

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TEXARKANA DIVISION**

MAXELL, LTD.,

Plaintiff,

v.

HUAWEI DEVICE USA INC. and HUAWEI
DEVICE CO., LTD.,

Defendants.

Case No. 5:18-cv-00033-RWS

LEAD CASE

JURY TRIAL DEMANDED

MAXELL, LTD.,

Plaintiff,

v.

ZTE CORP. and ZTE USA INC.,

Defendants.

Case No. 5:18-cv-00034-RWS

JURY TRIAL DEMANDED

**PLAINTIFF MAXELL, LTD.’S
PATENT RULE 3-1 AND 3-2 DISCLOSURE OF ASSERTED CLAIMS AND
INFRINGEMENT CONTENTIONS AGAINST THE HUAWEI DEFENDANTS**

Pursuant to Patent Rules (“P.R.”) 3-1 and 3-2, Plaintiff Maxell, Ltd. (“Maxell”) hereby serves its Disclosure of Asserted Claims and Infringement Contentions and accompanying disclosure against Defendants Huawei Device USA Inc. and Huawei Device Co., Ltd. (collectively, “Defendants” or “Huawei”).

These contentions are based on information reasonably available to Maxell at this time. Maxell’s investigation of the facts relevant to this case is ongoing, discovery has not yet

begun, and the Court has not yet construed the claims. Further, important information about many or all of Huawei's products is not publicly available, including information relevant to the patents-in-suit and these Infringement Contentions. Accordingly, Maxell reserves the right to modify and/or supplement these disclosures as information becomes available, based on the Court's claim constructions, and/or based on positions taken by Huawei.

A. P.R. 3-1(a): Identification of Asserted Claims

Pursuant to P.R. 3-1(a) and based on the information presently available, Maxell incorporates herein by reference the identification of asserted claims set forth in the Complaint (*see* Dkt. No. 1) and further discloses the claims of each patent-in-suit that it contends are infringed (directly and/or indirectly, literally and/or under the doctrine of equivalents) by each of the Defendants, through their manufacture, use, sale, offer for sale, and/or importation into the United States of the accused products identified further below at in the attached Appendices 1-10:

- U.S. Patent 7,324,487 ("the '487 Patent"): claims 1-5;
- U.S. Patent 7,068,503 ("the '503 Patent"): claims 1-3, 6, 10-12, 15, 19-21, and 24-26;
- U.S. Patent 8,982,086 ("the '086 Patent"): claims 1-4;
- U.S. Patent 6,928,306 ("the '306 Patent"): claims 2, 5, 6, and 13-15;
- U.S. Patent 6,983,140 ("the '140 Patent"): claim 1, 3, 4;
- U.S. Patent 7,515,810 ("the '810 Patent"): claim 1;
- U.S. Patent 7,995,897 ("the '897 Patent"): claims 10-12;
- U.S. Patent 6,347,068 ("the '068 Patent"): claims 1-2;
- U.S. Patent 6,973,334 ("the '334 Patent"): claims 4 and 6; and
- U.S. Patent 9,544,517 ("the '517 Patent"): claims 8-11.

Maxell expressly reserves the right to modify, amend and/or supplement the foregoing in light of new information made available to Maxell, based on the Court's claim construction, or based on positions taken by Huawei.

B. P.R. 3-1(b): Identification of Accused Instrumentalities

Pursuant to P.R. 3-1(b) and based on the information presently available, Maxell incorporates herein by reference the identification of Accused Instrumentalities set forth in the Complaint (*see* Dkt. No. 1), the attached Appendices 1-10, and further identifies the following Accused Instrumentalities of which it is currently aware:

- As to claims 1-5 of the '487 Patent, the accused products include, but are not limited to, Huawei Mate 9, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 8, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei Mate SE, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Honor 6X, Honor 5X, Huawei Ascend Mate 2, P8 Lite, P9), Ascend P7, Ascend Plus, Huawei GX8/G8, G7PLUS, Huawei SnapTo, Huawei Pronto, Huawei Union, Huawei MediaPad tablets (*e.g.*, M3, X2, T1 10, M2 10.0, T1 7.0, T1 8.0, MediaPad T3 7.0), Huawei Ascend XT, Honor 8 Lite, Fusion 3, Nova 2, Nova 2 Plus, Nova, Nova Plus, Mate 10 – Porsche Design, P10, P Smart, Mate 9 Porsche Design, P9 Plus, P9 Lite, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 1 (collectively, "the Accused Huawei '487 Products").
- As to claims 1-3, 6, 10, 11, 12, 15, 19, 20, 21, 24, 25, and 26 of the '503 Patent, the accused products include, but are not limited to, Huawei MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Inspira, Premia 4G, Ideos S7, Ideos x5, MediaPad T1 8.0, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Matebook HZ-W09, Matebook HZ-W19, Honor 6X, Honor 5X, Ascend W1, Glory, T1 8.0 Pro, M3 8.4, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 8, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate SE, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 2 (collectively, "the Accused Huawei '503 Products").

- As to claims 1-4 of the '086 Patent, the accused products include, but are not limited to, Honor 8, Honor 9, Mate 10, Mate 10 Pro, Huawei Mate SE, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 3 (collectively, “the Accused Huawei '086 Products”).
- As to claims 2, 5, 6, 13, 14 and 15 of the '306 Patent, the accused products include, but are not limited to, MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei Mate SE, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 4 (collectively, “the Accused Huawei '306 Products”).
- As to claims 1, 3, 4 of the '140 Patent, the accused products include, but are not limited to, MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate SE, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 5 (collectively, “the Accused Huawei '140 Products”).
- As to claims 1 and 6 of the '810 Patent, the accused products include, but are not limited to, the Mate 9, MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magna, Ascend Mate 2, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei Mate SE, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, and Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 6 (collectively, “the Accused Huawei '810 Products”).
- As to claims 10-12 of the '897 Patent, the accused products include, but are not limited to, of the MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y,

Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei Mate SE, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 7 (collectively, “the Accused Huawei ’897 Products”).

- As to claims 1-2 of the ’068 Patent, the accused products include, but are not limited to, Huawei MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei Mate SE, Huawei P10 Plus, Huawei Mate 9, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 8 (collectively, “the Accused Huawei ’068 Products”).
- As to claims 4 and 6 of the ’334 Patent, the accused products include, but are not limited to, the MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 9 (collectively, “the Accused Huawei ’334 Products”).
- As to claims 8-11 of the ’517 Patent, the accused products include, but are not limited to, the MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Honor 8 Pro/Honor V9, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Ascend XT2, Honor 7X, Honor 7, Honor 6 Plus, Honor 9, Elate, Mate 10, Mate 10 Pro, Huawei Mate SE, P10, P10 Lite, P10 Plus, Mate 9 Pro, Mate 9 Lite, and Mate 10 Porsche Design, Huawei P20 Pro, Huawei P20, Huawei P20 Lite, and any yet to be released product or additional product that includes similar functionality as identified in Appendix 10 (collectively, “the Accused Huawei ’517 Products”).

The identification of the accused products is based on information reasonably available to Maxell at this time. Maxell reserves the right to supplement these Infringement Contentions based on information developed in the course of this lawsuit through discovery or additional factual investigation, in view of the Court's claim construction rulings, or as other circumstances may require. Specifically, should discovery reveal that Huawei has committed acts of infringement related to any products other than those listed above, including newly released products or additional products with similar functionality identified in Appendices 1-10, Maxell reserves the right to supplement these contentions.

C. P.R. 3-1(c): Claim Charts

Pursuant to P.R. 3-1(c), and based on the information presently available Maxell attaches hereto the following appendices identifying specifically where each element of each asserted claim is found within exemplary Accused Instrumentalities: Appendix 1 (the '487 Patent), Appendix 2 (the '503 Patent), Appendix 3 (the '086 Patent), Appendix 4 (the '306 Patent), Appendix 5 (the '140 Patent), Appendix 6 (the '810 Patent), Appendix 7 (the '897 Patent), Appendix 8 (the '068 Patent), Appendix 9 (the '334 Patent), and Appendix 10 (the '517 Patent).

Each of these appendices identifies an exemplary claim chart for the asserted claims of the patents-in-suit using one or more exemplary Accused Instrumentalities. As explained below, the remaining Huawei Accused Instrumentalities function in the same manner with respect to the accused functionalities and accordingly infringe the asserted claims in the same manner as shown in Appendices 1-10 for each of the patents-in-suit.

1. The '487 Patent and Exemplary Appendix 1

With respect to the '487 Patent, Appendix 1 shows how each element of each of claims 1-5 is found in the exemplary product Huawei Mate 9.

As shown in Appendix 1, the Mate 10 implements a method for connecting to base stations that are, for example, connected via a wired network. For example, the Mate 9 includes one or more communication components that can concurrently connect to at least two base stations and performs data communications with at least one base station using the one or more communication components.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to the Mate 10 as they all implement similar communication components that connect to multiple base stations. For example as identified by their user guides and/or product webpage specifications, at least each of the Huawei Mate 9, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 8, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Mate SE, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Honor 6X, Honor 5X, Huawei Ascend Mate 2, P8 Lite, P9), Ascend P7, Ascend Plus, Huawei GX8/G8, G7PLUS, Huawei SnapTo, Huawei Pronto, Huawei Union, Huawei MediaPad tablets (*e.g.*, M3, X2, T1 10, M2 10.0, T1 7.0, T1 8.0, MediaPad T3 7.0), Huawei Ascend XT, Honor 8 Lite, Fusion 3, Nova 2, Nova 2 Plus, Nova, Nova Plus, Mate 10 – Porsche Design, P10, P Smart, Mate 9 Porsche Design, P9 Plus, P9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite include one or more communication components for concurrently connecting with at least two base stations and performing data communications with at least one base station similar to the components shown in Appendix 1 with respect to the Mate 10. *See, e.g.*, Appendix 1 and User Guides of the Accused Huawei '487 Products.

2. The '503 Patent and Exemplary Appendix 2

With respect to the '503 Patent, Appendix 2 shows how each element of each of claims 1-3, 6, 10, 11, 12, 15, 19, 20, 21, 24, 25, and 26 is found in the exemplary product Huawei Mate 9.

As shown in Appendix 2, the Mate 9 is a smartphone, which is an information processing apparatus. The Mate 9 includes a display and a HiSilicon Kirin 960 Octa-core CPU and i6 co-processor, as well as a Mali-G71 MP8 graphics processing unit. The Mate 9 includes 4GB of RAM, 64GB of ROM, and additionally has a Micro SD card slot supporting up to 256GB of additional memory. The Mate 9 has a USB Type-C port that receives power in order to charge the phone's battery. The Mate 9 has a USB cable that includes a second electricity terminal that is capable of sending and receiving electric power (*e.g.*, the USB Type-A end of the cable). The Mate 9 also includes a power controller that supplies the power received via at least one of the electricity terminal to at least any one of the display, CPU, and memory.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to the Mate 9. For example, at least each of the Huawei MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Inspira, Premia 4G, Ideos S7, Ideos x5, MediaPad T1 8.0, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Matebook HZ-W09, Matebook HZ-W19, Honor 6X, Honor 5X, Ascend W1, Glory, T1 8.0 Pro, M3 8.4, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 8, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite function similar to the Mate 9.

For instance, each of the Accused Huawei '503 Products include a display, a memory, a connector with terminals (e.g., USB cable), and a power controller such that the terminals can send and receive power. *See, e.g.*, Appendix 2 and User Guides of the Accused Huawei '503 Products.

3. The '086 Patent and Exemplary Appendix 3

With respect to the '086 Patent, Appendix 3 shows how each element of each of claims 1-4 is found in the exemplary product Huawei Mate 9.

