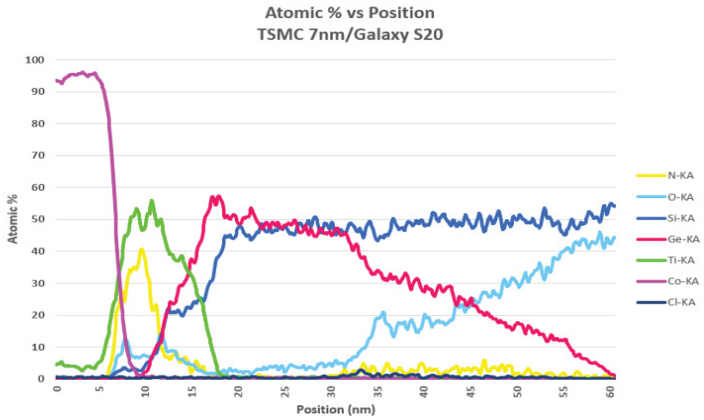
"a second source or drain region in the fin proximate a second side of the gate electrode opposite the first side, the second source or drain region comprising two or more facets and a top surface, wherein the second source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%; and"



See Ex. 20 at 16, Photographs for the TSMC Representative Article (annotated).

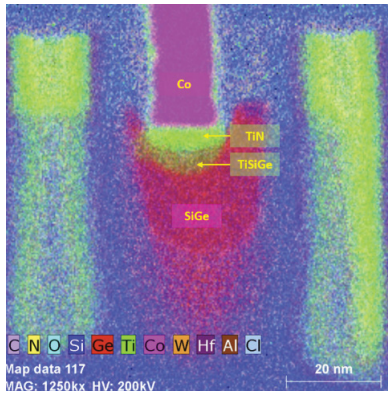
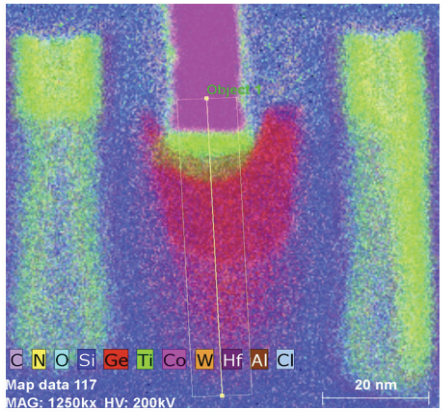
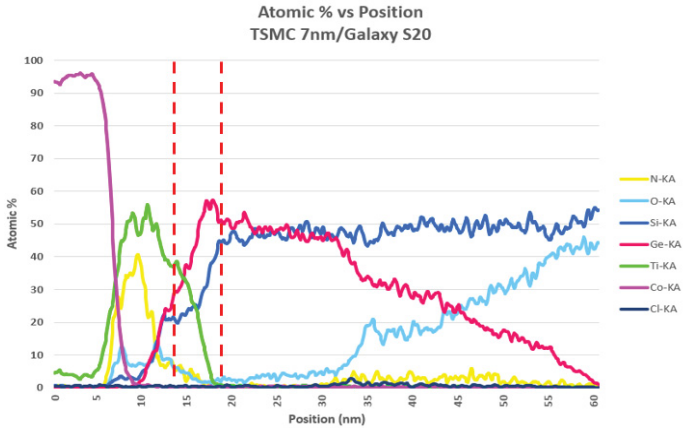
Further, the second source/drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%.





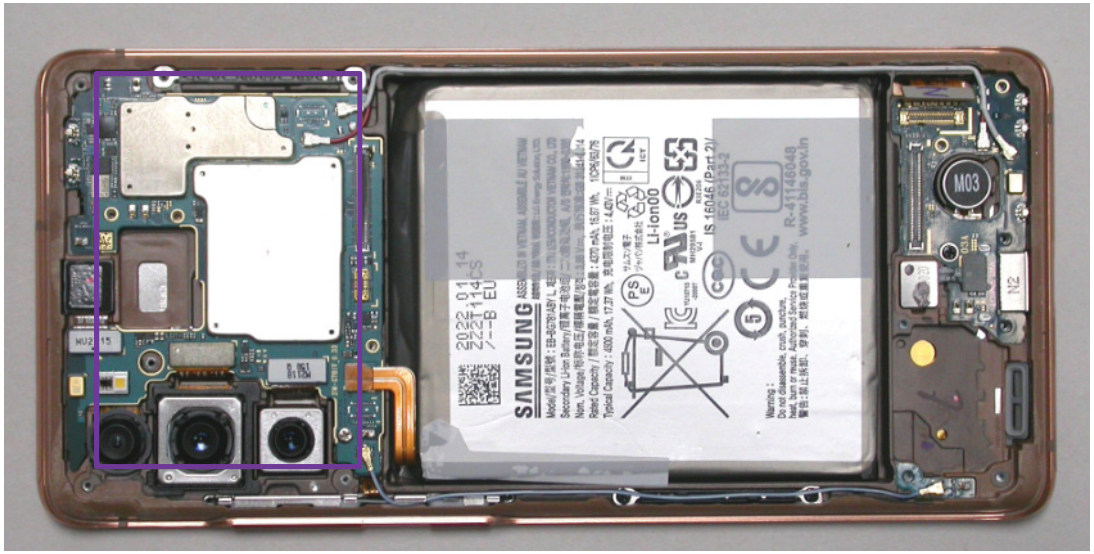
See Ex. 20 at 17 (left), 18 (right), Photographs for the TSMC Representative Article.

