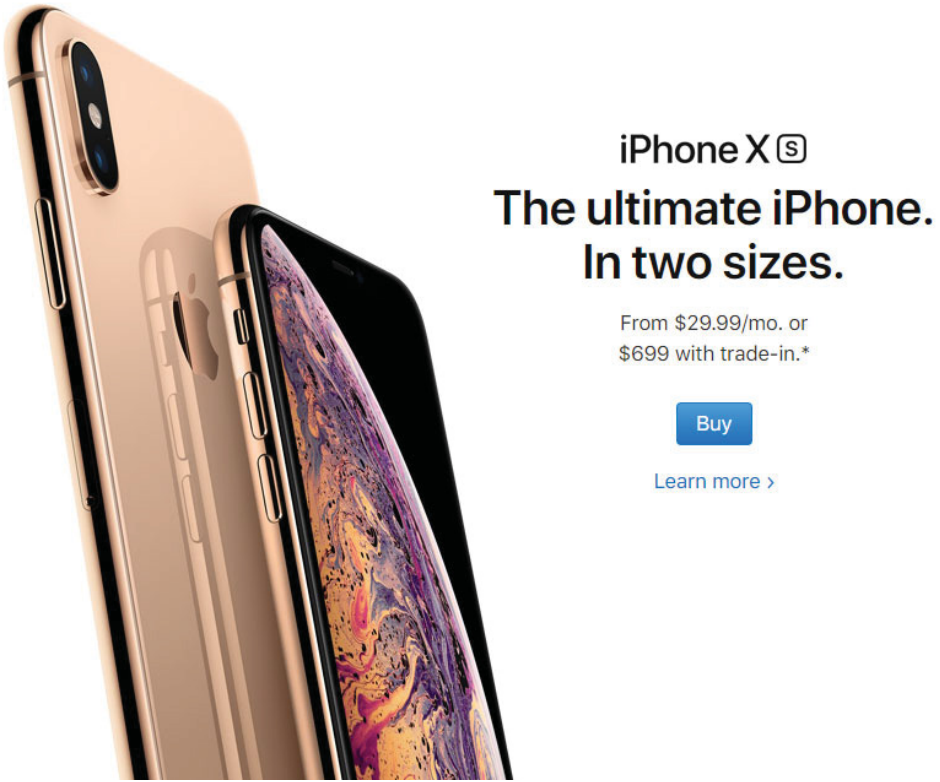**EXHIBIT 4**
U.S. Patent No. 8,411,557

These infringement contentions are prepared with public information and have not been prepared with the benefit of discovery. Plaintiffs reserve the right to amend these contentions, including adding and/or amending a doctrine of equivalents analysis for any claim element of any asserted claim, as discovery progresses. Plaintiffs further reserve the right to update, amend, or supplement these contentions and/or to add Accused Instrumentalities, standard, or chipset information, based on information received by Plaintiffs or otherwise produced by Apple, Qualcomm, Intel, or any other entity, in this litigation. Such information may include, but is not limited to, data sheets, design specifications, source code, testing information, reference designs, implementation and utilization information, and/or schematics. **Plaintiffs' citation of portions of the 3GPP LTE standard herein should not be interpreted to limit Plaintiffs' infringement proof in expert reports or at trial in any way.** Plaintiffs' citation of portions of the 3GPP LTE standard herein provides detailed notice of Plaintiffs' theory of infringement, but Plaintiffs intend to rely on additional evidence including, but not limited to, data sheets, design specifications, source code, testing information, reference designs, implementation and utilization information, and/or schematics as proof of infringement in expert reports and at trial. Reference should also be made to the cover pleading and Appendix A hereto.

Claim No.	Claim 1	ACCUSED INSTRUMENTALITIES
1	A mobile station apparatus comprising:	The Accused Instrumentalities[1] include a mobile station for use in a mobile communications system. For example, and without limitation, each of the Accused Instrumentalities is compliant with or is configured and designed to comply with and/or support the 3GPP Long Term Evolution ("LTE") Standard. Under the 3GPP LTE Standard, User Equipment (UE) comprises a mobile station apparatus for use in mobile communications. The LTE Standard covers the operation of mobile stations (such as Apple's Accused Instrumentalities) in LTE connectivity and communication. As further examples, and without limitation:

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[1] Throughout this chart, non-limiting examples from the iPhone XS are used to illustrate the application of the claims to the Accused Instrumentalities based on their LTE support. **Appendix A** to these contentions lists in a non-limiting manner similar LTE support documentation illustrating how the other Accused Instrumentalities infringe in the same manner.