As shown in Appendix 3, the Mate 9 is a smartphone, which is an information processing apparatus. The Mate 9 includes a touch panel, for example, a fingerprint sensor, configured to detect a contact of a finger of a user. The Mate 9 includes a detector configured to detect information, such as a user's fingerprint, to identify the user when the contact is detected between the touch panel and the finger of the user. The Mate 9 includes a memory that is configured to store information relating to the identification of the user. The Mate 9 includes one controller configured to control the information processing apparatus to operate into two operating modes and another controller configured to execute a specified process when the information of the detected user and the information stored in the memory are coincident within one of the modes.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to the Mate 9. For example, at least each of the Honor 8, Honor 9, Mate 10, Mate 10 Pro, Mate SE, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite include a component for detecting a finger of a user similar to the Mate 9. *See e.g.*, Appendix 3 and User Guides of the Accused Huawei '086 Products.

4. The '306 Patent and Exemplary Appendix 4

With respect to the '306 Patent, Appendix 4 shows how each element of claims 2, 5, 6, 13, 14, and 15 is found in the exemplary product Huawei Mate 9.

As shown in Appendix 4, the Mate 9 is a portable smartphone that is capable of alerting the user to an incoming phone call by a ringing sound. For example, the Mate 9 includes a ringtone sound source, as well as a Talkback sound source. The Mate 9 includes a HiSilicon Kirin 960 Octa-core CPU and an i6 co-processor that controls the operations of the smartphone. The Mate 9 can be configured to generate a ringing sound for an incoming phone call using two sound sources. The Mate 9 includes a controller that controls the ringing sound generator so as to generate the ringing sound when the signal comes within a time zone which is set up in advance or within a period based on a calendar function which is set up in advance.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to the Mate 9. For example, at least each of the MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei Mate SE, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite includes a call alert component similar to the components in the Mate 9. *See, e.g.,* Appendix 4 and User Guides of the Accused Huawei '306 Products.

5. The '140 Patent and Exemplary Appendix 5

With respect to the '140 Patent, Appendix 5 shows how each element of claims 1, 3, and 4 is found in the exemplary product Huawei Mate 9.

As shown in Appendix 5, the Mate 9 is a portable mobile unit that contains a receiver circuit for bi-directional communication made between itself and a base station. The Mate 9 also contains a signal processor that includes a controller and signal modulator that divides output from the receiver circuit into a communication signal and control signal. The Mate 9 contains a transmitter and displays the signal intensity on its display. Also, the control processor generates an alarm associated with the uplink signal in response to receipt of an intensity control signal included in the control signal for maximizing the intensity of the uplink signal while the downlink signal is normally received. By performing power control in accordance with the 3GPP standards, the controllers in the Mate 9 control the transmitted power to converge into a range required by the cell-site station bounded by a maximum output power (base station).

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to Mate 9. For example, at least each of the MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei Mate SE, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite includes components for generating an indication, similar to the components in the Mate 9. *See, e.g.,* Appendix 5 and User Guides of the Accused Huawei '140 Products.

6. The '810 Patent and Exemplary Appendix 6

With respect to the '810 Patent, Appendix 6 shows how each element of claims 1 and 6 is found in the exemplary product Huawei Mate 9.

As shown in Appendix 6, the Mate 9 allows users to access pictures and videos. The Mate 9 also has a touch screen display for inputting a command. The display also has a means for displaying a list of time-serial representative images of scenes included in a video picture. The Mate 9 has a means for scrolling the list by displaying a new representative image instead of the representative image already displayed earlier when a total number of the time-serial representative images exceed a maximum number of representative images which can be displayed on a display screen. The Mate 9 discloses a representative image wherein the representative image added newly for display is a representative image of a scene distanced for a given time in conformance to the command inputted by the user.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to the Mate 9. For example, at least each of the Mate 9, MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magna, Ascend Mate 2, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, and Huawei Mate 9 Lite, Mate SE, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite includes components for displaying a list of serial representative images, similar to the components in the Mate 9. *See, e.g.,* Appendix 6 and User Guides of the Accused Huawei '810 Products.

7. The '897 Patent and Exemplary Appendix 7

With respect to the '897 Patent, Appendix 7 shows how each element of claims 10-12 is found in the exemplary product Mate 10.

As shown in Appendix 7, the Mate 10 is a mobile communications terminal that is capable of reproducing video by one encoding method, such as MPEG-4 and pictures by a second encoding method, such as JPEG. The Mate 10 also produces thumbnails having a smaller number of pixels than the pictures as evidenced by, for example, the file size. The Mate 10 has a recording medium for storing the videos, pictures, and thumbnails and a display for reproducing the same.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to the Huawei Mate 10. For example, at least each of the the MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite include components for moving and still picture encoding and reproducing functionalities, similar to the components in the Huawei Mate 10. *See, e.g.,* Appendix 7 and User Guides of the Accused Huawei '897 Products.

8. The '068 Patent and Exemplary Appendix 8

With respect to the '068 Patent, Appendix 8 shows how each element of claims 1-2 is found in the exemplary product Huawei Mate 10.

As shown in Appendix 8, the Mate 10 is an information recording apparatus with a recording medium for storing data such as pictures and videos. The Mate 10 has electrical components for controlling and interfacing with the recording medium. The Mate 10 also has a processor for processing data stored on the recording medium. The Mate 10 has a battery for supplying electric power to the information recording apparatus. The Mate 10 has a battery indicator to show the amount of remaining battery power as the battery power decreases over time. The recording medium in Mate 10 records pictures and videos and records information with the pictures and videos such as time, data, format, size etc. in order to manage the stored data.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to the Huawei Mate 10. For example, at least each of the Huawei MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Mate SE, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite include an information recording component similar to the Huawei Mate 10. *See, e.g.,* Appendix 8 and User Guides of the Accused Huawei '068 Products.

9. The '334 Patent and Exemplary Appendix 9

With respect to the '334 Patent, Appendix 9 shows how each element of claims 4 and 6 is found in the exemplary product Huawei Mate 10.

As shown in Appendix 9, the Mate 10 is a cellular telephone used in a CDMA system, such as WCDMA, TD-SCDMA, and CDMA 1x with a double antenna for receiving signals from and transmitting signals to cell-site stations, such as a base station such that the device can switch antennas based on the stronger signal. The Mate 10 supports and implements at least the UMTS (universal mobile telecommunications service) standards and relevant technical specifications promulgated by the 3GPP. For example, the Mate 10's antenna receives a first communication signal (such as data signals transmitted on a downlink channel) and a transmitting power control signal (such as a TPC transmitted on a downlink channel) from a cell-site station (such as a base station), as evidenced by the 3GPP Standards. Further, the Mate 10 is configured to derive and output a power control signal from the transmitting power control signal (TPC) sent from the cell-site station, as required by the 3GPP standards. The Mate 10 converts speech spoken into RF signals that are transmitted at an antenna of the device in accordance with the supported technical standards. The Mate 10 has a controller that controls the transmitter so that an open-loop power control is performed at first and operates such that a closed-loop power control is performed according to the power control signal so as to control the transmitted power to converge into a range required by the cell-site station and has a variable amplitude amplifier which it controls the gain of and a bias condition using a function defining a relation between bias data and gain data stored in said memory. The control is such that function uses bias conditions defined in a ratio to the maximum bias voltage value and that said bias condition increases gradually to the maximum value when output intensity increases to the value taken when said cellular telephone is very far from the cell-site station.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to

the Huawei Mate 10. For example, at least each of the MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Mate SE, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite include a component to effectuate power control functionality similar to the Huawei Mate 10. *See, e.g.,* Appendix 9 and User Guides of the Accused Huawei '334 Products.

10. The '517 Patent and Exemplary Appendix 10

With respect to the '517 Patent, Appendix 10 shows how each element of claims 8-11 is found in the exemplary product Huawei Mate 10.

As shown in Appendix 10, the Mate 10 includes an electric camera for sensing images and videos. The Mate 10 senses light with a light receiving surface having an array of pixels arranged vertically and horizontally in a grid pattern. The Mate 10 includes a 12MP camera as well as a 8MP front camera. On information and belief, image sensors such as the 12 megapixel camera have a light receiving surface having an array of pixels arranged vertically and horizontally in a grid pattern with an arbitrary number of vertically arranged pixels N , where N is equal to or more than three times the number of effective scanning lines M of a display screen of a television system, at least in order to display the image in horizontal and vertical planes on the Mate 10.

Further, each of the remaining Huawei products identified above include all necessary hardware and operating systems and work in a similar manner as described above with respect to the Huawei Mate 10. For example, at least each of the MyTouch, Impulse 4G, Fusion, Fusion 2,

Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Honor 8 Pro/Honor V9, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Ascend XT2, Honor 7X, Honor 7, Honor 6 Plus, Honor 9, Elate, Mate 10, Mate 10 Pro, P10, P10 Lite, P10 Plus, Mate 9 Pro, Mate 9 Lite, and Mate 10 Porsche Design, Mate SE, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite include components for processing image signals and displaying images similar to the Huawei Mate 10. *See, e.g.*, Appendix 10 and User Guides of the Accused Huawei '517 Products.

D. P.R. 3-1(d): Literal Infringement and Infringement Under the Doctrine of Equivalents

Pursuant to P.R. 3-1(d), Maxell asserts that each element of each claim is literally present in each of the Accused Instrumentalities. To the extent any claim limitation is found not to be literally present, Maxell asserts that such limitation is present under the doctrine of equivalents in each of the Accused Instrumentalities. By asserting that a claim element may be present under the doctrine of equivalents, Maxell does not waive its right to assert literal infringement of that claim element. Additional, exemplary information about infringement under the doctrine of equivalents is set forth in the attached claim charts at Appendices 1-10.

E. P.R. 3-1(e): Priority Based on Earlier Applications

Pursuant to P.R. 3-1(e), Maxell asserts that the patents-in-suit are entitled to claim priority to at least the following applications:

Asserted Patent	Priority Applications
'487 Patent	Japanese Patent Appln. No. 2002-034515 (filed Feb. 12, 2002) U.S. Appl No. 10/360,713 (filed on Feb. 10, 2003); Prior Publication Data U.S. Patent AppIn. No. 2003/0169716 A1 (filed Sept. 11, 2003)
'503 Patent	Japanese Patent Appln. No. 9-105744 (filed April 23, 1997) U.S. Appl No.: 11/011,189 (filed on Dec. 15, 2004) ; Prior Publication Data U.S. Patent AppIn. No. 2005/0111171 A1 (filed May 26, 2005) Continuation of U.S. Patent Application Ser. No. 10/178,745 (filed June 25, 2002) now U.S. Patent No. 6,898,078,