Claim 1(f): "a second germanide layer over the top surface of the second source or drain region, the second germanide layer comprising silicon, germanium and titanium."

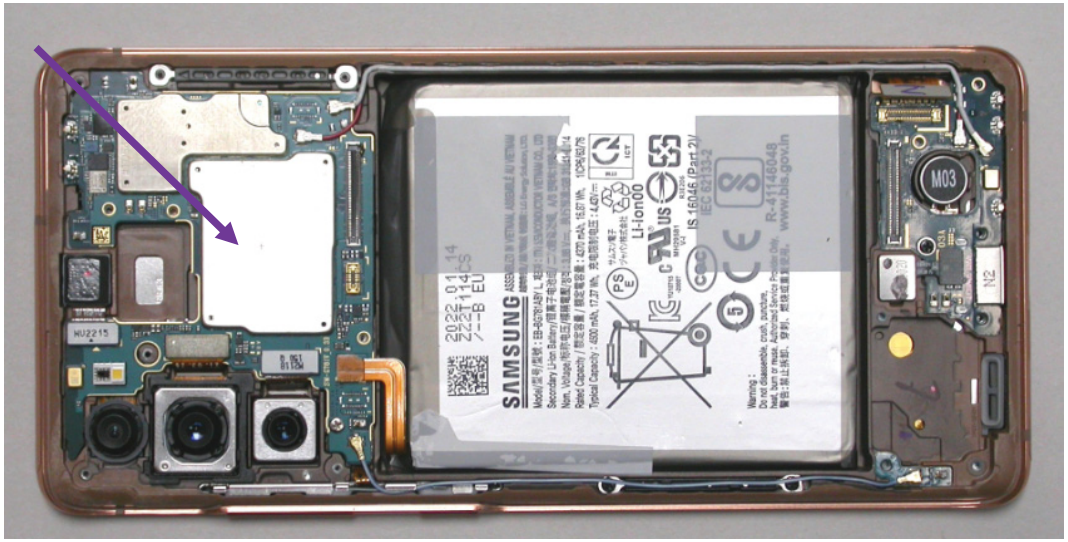
1(f). a second germanide layer over the top surface of the second source or drain region, the second germanide layer comprising silicon, germanium and titanium.	The Samsung/TSMC Product includes a second germanide layer over the top surface of the second source or drain region, the second germanide layer comprising silicon, germanium and titanium. For example, the Qualcomm SoC includes a germanide layer comprising silicon, germanium and titanium over the top surface of the second source/drain region.  *See* Ex. 20 at 19, Photographs for the TSMC Representative Article (annotated).   *See* Ex. 20 at 17 (left), 18 (right) (annotated), Photographs for the TSMC Representative Article.

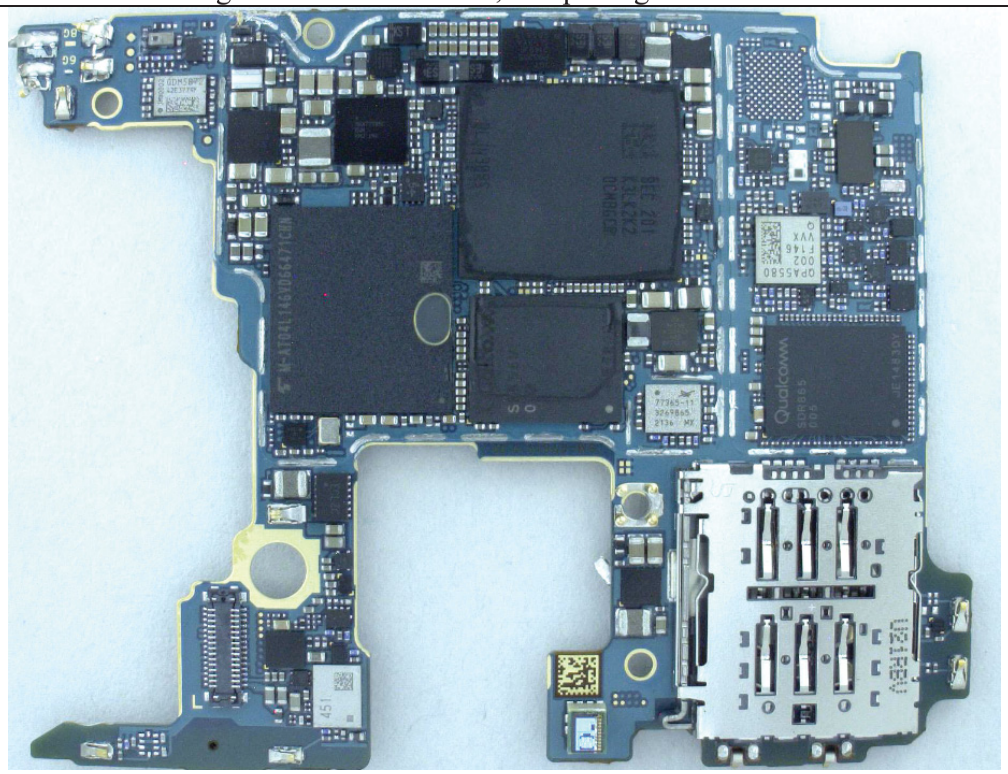
Claim 11(pre): "A computing device, comprising:"