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Claim No.	Claim 1	ACCUSED INSTRUMENTALITIES
		(Source: https://www.apple.com/iphone/)

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Claim No.	Claim 1	ACCUSED INSTRUMENTALITIES
		 (Source: https://www.apple.com/iphone-xs/specs/) # 1 Scope The present document describes a general description of the physical layer of the E-UTRA radio interface. The present document also describes the document structure of the 3GPP physical layer specifications, i.e. TS 36.200 series. The TS 36.200 series specifies the Uu point for the 3G LTE mobile system, and defines the minimum level of specifications required for basic connections in terms of mutual connectivity and compatibility.

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Claim No.	Claim 1	ACCUSED INSTRUMENTALITIES
		(Source: 3GPP TS 36.201 V8.3.0 (2009-03) at § 1) and all subsequent versions. ## 4 General description of LTE Layer 1 ### 4.1 Relation to other layers #### 4.1.1 General Protocol Architecture The radio interface described in this specification covers the interface between the User Equipment (UE) and the network. The radio interface is composed of the Layer 1, 2 and 3. The TS 36.200 series describes the Layer 1 (Physical Layer) specifications. Layers 2 and 3 are described in the 36.300 series. **(Source: 3GPP TS 36.201 V8.3.0 (2009-03) at § 4.1.1)** and all subsequent versions. *See also* **1.1-1.4.** PanOptis reserves the right to add additional information and infringement theories once discovery begins in this case, particularly once Apple produces its technical documents (including, but not limited to, source code).
1.1	a receiving unit configured to receive control information;	The Accused Instrumentalities include a receiving unit configured to receive control information. For example, and without limitation, because each of the Accused Instrumentalities is compliant with or is configured and designed to comply with and/or support the LTE Standard, they necessarily include a receiving unit configured to receive control information. As further example and without limitation, the LTE Standard requires that a receiving unit be configured to receive control information: ## 5 MAC procedures

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Claim No.	Claim 1	ACCUSED INSTRUMENTALITIES
		5.1 Random Access procedure **5.1.1 Random Access Procedure initialization** The Random Access procedure described in this subclause is initiated by a PDCCH order or by the MAC sublayer itself. If a UE receives a PDCCH transmission consistent with a PDCCH order [5] masked with its C-RNTI, it shall initiate a Random Access procedure. The PDCCH order or RRC optionally indicate *ra-PreambleIndex* and *ra-PRACH-MaskIndex*. Before the procedure can be initiated, the following information is assumed to be available [8]: - the available set of PRACH resources for the transmission of the Random Access Preamble, *prach-ConfigIndex*. - the groups of Random Access Preambles and the set of available Random Access Preambles in each group: The preambles that are contained in Random Access Preambles group A and Random Access Preambles group B are calculated from the parameters *numberOfRA-Preambles* and *sizeOfRA-PreamblesGroupA*: If *sizeOfRA-PreamblesGroupA* is equal to *numberOfRA-Preambles* then there is no Random Access Preambles group B. The preambles in Random Access Preamble group A are the preambles 0 to *sizeOfRA-PreamblesGroupA* – 1 and, if it exists, the preambles in Random Access Preamble group B are the preambles *sizeOfRA-PreamblesGroupA* to *numberOfRA-Preambles* – 1 from the set of 64 preambles as defined in [7]. - if Random Access Preambles group B exists, the thresholds, *messagePowerOffsetGroupB* and *messageSizeGroupA*, the configured UE transmitted power, P_{CMAX} [10], and the offset between the preamble and Msg3, *deltaPreambleMsg3*, that are required for selecting one of the two groups of Random Access Preambles. **(Source: 3GPP TS 36.321 V8.7.0 (2009-09) at § 5.1.1)** and all subsequent versions. **5 Procedures** **5.1 General** **5.1.1 Introduction** The procedural requirements are structured according to the main functional areas: system information (5.2), connection

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