	which is a continuation of U.S. Patent Application Ser. No. 09/788,529 (filed 21, 2001) now U.S. Patent No. 6,606,243, which is a continuation of U.S. Patent Application Ser. No. 09/063,444 (filed April 21, 1998) now U.S. Patent No. 6,201,693
'086 Patent	Japanese Patent Appln. No. 2011-025576 (filed Feb. 9, 2011) U.S. Appl. No. 14/154,993 (filed on Jan. 14, 2014); Prior Publication Data U.S. Patent Appln. No. 2014/0125621 A1 (filed May 8, 2014) continuation of application No. 13/366,983 (filed on Feb. 6, 2012) now Patent No. 8,654,093, which claims the benefit of Japanese Patent AppIn Ser. No. JP2011-0255576.
'306 Patent	Japanese Patent Appln. No. 2000-005858 (filed on Jan. 7, 2000) U.S. Appl. No. 09/755,878 (filed on Jan. 4, 2001); Prior Publication Data U.S. Patent AppIn. No. 2001/0014616 A1 (filed on August 16, 2001)
'140 Patent	Japanese Patent Appln. No. 2000-321918 (filed October 17, 2002) U.S. Appl. No. 09/842,913 (filed on Apr. 27, 2001); Prior Publication Data U.S. Patent AppIn. No. 2002/0045445 A1 (filed on Apr. 18, 2002)
'810 Patent	Japanese Patent AppIn. No. 2000-081706 (filed on Mar. 17, 2000) U.S. AppIn. No. 11/221,810 (filed on Sept. 9, 2005); Prior Publication Data: U.S. Patent AppIn No. 2006/0008249 A1 (filed on Jan. 12, 2006) Division of App. No. 09/797,723 (filed on Mar. 5, 2001) now Pat. No. 6,954,583
'897 Patent	Japanese Patent Appln. No. P11-189868 (filed on May 7, 1999) U.S. Appl. No. 12/124,229 (filed on May 21, 2008); Prior Publication Data: U.S. Patent AppIn. No. 2009/0116820 A1 (filed on May 7, 2009) continuation of application No. 10/191,551 (filed on Jul. 10, 2002) now Patent No. 7,457,529 which is a continuation of application No. 09/446,338 (filed on Dec. 20, 1999) now Patent No. 6,424,795
'068 Patent	Japanese Patent Appln. No. 9-212880 (filed Aug. 7, 1997) U.S. Appl. No. 09/810,405 (Filed on Mar. 19, 2001) related Application Data: U.S. Patent Appln. No. 09/810405 (filed Mar. 19, 2001) continuation of application No. 09/121,336 (filed on Jul. 24, 1998)
'334 Patent	Japanese Patent Appln. No. P10-318689 (filed Nov. 10, 1998) U.S. Application No: 10,142,051 (filed on May 10, 2002); Prior Publication: U.S. Patent AppIn No. 2002/0132587 A1 (filed on September 19, 2002) continuation of application No. 09/436,502 filed on Nov. 9, 1999 now Pat. No. 6,408, 193.
'517 Patent	Japanese Patent Appin. No. 2000-006064 (filed on Jan. 11, 2000) U.S. AppIn No. 14/661,227 (filed on Mar. 18, 2015); Prior Publication: U.S. Patent AppIn. No. 2015/0195468 A1 (filed on Jul. 9, 2015) continuation of app No. 14/264,243 (filed on Apr. 29, 2014) now Pat. No. 9,100,604 continuation of application no. 13/681,495, (filed on Nov. 20, 2012) now Pat No. 8,736,729 which

	is a continuation of application No. 12/845,266 (file don Jul. 28, 2010) now Pat No. 8,339,493 which is a continuation of application no. 10/660,710 (filed on Sept. 12, 2003) now Pat. No. 8,059,177, which is a division of application No. 09/520,836 (filed on Mar. 8, 2000) now Pat. No. 6,765,616.
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Maxell further directs Huawei to the patents themselves and the file histories, which contain information regarding the patents' priority dates.

F. P.R. 3-1(f): Identification of Any Maxell Instrumentalities that Practice Claimed Inventions

Pursuant to P.R. 3-1(f), Maxell states that it is not presently aware of any of its own apparatuses, products, devices, processes, methods, acts, or other instrumentalities that practice the claimed inventions of the patents-in-suit.

G. P.R. 3-1(g): Source Code

Pursuant to P.R. 3-1(g), Maxell asserts the following with respect to the patents-in-suit. Claims 1-5 of the '487 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '487 Patent.

Claims 1-3, 6, 10, 11, 12, 15, 19, 20, 21, 24, 25, and 26 of the '503 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '503 Patent.

Claims 1 and 4 of the '086 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement

contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '086 Patent.

Claims 2, 5, 6, 13, 14, and 15 of the '306 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '306 Patent.

Claims 1, 3, 4 of the '140 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '140 Patent.

Claim 1 of the '810 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '810 Patent.

Claims 10-12 of the '897 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '897 Patent.

Claims 1-2 of the '068 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '068 Patent.

Claims 4 and 6 of the '334 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '334 Patent.

Claims 8-11 of the '517 Patent recite functionality that is implemented by using a combination of hardware and software. Thus, Maxell intends to supplement its infringement contentions after Huawei and/or third parties produce adequate source code for each of the products accused of infringing the '517 Patent.

H. Document Production Accompanying Disclosure

Pursuant to P.R. 3-2, Maxell hereby discloses the following documents accompanying its Disclosure of Asserted Claims and Infringement Contentions that correspond to the following categories:

P.R. 3-2(a): Based on its reasonable search and investigation, Maxell states that it does not have any documents that fall within this category.

P.R. 3-2(b): Based on its reasonable search and investigation, Maxell states that it does not have any documents that fall within this category.

P.R. 3-2(c): A copy of the file histories is being produced concurrently herewith at Bates Nos. MAXELL_HU-ZTEII0005335 through MAXELL_HU-ZTEII0007390.

Dated: September 6, 2018

By: /s/ Jamie B. Beaber

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CERTIFICATE OF SERVICE

I hereby certify that on September 4, 2018, I caused a copy of PLAINTIFF MAXELL LTD.'S PATENT RULE 3-1 AND 3-2 DISCLOSURE OF ASSERTED CLAIMS AND INFRINGEMENT CONTENTIONS THE AGAINST HUAWEI DEFENDANTS to be served on counsel of record via Accellion on the following email addresses: kradamo@kirkland.com, bryan.hales@kirkland.com, brent.ray@kirkland.com, ryan.hubbard@kirkland.com, kristina.hendricks@kirkland.com, nikhil.krishnan@kirkland.com, jainsworth@wilsonlawfirm.com.

Dated: September 6, 2018

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Jamie B. Beaber

APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement
4. [4.preamble.a] A method of controlling a cellular telephone used in a CDMA system,	Each of the Accused Huawei '334 Products¹ carries out a method of controlling a cellular telephone used in a CDMA system. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that accused devices each execute a method of controlling a cellular telephone used in a CDMA system). Each of these accused devices is a cellular telephone, “tablet,” or similar device used in a CDMA system, such as WCDMA and TD-SCDMA. <i>See id.</i> As one example of Huawei’s infringement, the Huawei Mate 10 is a cellular telephone used in a CDMA system:

¹ The Accused Huawei '334 Products include each of the MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite.

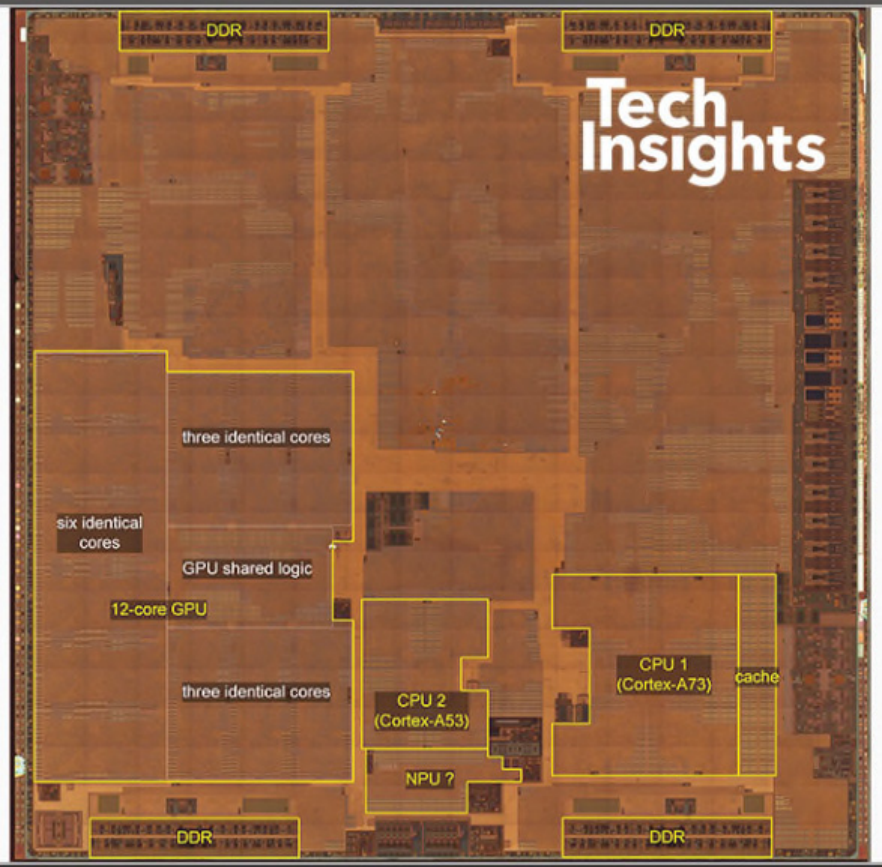
APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement
	NETWORK ALP-L09: FDD-LTE: Band 1/2/3/4/5/6/7/8/9/12/17/18/19/20/26/28 TD-LTE: Band 34/38/39/40 UMTS(WCDMA)/HSPA + /DC-HSDPA: Band 1/2/4/5/6/8/19 TD-SCDMA: Band 34/39 GSM/EDGE: 850/900/1800/1900MHz ALP-L29: SIM1: FDD-LTE: Band 1/2/3/4/5/6/7/8/9/12/17/18/19/20/26/28 TD-LTE: Band 34/38/39/40 UMTS(WCDMA)/HSPA + /DC-HSDPA: Band1/2/4/5/6/8/19 TD-SCDMA: Band 34/39 GSM/EDGE: 850/900/1800/1900MHz SIM2: FDD-LTE: Band 1/2/3/4/5/6/7/8/9/12/17/18/19/20/26/28 TD-LTE: Band 34/38/39/40 UMTS(WCDMA): Band 1/2/4/5/6/8/19 GSM/EDGE: 850/900/1800/1900MHz (http://consumer.huawei.com/en/phones/mate10/specs/ (annodations added).) As shown by Huawei’s promotional website, the Huawei Mate 10 is configured to operate in a CDMA system such as CDMA, WCDMA or UMTS and TD-SCDMA. (<i>Id.</i>) In addition, the Huawei Mate 10 includes a “Kirin 970 Octa-Core CPU” that controls the operations of the device. (<i>Id.</i>) A teardown of the Huawei Mate 10 performed by third party Tech Insights confirms that the Mate 10 uses a Kirin 970 CPU as the “application processor.” (http://www.techinsights.com/about-techinsights/overview/blog/huawei-

APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement
	mate-10-teardown/ .) The following image shows an annotated die photo of the Kirin 970 taken by third party Tech Insights:

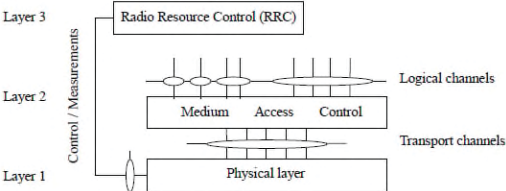
APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement
	 The image is a micrograph of a processor die, likely from a mobile device, showing various functional blocks. The die is rectangular with a complex internal layout of circuitry. Several components are highlighted with yellow boxes and labeled: DDR: Four memory modules are located at the top-left, top-right, bottom-left, and bottom-right corners of the die. three identical cores: A label pointing to a cluster of three cores in the upper-middle section. six identical cores: A label pointing to a larger cluster of six cores on the left side. GPU shared logic: A label pointing to a block between the core clusters. 12-core GPU: A label pointing to a large block in the lower-left area. three identical cores: A label pointing to another cluster of three cores in the lower-middle section. CPU 2 (Cortex-A53): A label pointing to a block in the lower-middle section, below the three-core cluster. NPU ?: A label pointing to a block below CPU 2. CPU 1 (Cortex-A73): A label pointing to a block on the right side. cache: A label pointing to a block adjacent to CPU 1. The text "Tech Insights" is visible in the upper right quadrant of the die image.

APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement
	As the central processing unit (CPU) for the Mate 10, the Kirin 970 CPU controls the operations of the Mate 10. The CPUs or similar processing units in the remaining Accused Huawei '334 Products likewise control the operations of each accused device. Likewise, the User Guide for the Huawei Mate 10 confirms that the Mate 10 can connect to a variety of mobile networks: Basic Calling Functions Make Calls On the dialer screen, enter part of the phone number or the first letter or pinyin initials of the contact's name. Your Phone will automatically search for the relevant contacts. Open  Dialer. From the dialer screen, enter the phone number or the first letter or pinyin initials of the contact's name (for example, enter hwkf for Huawei customer service). Your device will automatically search Contacts, call logs, and the yellow pages. Touch the contact you want to call in the list. If you have a dual-SIM device, touch  or  to make the call. You can check your contact's status on your screen (such as ringing or call forwarding enabled). Touch  to hang up. Press the power button to hang up: Accidentally dialed the wrong number and hid the calling screen, and want to hang up quickly? You can set Power button ends call. On the Dialer screen, go to  > Settings, and enable Power button ends call to quickly hang up calls. (Huawei Mate 10 User Guide at 44.) Connecting using mobile data  Before using mobile data, ensure that you have a data plan with your carrier to avoid incurring excessive data charges. 1 Swipe down from the status bar to open the notification panel. 2 Touch  to enable mobile data.  When you don't need to access the Internet, disable mobile data to save battery power and reduce data usage. (<i>Id.</i> at 125.) In particular, the Accused Huawei '334 Products are believed to support and implement one or more versions of 3GPP/ETSI technical specification TS 25.101 specification for

APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement
	User Equipment radio transmission and reception for UMTS, TS 25.133 requirements for support of radio resource management for UMTS, TS 25.211 specification for physical channels and mapping of transport channels onto physical channels for UMTS, TS 25.212 specification for multiplexing and channel coding for UMTS, TS 25.214 physical layer procedures for UMTS, TS 25.321 medium access control (MAC) protocol specification for UMTS. Compliance with UMTS requires each the Accused Huawei '334 Products to implement a Code Division Multiple Access to operate in a CDMA system. 4.1.1 General Protocol Architecture Radio interface which is prescribed by this specification means the Uu point between User Equipment (UE) and network. The radio interface is composed of Layers 1, 2 and 3. Layer 1 is based on WCDMA/TD-SCDMA technology and the TS 25.200 series describes the Layer-1 specification. Layers 2 and 3 of the radio interface are described in the TS 25.300 series.  Figure 1: Radio interface protocol architecture around the physical layer TS 25.201 version 10.0.0, § 4.1.1

APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement
	4.2.1 Multiple Access The access scheme is Direct-Sequence Code Division Multiple Access (DS-CDMA) with information either spread over approximately 5 MHz (FDD and 3.84 Mcps TDD) bandwidth, thus also often denoted as Wideband CDMA (WCDMA) due that nature, 10MHz (7.68 Mcps TDD) bandwidth, or 1.6MHz (1.28Mcps TDD), thus also often denoted as Narrowband CDMA. UTRA has two modes, FDD (Frequency Division Duplex) & TDD (Time Division Duplex), for operating with paired and unpaired bands respectively. The possibility to operate in either FDD or TDD mode allows for efficient utilisation of the available spectrum according to the frequency allocation in different regions. FDD and TDD modes are defined as follows: FDD: A duplex method whereby uplink and downlink transmissions use two separated radio frequencies. In the FDD, each uplink and downlink uses the different frequency band. A pair of frequency bands which have specified separation shall be assigned for the system. TDD: A duplex method whereby uplink and downlink transmissions are carried over same radio frequency by using synchronised time intervals. In the TDD, time slots in a physical channel are divided into transmission and reception part. Information on uplink and downlink are transmitted reciprocally. UTRA TDD has three options, the 3.84Mcps option and the 1.28Mcps option, the 7.68Mcps TDD option. In UTRA TDD there is TDMA component in the multiple access in addition to DS-CDMA. Thus the multiple access has been also often denoted as TDMA/CDMA due to the added TDMA nature. A 10 ms radio frame is divided into 15 slots (2560 chip/slot at the chip rate 3.84 Mcps). A physical channel is therefore defined as a code (or number of codes) and additionally in TDD mode the sequence of time slots completes the definition of a physical channel. In FDD, for HS-DSCH, E-DCH and associated signalling channels, 2ms sub-frames consisting of 3 slots are defined. TS 25.201 version 10.0.0, § 4.2.1
[4.preamble.b] said cellular telephone including a transmitter having a variable amplitude amplifier and a power amplifier,	Each of the Accused Huawei '334 Products includes a transmitter that has a variable amplitude/gain amplifier and a power amplifier. <i>See, e.g.,</i> User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that accused devices are capable of transmitting data and signals and thus have a transmitter). As an example of a transmitter, each of the Accused Huawei '334 Products contains RF transmitting circuits for converting modulated signals into RF transmit signals to be transmitted by an antenna of the Accused Huawei '334 Product in accordance with the

APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement
	CDMA, UMTS, WCDMA, specifications. One or more processors within the Accused Huawei '334 Products is configured to change the output power of RF amplifiers such as RF power amplifiers with step sizes of 1, 2, and 3dB according a value of a TPC (transmit power control) commands received from the network. As a further example of a transmitter circuit, each of the Accused Huawei '334 Products incorporates a RF power amplifier for amplifying RF signals to be transmitted by the antenna in accordance with the requirements of the standards. For example, for UMTS/WCDMA: 6 Transmitter characteristics 6.1 General Unless otherwise stated, the transmitter characteristics are specified at the antenna connector of the UE. For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed. Transmitter characteristics for UE(s) with multiple antennas/antenna connectors are FFS. <i>ETSI</i> 3GPP TS 25.101 version 10.2.0 Release 10 22 ETSI TS 125 101 V10.2.0 (2011-06) The UE antenna performance has a significant impact on system performance, and minimum requirements on the antenna efficiency are therefore intended to be included in future versions of the present document. It is recognised that different requirements and test methods are likely to be required for the different types of UE. UEs supporting DC-HSUPA shall support both minimum requirements, as well as additional requirements for DC-HSUPA. For the additional requirements for DC-HSUPA, all the parameters in clause 6 are defined using the UL E-DCH reference measurement channel, specified in subclause A.2.6. For the additional requirements for DC-HSUPA, the spacing of the carrier frequencies of the two cells shall be 5 MHz. TS 25.101, version 10.2.0, § 6.1

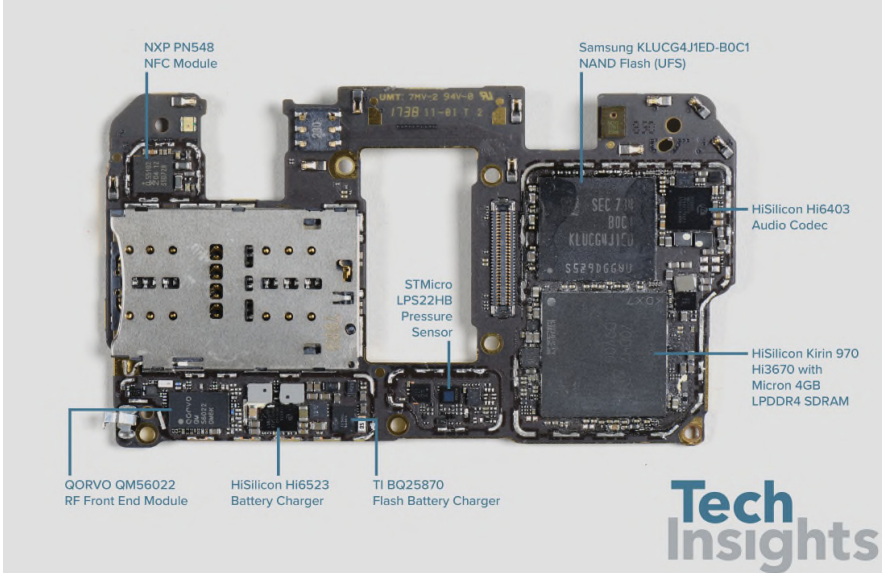
APPENDIX 9 - PRELIMINARY INFRINGEMENT CONTENTIONS OF U.S. PATENT NO. 6,973,334

U.S. Patent No. 6,973,334	Exemplary Evidence of Infringement						
	6.4.1 Open loop power control Open loop power control is the ability of the UE transmitter to sets its output power to a specific value. The open loop power control tolerance is given in Table 6.3 6.4.1.1 Minimum requirement The UE open loop power is defined as the mean power in a timeslot or ON power duration, whichever is available. Table 6.3: Open loop power control tolerance <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Conditions</th><th>Tolerance</th></tr> </thead> <tbody> <tr> <td>Normal conditions</td><td>± 9 dB</td></tr> <tr> <td>Extreme conditions</td><td>± 12 dB</td></tr> </tbody> </table> 6.4.1.1A Additional requirement for DC-HSUPA The open loop power control tolerance per carrier is given in Table 6.3. 6.4.2 Inner loop power control in the uplink Inner loop power control in the Uplink is the ability of the UE transmitter to adjust its output power in accordance with one or more TPC commands received in the downlink. 6.4.2.1 Power control steps The power control step is the change in the UE transmitter output power in response to a single TPC command, TPC_cmd, derived at the UE. 6.4.2.1.1 Minimum requirement The UE transmitter shall have the capability of changing the output power with a step size of 1, 2 and 3 dB according to the value of Δ_{TPC} or Δ_{RP-TPC}, in the slot immediately after the TPC_cmd as follows a) The transmitter output power step due to inner loop power control shall be within the range shown in Table 6.4. b) The transmitter average output power step due to inner loop power control shall be within the range shown in Table 6.3. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of TPC commands of the same duration. TS 25.101, version 10.2.0, §§ 6.4.1-6.4.2 As one example of Huawei's infringement, the Huawei Mate 10 has a transmitter having radio frequency (RF) circuits or modules that include a variable amplitude/gain amplifier and a power amplifier. On information and belief, RF circuits or modules in the Huawei Mate 10 incorporate one or more amplifiers (such as driver amplifiers, power amplifiers, narrow-band amplifiers, and up-converters) that can be adjusted to provide a desired power level. The transceivers in these products operate in conjunction with both power	Conditions	Tolerance	Normal conditions	± 9 dB	Extreme conditions	± 12 dB
Conditions	Tolerance						
Normal conditions	± 9 dB						
Extreme conditions	± 12 dB						

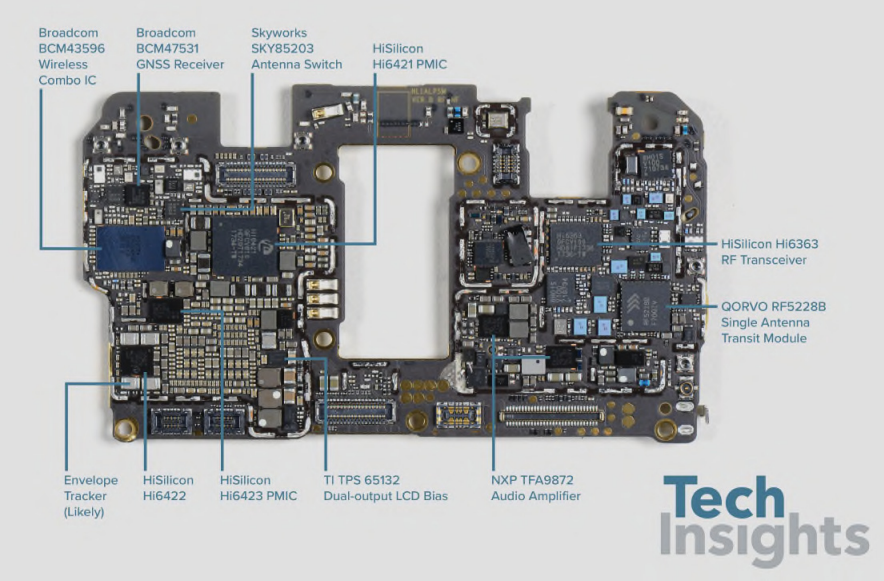
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	amplifiers and at least one variable amplitude amplifier. Thus, the variable amplitude amplifiers and the power amplifiers are part of a “transmitter” in the accused devices. For example, according to a teardown performed by third party Tech Insights, the Huawei Mate 10 includes a HiSilicon Hi6363 RF transceiver. (http://www.techinsights.com/about-techinsights/overview/blog/huawei-mate-10-teardown/.) On information and belief, this transceiver includes at least one power amplifier and variable amplitude amplifier in the transmit path. Likewise, the Huawei Mate 10 includes a Qorvo RF5228B transmit module, Qorvo QM56022 RF front-end module, and Skyworks SKY85203 antenna switch as part of the front-end transmit path:

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	 (Id.)