11(pre). A computing device, comprising:	The Samsung Product includes a computing device. *See supra* Claim 1(pre).

11(a). a board; and	The Samsung Product includes a board. *See supra* Claim 1(pre). Further, for example, upon information and belief, the Samsung Product includes a circuit board.  *See* Ex. 20 at 23, Photographs for the TSMC Representative Article, Samsung Galaxy S20 FE - About Phone (annotated).

Claim 11(b): "a component coupled to the board, the component including an integrated circuit structure, comprising:"

11(b). a component coupled to the board, the component including an integrated circuit structure, comprising:	The Samsung Product includes a component coupled to the board, the component including an integrated circuit structure. *See supra* Claim 1(pre). Further, for example, upon information and belief, the Samsung Product includes an SoC coupled to the circuit board.  *See* Ex. 20 at 23, Photographs for the TSMC Representative Article, Samsung Galaxy S20 FE - About Phone (annotated). Upon information and belief, the SoC is layered underneath the Samsung memory.

	 *See* Ex. 20 at 24, Photographs for the TSMC Representative Article, Samsung Galaxy S20 FE - About Phone (annotated).

Claim 11(c): "a fin comprising silicon;"

11(c). a fin comprising silicon;	The Samsung Product includes a fin comprising silicon. *See supra* Claim 1(a).

Claim 11(d): "a gate electrode over the body;"

11(d). a gate electrode over the fin;	The Samsung Product includes a gate electrode over the fin. *See supra* Claim 1(b).

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Claim 11(e): "a first source or drain region in the fin proximate a first side of the gate electrode, the first source or drain region comprising two or more facets and a top surface, wherein the first source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%;"

11(e). a first source or drain region in the fin proximate a first side of the gate electrode, the first source or drain region comprising two or more facets and a top surface, wherein the first source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%;	The Samsung Product includes a first source or drain region in the fin proximate a first side of the gate electrode, the first source or drain region comprising two or more facets and a top surface, wherein the first source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%. *See supra* Claim 1(c).

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Claim 11(f): "a first germanide layer over the top surface of the first source or drain region, the first germanide layer comprising silicon, germanium and titanium;"

11(f). a first germanide layer over the top surface of the first source or drain region, the first germanide layer comprising silicon, germanium and titanium;	The Samsung Product includes a first germanide layer over the top surface of the first source or drain region, the first germanide layer comprising silicon, germanium and titanium. *See supra* Claim 1(d).

Claim 11(g): "a second source or drain region in the fin proximate a second side of the gate electrode opposite the first side, the second source or drain region comprising two or more facets and a top surface, wherein the second source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%; and"

11(g). a second source or drain region in the fin proximate a second side of the gate electrode opposite the first side, the second source or drain region comprising two or more facets and a top surface, wherein the second source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%; and	The Samsung Product includes a second source or drain region in the fin proximate a second side of the gate electrode opposite the first side, the second source or drain region comprising two or more facets and a top surface, wherein the second source or drain region comprises silicon and germanium having a germanium concentration graded to a concentration in excess of 50%. *See supra* Claim 1(e).

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Claim 11(h): "a second germanide layer over the top surface of the second source or drain region, the second germanide layer comprising silicon, germanium and titanium."

11(h). a second germanide layer over the top surface of the second source or drain region, the second germanide layer comprising silicon, germanium and titanium.	The Samsung Product includes a second germanide layer over the top surface of the second source or drain region, the second germanide layer comprising silicon, germanium and titanium. *See supra* Claim 1(f).