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	RF Front-end: Qorvo RF5228B, Qorvo QM56022, Skyworks SKY85203 Qorvo RF5228B, Single Antenna Transmit Module. The transmit module integrates GSM/EDGE coverage and antenna switch functionality. Skyworks SKY85203 Antenna Switches. Qorvo QM56022 RF Front-end Module. <i>(Id.)</i> The QM56022 RF front-end module includes power amplifiers: The QM56022 features low-band, medium-band, and high-band power amplifiers (PAs) and band-select switches in the most popular footprint for mid-tier smartphones. It delivers linearity, output power, and current consumption that meets strict operator requirements for uplink intra-band CA. The device also supports the newly emerging standard for Power Class 2/high-performance user equipment (HPUE) on Band 41. (https://www.mouser.com/qorvo-rf-flex/.) Skyworks frontend modules include power amplifiers: Front-end Modules for Cellular Designed with cost and space savings in mind, Skyworks front-end modules combine the company's industry-leading power amplifier (PA) module and switch functions into single low-cost, laminate-based multi-chip modules (MCM), 40 percent smaller than alternative solutions. Key features of the transmit front-end modules include multi-band / multi-mode power amplifiers, current sensing power control, high-linearity transmit/receive switches and all associated filtering, duplexing and control functions. Further, the new module requires no external matching components, accelerating time-to-market. Manufactured using Skyworks proprietary heterojunction bipolar transistor (HBT) power amplifier process and low-loss pseudomorphic high electron mobility transistor (PHEMT) switch technologies, front-end modules deliver superior handset talk and standby time. The Front-end Modules Feature: • Multi-band / Multi-mode power amplifier • High linearity TX/RX switches • Single multi-chip module design • Reduced handset design time • Superior handset talk and standby times

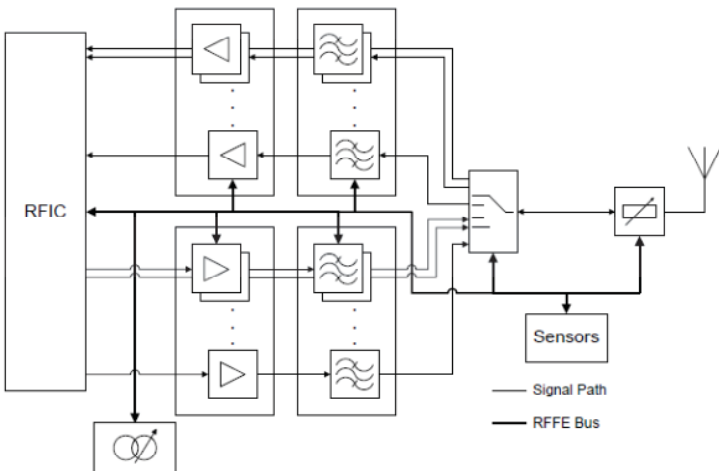
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	See http://www.skyworksinc.com/Products_FEMs_Cellular.aspx Upon information and belief the Mate 10 implements an RF Front End Control Interface similar to and/or in accordance with the MIPI Alliance Specification for RF Front-End Control Interface. See e.g., https://mipi.org/membership/board-and-contributor-members indicating that HiSilicon and Skyworks are both “contributor[s]” to the MIPI alliance specifications and components of both are included in the Mate 10: 1 Introduction 1 The RF Front-End Control Interface (later referred to as RFFE) was developed to offer a common and wide-spread method for controlling RF front-end devices. There are a variety of front-end devices, including Power Amplifiers (PA), Low-Noise Amplifiers (LNA), filters, switches, power management modules, antenna tuners and sensors. These functions may be located either in separate devices or integrated into a single device, depending on the application. MIPI Alliance Specification for RFFE Ver. 1.10 at 10.

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	4.1 Overview 86 RFFE is a two-wire, serial interface intended to be used to connect Radio Frequency ICs (RFIC) of a mobile terminal to their related Front-End Modules (FEM). The RFFE interface enables systems to efficiently control various FEMs in next generation mobile terminals with increased complexity of performance supporting multi-mode, multi-band and multiple antennas, all with a minimum number of wires and pins using a single RFFE bus. It is designed to support existing 3GPP standards such as LTE, EGPRS, UMTS, HSPA, etc. and also other, non-3GPP air interfaces. The RFFE interface is based on <i>MIPI Alliance Specification for System Power Management Interface (SPMI)</i> [MIP103]. The RFFE interface is intended to be efficient, flexible, and extensible, accommodating many variations in the overlying system design, while providing interoperability at the interface level between compliant RFICs and FEMs. The ability to design one common control interface which may be reused for all of these modules helps reduce front-end complexity, and hence speed up the time-to-market for these terminals. <i>Id.</i> at 19. 4.1.1.1 Basic 96 Figure 2 shows a Basic Configuration of an RFFE bus implementation based on a minimal topology consisting of a RFIC with one RX and one TX path connected to one antenna. The main characteristic of the Basic Configuration is that there is only one RFFE bus where all front-end components are connected. The RFIC is the Master on the RFFE bus and all front-end components act as Slaves. The TX signal path starts at the RFIC and may comprise various outputs for different radio standards or frequency bands. Depending on the detailed architecture these analog outputs may be connected to a set of different gain or power amplifiers, which usually need to be controlled. These gain or power amplifiers may be separate for each output or may also be shared for several outputs. Following the TX direction towards the antenna there are bandlimiting filters, which may be configurable for different scenarios, the antenna switch used to select RX and TX directions as well as different bands, and finally the antenna tuning-module. In addition, these components may be accompanied by various sensors for temperature, power, voltage, etc. and adjustable power supplies for the front-end components like LDOs or DC/DC converters for PAs. <i>Id.</i> at 20.

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	 Figure 2 Basic Configuration <i>Id.</i> at 21. Also on information and belief, the transmitter in each of the accused devices transforms baseband signals into RF signals to be transmitted by an antenna. For example, the transmitter in each of the Accused Huawei '334 Products converts audio signals into communication signals to be transmitted by an antenna in accordance with the WCDMA, TD-SCDMA, and CDMA1x specifications. <i>See, e.g.</i>, 3GPP TS 25.101 (v10.2.0), § 6.2.2A; 3GPP TS 26.212 (v10.1.0), § 4.1. For example, the transmitter in the Huawei Mate 10 uses one or more transceiver that incorporates one or more variable amplitude amplifier (or variable gain amplifier) to vary the amplitude so as to adjust the input to a power amplifier. For example, the transmitter in the accused device includes electronic transceiving components or transceivers for

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	processing and converting baseband signals into RF communication signals. On information and belief, those electronic transceiving components or transceivers incorporates one or more variable amplitude amplifier for amplifying the processed and/or converted signals that are eventually outputted as RF signals at the output of the transceiver. On information and belief, the output amplitude of the variable amplitude amplifier may be varied to provide a variable gain in response to a control signal from the controller. On information and belief, the power amplifier provides further amplification of the already amplified signals from the variable amplitude amplifier. Similarly, the transmitter in the Huawei Mate 10 uses a power amplifier to amplify the signal output from a variable amplitude amplifier. Indeed, it is inherent that modern cellular devices (like the Accused Huawei '334 Products) must have some means of varying or controlling the output power of signals transmitted by the phone's antenna in response to power control commands from the network. Thus, the Accused Huawei '334 Products must have a variable amplitude amplifier and a power amplifier (or equivalent components) for achieving this functionality. Discovery from Huawei (and relevant third parties) is expected to confirm that the Accused Huawei '334 Products each include a variable amplitude amplifier and a power amplifier as part of a transmitter. For example, source code documents, circuit schematics, and other technical information about Huawei's products will likely show that these products meet these limitations. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function,

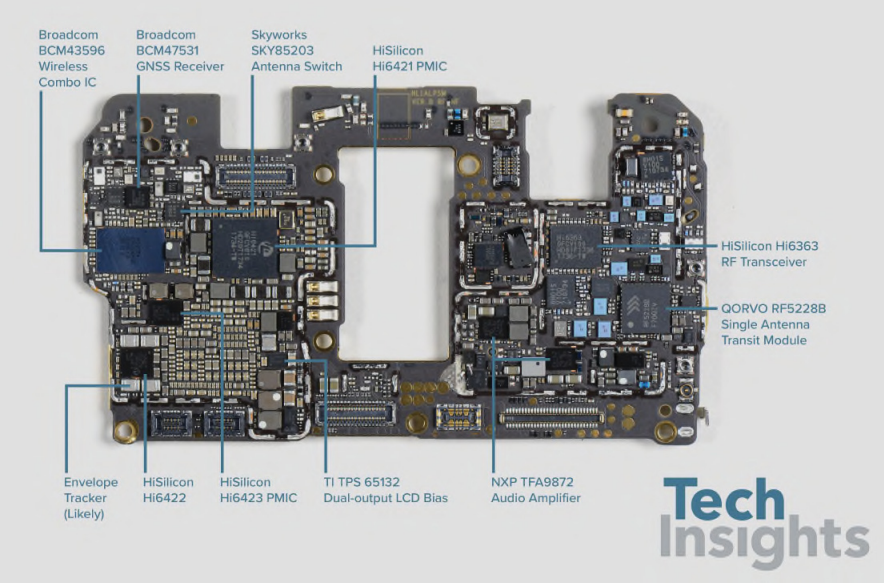
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	way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the transmitter in the Accused Huawei '334 Products does not include a variable amplitude/gain amplifier and a power amplifier, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent functions of a variable amplitude/gain amplifier and a power amplifier. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, varying amplitude and increasing signal gain) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, better, more-flexible transmission of communication signals.
[4.preamble.c] said method comprising the steps of:	See citations for claim element [4.preamble.a] and [4.preamble.b] , which are incorporated herein.
[4.a] receiving a first communication signal and a transmitting power control signal from a cell-site station,	Each of the Accused Huawei '334 Products includes a transmitter that has a variable amplitude/gain amplifier and a power amplifier. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices have an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station). As one example of Huawei's infringement, the Huawei Mate 10 has an antenna (or equivalent component) that allows the device to receive communication signals and transmitting power control signals from a cell-site (base) station:

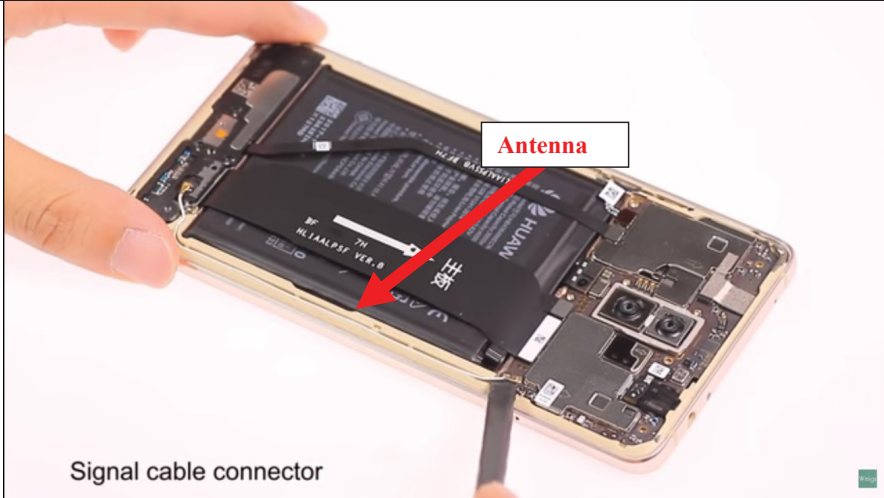
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	RF Front-end: Qorvo RF5228B, Qorvo QM56022, Skyworks SKY85203 Qorvo RF5228B, Single Antenna Transmit Module. The transmit module integrates GSM/EDGE coverage and antenna switch functionality. Skyworks SKY85203 Antenna Switches. Qorvo QM56022 RF Front-end Module. (http://www.techinsights.com/about-techinsights/overview/blog/huawei-mate-10-teardown/.)

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	 <i>(Id.)</i> The following still image taken from a third-party teardown video of the Huawei Mate 10 also shows an antenna in the device:

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	 https://www.youtube.com/watch?v=VzHGAi9cAXY at 2:31 (annotations added).) Skyworks frontend modules include power amplifiers:

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	Front-end Modules for Cellular Designed with cost and space savings in mind, Skyworks front-end modules combine the company's industry-leading power amplifier (PA) module and switch functions into single low-cost, laminate-based multi-chip modules (MCM), 40 percent smaller than alternative solutions. Key features of the transmit front-end modules include multi-band / multi-mode power amplifiers, current sensing power control, high-linearity transmit/receive switches and all associated filtering, duplexing and control functions. Further, the new module requires no external matching components, accelerating time-to-market. Manufactured using Skyworks proprietary heterojunction bipolar transistor (HBT) power amplifier process and low-loss pseudomorphic high electron mobility transistor (PHEMT) switch technologies, front-end modules deliver superior handset talk and standby time. The Front-end Modules Feature: • Multi-band / Multi-mode power amplifiers • High linearity TX/RX switches • Single multi-chip module design • Reduced handset design time • Superior handset talk and standby times See http://www.skyworksinc.com/Products_FEMs_Cellular.aspx On information and belief, the antenna and front-end components in the Huawei Mate 10 receive a first communication signal (such as data signals transmitted on a downlink channel) and a transmitting power control signal (such as a transmit power control (TPC) signal transmitted on a downlink channel) from a cell-site station (such as a base station), as evidenced by the 3GPP Standards implemented by the Huawei Mate 10. For example, it is believed that each of the Accused Huawei '334 Products supports and implements at least the UMTS (universal mobile telecommunications service) standards and relevant technical specifications promulgated by the 3GPP. In particular, these devices are believed to support and implement one or more versions of 3GPP technical specification TS 25.211, UMTS Physical Layer Procedures (FDD), such as Releases 12 and 13 of TS 25.211. TS 25.211 specifies that compliant devices (including the Accused Huawei '334 Products) have an antenna that utilizes a downlink channel (such as the dedicated channel DCH, high-speed downlink shared channel HS-DSCH, or the forward access channel FACH) to receive communication signals from a cell-site (base) station: 4.1.1.1 DCH - Dedicated Channel The Dedicated Channel (DCH) is a downlink or uplink transport channel. The DCH is transmitted over the entire cell or over only a part of the cell using e.g. beam-forming antennas.

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	3GPP TS 25.211 (v13.1.0), § 4.1.1.1. 4.1.2.7 HS-DSCH – High Speed Downlink Shared Channel The High Speed Downlink Shared Channel is a downlink transport channel shared by several UEs. The HS-DSCH can be associated with one downlink DPCH or F-DPCH, and one or several Shared Control Channels (HS-SCCH). The HS-DSCH is transmitted over the entire cell or over only part of the cell using e.g. beam-forming antennas. <i>Id.</i> at § 4.1.2.7. 4.1.2.2 FACH - Forward Access Channel The Forward Access Channel (FACH) is a downlink transport channel. The FACH is transmitted over the entire cell. The FACH can be transmitted using power setting described in [16]. <i>Id.</i> at § 4.1.2.2. TS 25.211 also specifies that the compliant devices (including the Accused Huawei '334 Products) each have an antenna that utilizes a downlink channel to receive a transmitting power control (TPC) signal. <i>See id.</i> at § 3.2 (defining “TPC” as “Transmit Power Control”). 5.3.2 Dedicated downlink physical channels Within one downlink DPCH, dedicated data generated at Layer 2 and above, i.e. the dedicated transport channel (DCH), is transmitted in time-multiplex with control information generated at Layer 1 (known pilot bits, TPC commands, and an optional TFCI). The downlink DPCH can thus be seen as a time multiplex of a downlink DPDCH and a downlink DPCCH, compare subclause 5.2.1. Figure 9 shows the frame structure of the downlink DPCH. Each frame of length 10 ms is split into 15 slots, each of length $T_{\text{slot}} = 2560$ chips, corresponding to one power-control period. <i>Id.</i> at § 5.3.2.

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	Figure 9: Frame structure for downlink DPCH <i>Id.</i> (annotations added). The Accused Huawei '334 Products also each have an antenna that transmits a second communication signal (such as data on an uplink channel) to the cell-site (base) station, as shown by the 3GPP Specifications: 5.2.1 Dedicated uplink physical channels There are seven types of uplink dedicated physical channels, the uplink Dedicated Physical Data Channel (uplink DPDCH), the uplink Dedicated Physical Control Channel (uplink DPCCH), the uplink Secondary Dedicated Physical Control Channel (uplink S-DPCCH), the uplink Dedicated Physical Control Channel 2 (uplink DPCCH2), the uplink E-DCH Dedicated Physical Data Channel (uplink E-DPDCH), the uplink E-DCH Dedicated Physical Control Channel (uplink E-DPCCH) and the uplink Dedicated Control Channel associated with HS-DSCH transmission (uplink HS-DPCCH). The DPDCH, the DPCCH, the DPCCH2, the S-DPCCH, the E-DPDCH, the E-DPCCH and the HS-DPCCH are I/Q code multiplexed (see [4]). <i>Id.</i> at § 5.2.1.

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	DPDCH Data N_{data} bits $T_{slot} = 2560$ chips, $N_{data} = 10 \times 2^k$ bits ($k=0..6$) DPCCH Pilot N_{pilot} bits TFCI N_{TFCI} bits FBI N_{FBI} bits TPC N_{TPC} bits $T_{slot} = 2560$ chips, 10 bits DPCCH2 Pilot N_{pilot} bits TPC N_{TPC} bits $T_{slot} = 2560$ chips, 10 bits S-DPCCH Pilot N_{pilot} bits $N_{FBI,slot}$ bits $T_{slot} = 2560$ chips, 10 bits

Slot #0

Slot #1

Slot #2

Slot #3

...

Slot #i

...

Slot #14

Subframe #0

Subframe #1

Subframe #2

Subframe #3

Subframe #4

1 subframe = 2 ms

1 radio frame: $T_f = 10$ ms

Figure 1: Frame structure for uplink DPDCH/DPCCH/S-DPCCH/DPCCH2

Id. at § 5.2.1.1 (annotations added).

The Accused Huawei '334 Products are also believed to support and implement one or more versions of 3GPP technical specification TS 25.212, Multiplexing and channel coding (FDD). TS 25.212 further demonstrates that the Accused Huawei '334 Products each receive a first communication signal and a transmitting power control signal from a cell-site (base) station, as recited by this limitation:

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	4.2 General coding/multiplexing of TrCHs This section only applies to the transport channels: DCH, RACH, BCH, FACH and PCH. Other transport channels which do not use the general method are described separately below. Data arrives to the coding/multiplexing unit in form of transport block sets once every transmission time interval. The transmission time interval is transport-channel specific from the set {10 ms, 20 ms, 40 ms, 80 ms}, where 80 ms TTI for DCH shall not be used unless SF=512. The following coding/multiplexing steps can be identified: - add CRC to each transport block (see subclause 4.2.1); - transport block concatenation and code block segmentation (see subclause 4.2.2); - channel coding (see subclause 4.2.3); - radio frame equalisation (see subclause 4.2.4); - rate matching (see subclause 4.2.7); - insertion of discontinuous transmission (DTX) indication bits (see subclause 4.2.9); - interleaving (two steps, see subclauses 4.2.5 and 4.2.11); - radio frame segmentation (see subclause 4.2.6); - multiplexing of transport channels (see subclause 4.2.8); - physical channel segmentation (see subclause 4.2.10); - mapping to physical channels (see subclause 4.2.12). The coding/multiplexing steps for uplink and downlink are shown in figure 1 and figure 2 respectively. 3GPP TS 25.212 (v14.0.0), § 4.2. The Accused Huawei '334 Products are also believed to support and implement one or more versions of 3GPP/ETSI technical specification TS 25.101, User Equipment (UE) radio transmission and reception (FDD). This specification further demonstrates that the Accused Huawei '334 Products (including the Huawei Mate 10) each receive a first communication signal and a transmitting power control signal from a cell-site (base) station, as recited by this limitation:

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	7 Receiver characteristics 7.1 General Unless otherwise stated the receiver characteristics are specified at the antenna connector of the UE. For UE(s) with an integral antenna only, a reference antenna with a gain of 0 dBi is assumed. UE with an integral antenna may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. For UEs with more than one receiver antenna connector the AWGN signals applied to each receiver antenna connector shall be uncorrelated. The levels of the test signal applied to each of the antenna connectors shall be as defined in the respective sections below. The UE antenna performance has a significant impact on system performance, and minimum requirements on the antenna efficiency are therefore intended to be included in future versions of the present document. It is recognised that different requirements and test methods are likely to be required for the different types of UE. 3GPP TS 25.101 (v14.0.0), § 7.1. 6 Transmitter characteristics 6.1 General Unless otherwise stated, the transmitter characteristics are specified at the antenna connector of the UE. For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed. Transmitter characteristics for UE(s) with multiple antennas/antenna connectors are FFS. The UE antenna performance has a significant impact on system performance, and minimum requirements on the antenna efficiency are therefore intended to be included in future versions of the present document. It is recognised that different requirements and test methods are likely to be required for the different types of UE. <i>Id.</i> at § 6.1. The Accused Huawei '334 Products are also believed to support and implement one or more versions of 3GPP technical specification TS 25.214, Physical Layer Procedures (FDD). For example, TS 25.214 further demonstrates that the Accused Huawei '334 Products (including the Huawei Mate 10) each receive a first communication signal and a transmitting power control signal from a cell-site (base) station, as recited by this limitation:

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	5.1.2 DPCCH/DPDCH/DPCCH2 5.1.2.1 General The initial uplink DPCCH transmit power is set by higher layers. Subsequently the uplink transmit power control procedure simultaneously and independently controls the power of a DPCCH on each activated uplink frequency and its corresponding DPDCHs (if present). The relative transmit power offset between DPCCH and DPDCHs is determined by the network and is computed according to subclause 5.1.2.5 using the gain factors signalled to the UE using higher layer signalling. The operation of the inner power control loop, described in sub clause 5.1.2.2, adjusts the power of the DPCCH and DPDCHs by the same amount, provided there are no changes in gain factors. Additional adjustments to the power of the DPCCH associated with the use of compressed mode are described in sub clause 5.1.2.3. Any change in the uplink DPCCH transmit power shall take place immediately before the start of the pilot field on the DPCCH. The change in DPCCH power with respect to its previous value is derived by the UE and is denoted by Δ_{DPCCH} (in dB). The previous value of DPCCH power shall be that used in the previous slot, except in the event of an interruption in transmission due to the use of compressed mode or discontinuous uplink DPCCH transmission operation, when the previous value shall be that used in the last slot before the transmission gap. If the DTX enhancements is configured, the initial UL DPCCH transmit power value after a transmission gap on the secondary uplink carrier if configured, shall be calculated according to subclause 5.1.2.2.1.3. During the operation of the uplink power control procedure the UE transmit power shall not exceed a maximum allowed value which is the lower out of the maximum output power of the terminal power class and a value which may be set by higher layer signalling. Uplink power control shall be performed while the UE transmit power is below the maximum allowed output power. The provisions for power control at the maximum allowed value and below the required minimum output power (as defined in [7]) are described in subclause 5.1.2.6. TS 25.214 (v14.0.0), § 5.1.2. Discovery from Huawei is expected to confirm that the Accused Huawei '334 Products implement the 3GPP standards and operate in accordance with these standards, thus meeting this limitation as shown here. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order.

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	To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the Accused Huawei '334 Products do not have the capability to receive a first communication signal and a transmitting power control signal from a cell-site station, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent function of receiving signals from a cell-site (base) station. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, receiving signals from a cell-site (base) station) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, the transmission of information and signals between the cell-site (base) station and the cellular device.
[4.b] generating a power control signal derived from said transmitting power control signal received from said cell-site station,	Each of the Accused Huawei '334 Products generates a power control signal derived from said transmitting power control signal received from said cell-site station. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices vary power output, thereby showing that the devices generate a power control signal derived from a cell-site (base) station). For example, each of the Accused Huawei '334 Products is believed to support and implement one or more versions of 3GPP/ETSI technical specification TS 25.214, Physical Layer Procedures (FDD). TS 25.214 demonstrates that the accused devices have the functionality recited by this limitation. As one example of Huawei's infringement, the Huawei Mate 10 generates a power control signal derived from the transmitting

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	power control signal received from a cell-site (base) station. For example, each of the Accused Huawei '334 Products performs power control including uplink power control in accordance with power control adjustment sent by a network. The Accused Huawei '334 Products derive a power control step size from TPC commands received from the network. 5.1.2 DPCCH/DPDCH 5.1.2.1 General The initial uplink DPCCH transmit power is set by higher layers. Subsequently the uplink transmit power control procedure simultaneously and independently controls the power of a DPCCH on each activated uplink frequency and its corresponding DPDCHs (if present). The relative transmit power offset between DPCCH and DPDCHs is determined by the network and is computed according to subclause 5.1.2.5 using the gain factors signalled to the UE using higher layer signalling. The operation of the inner power control loop, described in sub clause 5.1.2.2, adjusts the power of the DPCCH and DPDCHs by the same amount, provided there are no changes in gain factors. Additional adjustments to the power of the DPCCH associated with the use of compressed mode are described in sub clause 5.1.2.3. Any change in the uplink DPCCH transmit power shall take place immediately before the start of the pilot field on the DPCCH. The change in DPCCH power with respect to its previous value is derived by the UE and is denoted by Δ_{DPCCH} (in dB). The previous value of DPCCH power shall be that used in the previous slot, except in the event of an interruption in transmission due to the use of compressed mode or discontinuous uplink DPCCH transmission operation, when the previous value shall be that used in the last slot before the transmission gap. During the operation of the uplink power control procedure the UE transmit power shall not exceed a maximum allowed value which is the lower out of the maximum output power of the terminal power class and a value which may be set by higher layer signalling. Uplink power control shall be performed while the UE transmit power is below the maximum allowed output power. The provisions for power control at the maximum allowed value and below the required minimum output power (as defined in [7]) are described in sub-clause 5.1.2.6. TS 25.214, § 5.1.2.

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	Upon reception of one or more TPC commands in a TPC command combining period, the UE shall derive a single TPC command, TPC_cmd, for each TPC command combining period in which a TPC command is known to be present, combining multiple TPC commands if more than one is received in a TPC command combining period. The TPC command combining period has a length of one slot, beginning at the downlink slot boundary for DPCH, and 512 chips after the downlink slot boundary for F-DPCH. The UE shall ignore any TPC commands received in an F-DPCH slot starting during an uplink DPCCCH slot which is in an uplink DPCCCH transmission gap as defined in subclause 6C.2. TS 25.214, § 5.1.2.2.1. The step size Δ_{TPC} is a layer 1 parameter which is derived from the UE-specific higher-layer parameter "TPC-StepSize" which is under the control of the UTRAN. If "TPC-StepSize" has the value "dB1", then the layer 1 parameter Δ_{TPC} shall take the value 1 dB and if "TPC-StepSize" has the value "dB2", then Δ_{TPC} shall take the value 2 dB. The parameter "TPC-StepSize" only applies to Algorithm 1 as stated in [5]. For Algorithm 2 Δ_{TPC} shall always take the value 1 dB. After deriving of the combined TPC command TPC_cmd using one of the two supported algorithms, the UE shall adjust the transmit power of the uplink DPCCCH with a step of Δ_{DPCCCH} (in dB) which is given by: $\Delta_{DPCCCH} = \Delta_{TPC} \times TPC_cmd.$ TS 25.214, § 5.1.2.2.1. In addition, each of the Accused Huawei '334 Products (including the Huawei Mate 10) is configured to derive a power control command from the transmitting power control signal (TPC) sent from the cell-site (base) station, as required by the 3GPP/ETSI standards. For example, each of the Accused Huawei '334 Products derives a power control step in response to a TPFC command received from the network and provides corresponding power control signals to RF transmitter components to control the transmitter output power.

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	6.4.2 Inner loop power control in the uplink Inner loop power control in the Uplink is the ability of the UE transmitter to adjust its output power in accordance with one or more TPC commands received in the downlink. 6.4.2.1 Power control steps The power control step is the change in the UE transmitter output power in response to a single TPC command, TPC_cmd, derived at the UE. 6.4.2.1.1 Minimum requirement The UE transmitter shall have the capability of changing the output power with a step size of 1, 2 and 3 dB according to the value of Δ_{TPC} or Δ_{2P_TPC} in the slot immediately after the TPC_cmd as follows - The transmitter output power step due to inner loop power control shall be within the range shown in Table 6.4. - The transmitter average output power step due to inner loop power control shall be within the range shown in Table 6.5. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of TPC commands of the same duration. The inner loop power step is defined as the relative power difference between the mean power of the original (reference) timeslot and the mean power of the target timeslot, not including the transient duration. The transient duration is from 25μs before the slot boundary to 25μs after the slot boundary. 3GPP TS 25.101 (v10.2.0), § 6.4.2. Skyworks frontend modules include power amplifiers: Front-end Modules for Cellular Designed with cost and space savings in mind, Skyworks front-end modules combine the company's industry-leading power amplifier (PA) module and switch functions into single low-cost, laminate-based multi-chip modules (MCM), 40 percent smaller than alternative solutions. Key features of the transmit front-end modules include multi-band / multi-mode power amplifiers, current sensing power control, high-linearity transmit/receive switches and all associated filtering, duplexing and control functions. Further, the new module requires no external matching components, accelerating time-to-market. Manufactured using Skyworks proprietary heterojunction bipolar transistor (HBT) power amplifier process and low-loss pseudomorphic high electron mobility transistor (PHEMT) switch technologies, front-end modules deliver superior handset talk and standby time. The Front-end Modules Feature: - Multi-band / Multi-mode power amplifiers - High linearity TX/RX switches - Single multi-chip module design - Reduced handset design time - Superior handset talk and standby times

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	See http://www.skyworksinc.com/Products_FEMs_Cellular.aspx Upon information and belief the Mate 10 implements an RF Front End Control Interface similar to and/or in accordance with the MIPI Alliance Specification for RF Front-End Control Interface. See e.g., https://mipi.org/membership/board-and-contributor-members indicating that HiSilicon and Skyworks are both “contributor[s]” to the MIPI alliance specifications and components of both are included in the Mate 10:  1 Introduction 1 The RF Front-End Control Interface (later referred to as RFFE) was developed to offer a common and wide-spread method for controlling RF front-end devices. There are a variety of front-end devices, including Power Amplifiers (PA), Low-Noise Amplifiers (LNA), filters, switches, power management modules, antenna tuners and sensors. These functions may be located either in separate devices or integrated into a single device, depending on the application. MIPI Alliance Specification for RFFE Ver. 1.10 at 10.

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	4.1 Overview 86 RFFE is a two-wire, serial interface intended to be used to connect Radio Frequency ICs (RFIC) of a mobile terminal to their related Front-End Modules (FEM). The RFFE interface enables systems to efficiently control various FEMs in next generation mobile terminals with increased complexity of performance supporting multi-mode, multi-band and multiple antennas, all with a minimum number of wires and pins using a single RFFE bus. It is designed to support existing 3GPP standards such as LTE, EGPRS, UMTS, HSPA, etc. and also other, non-3GPP air interfaces. The RFFE interface is based on <i>MIPI Alliance Specification for System Power Management Interface (SPMI)</i> [MIPI03]. The RFFE interface is intended to be efficient, flexible, and extensible, accommodating many variations in the overlying system design, while providing interoperability at the interface level between compliant RFICs and FEMs. The ability to design one common control interface which may be reused for all of these modules helps reduce front-end complexity, and hence speed up the time-to-market for these terminals. <i>Id.</i> at 19. 4.1.1.1 Basic 96 Figure 2 shows a Basic Configuration of an RFFE bus implementation based on a minimal topology consisting of a RFIC with one RX and one TX path connected to one antenna. The main characteristic of the Basic Configuration is that there is only one RFFE bus where all front-end components are connected. The RFIC is the Master on the RFFE bus and all front-end components act as Slaves. The TX signal path starts at the RFIC and may comprise various outputs for different radio standards or frequency bands. Depending on the detailed architecture these analog outputs may be connected to a set of different gain or power amplifiers, which usually need to be controlled. These gain or power amplifiers may be separate for each output or may also be shared for several outputs. Following the TX direction towards the antenna there are bandlimiting filters, which may be configurable for different scenarios, the antenna switch used to select RX and TX directions as well as different bands, and finally the antenna tuning-module. In addition, these components may be accompanied by various sensors for temperature, power, voltage, etc. and adjustable power supplies for the front-end components like LDOs or DC/DC converters for PAs. <i>Id.</i> at 20. In accordance with these power control steps, the Accused Huawei '334 Products generate power control signals in order to carry out power control including closed loop power control or inner loop power control. Discovery from Huawei (and relevant third parties) is expected to confirm that the Accused Huawei '334 Products implement the 3GPP standards and operate in

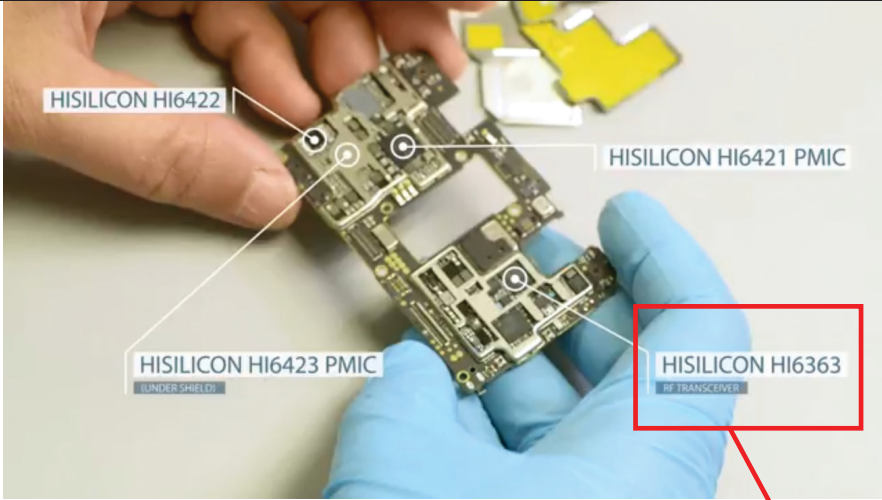
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	accordance with these standards, thus meeting this limitation. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the Accused Huawei '334 Products do not generate a power control signal derived from the transmitting power control signal received from the cell-site station, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent function of generating power control signals derived from signals sent by and received from a cell-site (base) station. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, generating power control signals derived from signals received from a cell-site (base) station) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, creating a received power control signal to carry out the power control instructions contained in that signal.
[4.c] converting said first communication signal received from a cell-site station into a voice signal code,	Each of the Accused Huawei '334 Products covert the first communication signal received from a cell-site station into a voice signal code. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite,

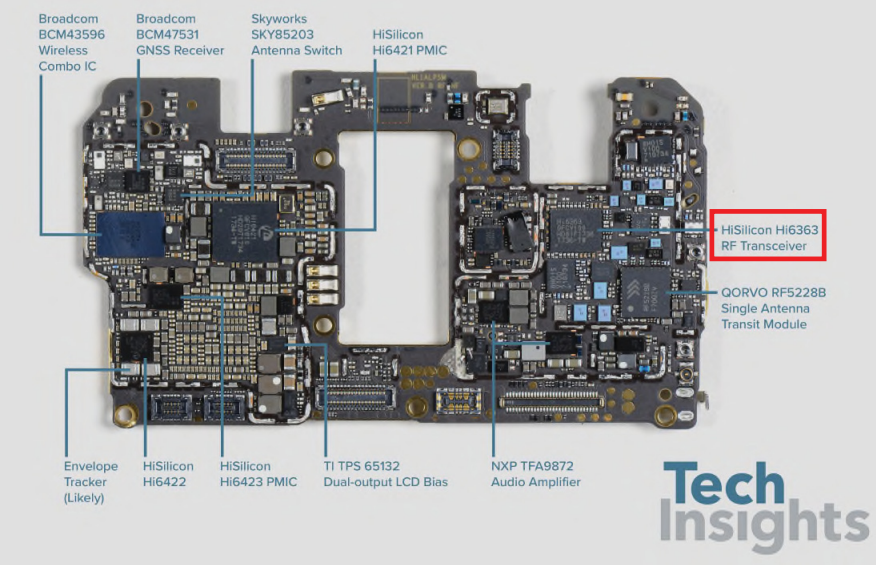
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	Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices can send and receive voice calls, thus showing that each device converts communication signals into voice signal code). As one example of Huawei's infringement, the Huawei Mate 10 converts the first communication signal into a voice signal code. On information and belief, this device includes RF components, modules, or circuits that convert RF signals received at the antenna into digital signals that contain, for example, digital data or signal codes that represent voice signals. This functionality is apparent from the Mate 10's ability to make and receive phone calls: Basic Calling Functions Make Calls On the dialer screen, enter part of the phone number or the first letter or pinyin initials of the contact's name. Your Phone will automatically search for the relevant contacts. Open  Dialer. From the dialer screen, enter the phone number or the first letter or pinyin initials of the contact's name (for example, enter hwkf for Huawei customer service). Your device will automatically search Contacts, call logs, and the yellow pages. Touch the contact you want to call in the list. If you have a dual-SIM device, touch  or  to make the call. You can check your contact's status on your screen (such as ringing or call forwarding enabled). Touch  to hang up. Press the power button to hang up: Accidentally dialed the wrong number and hid the calling screen, and want to hang up quickly? You can set Power button ends call. On the Dialer screen, go to  > Settings, and enable Power button ends call to quickly hang up calls. (Huawei Mate 10 User Guide at 44.) In addition, the previously mentioned third-party teardown report and video confirm that the Mate 10 includes an RF transceiver and associated circuitry that coverts communication signals into voice signal code:

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	 (https://www.youtube.com/watch?v=LQwkUqbZda0 at 1:14.) HISILICON HI6363 RF Tranceiver

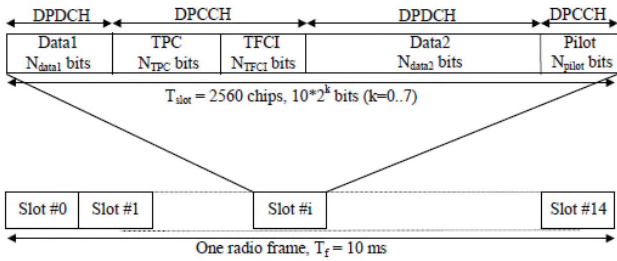
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	 (<i>Id.</i> (annotations added).) The Huawei Mate 10 is configured to convert the first communication signal to data including a voice signal code. On information and belief, this device transforms RF signals received by the antenna into baseband signals that contains the voice signal code. Each of the Accused Huawei '334 Products converts signals received through an antenna into digital signal codes or baseband signals, which is a digital representation of speech or voice signals in accordance with the WCDMA and TD-SCDMA specifications. Further, on information and belief, each of the Accused Huawei '334 Products supports and implements at least the UMTS standards and relevant technical specifications

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	promulgated by the 3GPP. In particular, these devices are believed to support and implement one or more versions of 3GPP technical specifications TS 25.101, TS 25.211, and TS 25.212, as explained earlier. These specifications require that the accused devices convert communication signals into voice signal code: 7 Receiver characteristics 7.1 General Unless otherwise stated the receiver characteristics are specified at the antenna connector of the UE. For UE(s) with an integral antenna only, a reference antenna with a gain of 0 dBi is assumed. UE with an integral antenna may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. For UEs with more than one receiver antenna connector the AWGN signals applied to each receiver antenna connector shall be uncorrelated. The levels of the test signal applied to each of the antenna connectors shall be as defined in the respective sections below. 3GPP TS 25.101 (v10.2.0), § 7.1. Within one downlink DPCH, dedicated data generated at Layer 2 and above, i.e. the dedicated transport channel (DCH), is transmitted in time-multiplex with control information generated at Layer 1 (known pilot bits, TPC commands, and an optional TFCD). The downlink DPCH can thus be seen as a time multiplex of a downlink DPDCH and a downlink DPCCH, compare subclause 5.2.1. Figure 9 shows the frame structure of the downlink DPCH. Each frame of length 10 ms is split into 15 slots, each of length $T_{slot} = 2560$ chips, corresponding to one power-control period. 3GPP TS 25.211 (v10.0.0), § 5.3.2.

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	 Figure 9: Frame structure for downlink DPCH <i>Id.</i> On information and belief, each of the Accused Huawei '334 Products incorporates a modem to demodulate received signals that are converted to audio signals codes (e.g. digital codes) further processing by voice codecs. On information and belief the modem includes processor and/or circuits for demodulating the first communication signal from a cell-site station and extracting a voice signal code from the demodulated first communication signals.

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	The new LTE modem incorporated in the SoC introduces support for 4 component carriers (4CC) for LTE versus 3CC on its older chipsets, which essentially adds extra channels for data throughput when using LTE-Advanced carrier aggregation technologies. This also has the added benefit of adding 6dB of signal coverage over 3CC, meaning faster speeds while roaming away from cell towers. On today's fastest networks, this allows the modem to hit peak data speeds of 600Mbps. <i>HiSilicon has its own CDMA solution, so it won't need Qualcomm licenses to sell phones on networks like Verizon.</i> (https://www.androidauthority.com/hisilicon-kirin-960-soc-close-look-724326/) In other words, the Kirin 960's LTE modem supports Category 12 download, with 4x carrier aggregation, 4x4 MIMO, 256QAM spatial stream modulation, and download speeds of up to 600Mbps. The SoC also boasts Category 13 upload capabilities, which tops out at 150Mbps. This is right in the same category as the Snapdragon 820 and the Exynos 8890. (https://www.androidauthority.com/hisilicon-kirin-960-soc-close-look-724326/)

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	<table><tr><th colspan="4">HiSilicon High-End Kirin SoC Lineup</th></tr><tr><th>SoC</th><th>Kirin 960</th><th>Kirin 955</th><th>Kirin 950</th></tr><tr><td>CPU</td><td>4x Cortex-A73 @ 2.36GHz 4x Cortex-A53 @ 1.84GHz</td><td>4x Cortex-A72 @ 2.52GHz 4x Cortex-A53 @ 1.81GHz</td><td>4x Cortex-A72 @ 2.30GHz 4x Cortex-A53 @ 1.81GHz</td></tr><tr><td>GPU</td><td>ARM Mali-G71MP8 1037MHz</td><td colspan="2">ARM Mali-T880MP4 900MHz</td></tr><tr><td>Memory</td><td>2x 32-bit LPDDR4 @ 1866MHz 29.9GB/s</td><td colspan="2">2x 32-bit LPDDR3 @ 933MHz (14.9GB/s) or 2x 32-bit LPDDR4 @ 1333MHz (21.3GB/s) (hybrid controller)</td></tr><tr><td>Interconnect</td><td>ARM CCI-550</td><td colspan="2">ARM CCI-400</td></tr><tr><td>Storage</td><td>UFS 2.1</td><td colspan="2">eMMC 5.0</td></tr><tr><td>ISP/Camera</td><td>Dual 14-bit ISP (Improved)</td><td colspan="2">Dual 14-bit ISP 940MP/s</td></tr><tr><td>Encode/Decode</td><td>2160p30 HEVC & H.264 Decode & Encode 2160p60 HEVC Decode</td><td colspan="2">1080p H.264 Decode & Encode 2160p30 HEVC Decode</td></tr><tr><td>Integrated Modem</td><td>Kirin 960 Integrated LTE (Category 12/13) DL = 600Mbps 4x20MHz CA, 64-QAM UL = 150Mbps 2x20MHz CA, 64-QAM</td><td colspan="2">Balong Integrated LTE (Category 6) DL = 300Mbps 2x20MHz CA, 64-QAM UL = 50Mbps 1x20MHz CA, 16-QAM</td></tr><tr><td>Sensor Hub</td><td>i6</td><td colspan="2">i5</td></tr><tr><td>Mfc. Process</td><td>TSMC 16nm FFC</td><td colspan="2">TSMC 16nm FF+</td></tr></table>	HiSilicon High-End Kirin SoC Lineup				SoC	Kirin 960	Kirin 955	Kirin 950	CPU	4x Cortex-A73 @ 2.36GHz 4x Cortex-A53 @ 1.84GHz	4x Cortex-A72 @ 2.52GHz 4x Cortex-A53 @ 1.81GHz	4x Cortex-A72 @ 2.30GHz 4x Cortex-A53 @ 1.81GHz	GPU	ARM Mali-G71MP8 1037MHz	ARM Mali-T880MP4 900MHz		Memory	2x 32-bit LPDDR4 @ 1866MHz 29.9GB/s	2x 32-bit LPDDR3 @ 933MHz (14.9GB/s) or 2x 32-bit LPDDR4 @ 1333MHz (21.3GB/s) (hybrid controller)		Interconnect	ARM CCI-550	ARM CCI-400		Storage	UFS 2.1	eMMC 5.0		ISP/Camera	Dual 14-bit ISP (Improved)	Dual 14-bit ISP 940MP/s		Encode/Decode	2160p30 HEVC & H.264 Decode & Encode 2160p60 HEVC Decode	1080p H.264 Decode & Encode 2160p30 HEVC Decode		Integrated Modem	Kirin 960 Integrated LTE (Category 12/13) DL = 600Mbps 4x20MHz CA, 64-QAM UL = 150Mbps 2x20MHz CA, 64-QAM	Balong Integrated LTE (Category 6) DL = 300Mbps 2x20MHz CA, 64-QAM UL = 50Mbps 1x20MHz CA, 16-QAM		Sensor Hub	i6	i5		Mfc. Process	TSMC 16nm FFC	TSMC 16nm FF+	
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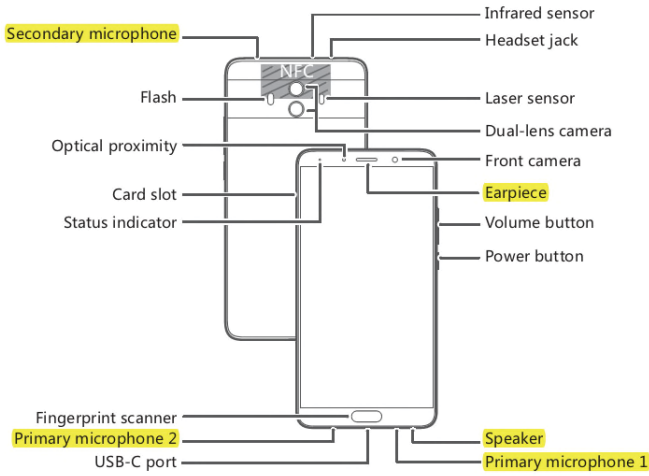
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	HiSilicon Kirin 960 The HiSilicon Kirin 960 is an ARM based high-end octa-core SoC for smartphones and tablet, which was introduced with the Huawei Mate 9 in November 2016. Besides 8 CPU cores (4x Cortex-A73, 4x Cortex-A53), the SoC is also equipped with a modern Mali-G71 MP8 graphics adapter, a dual-channel LPDDR4 memory controller as well as an LTE Cat. 12/13 modem. It is one of the fastest ARM SoCs in the end of 2016. The Kirin 960 is manufactured in a modern 16-nm process at TSMC. (https://www.notebookcheck.net/HiSilicon-Kirin-960-SoC.185280.0.html) Discovery from Huawei (or relevant third parties) is expected to confirm that the Accused Huawei '334 Products implement the 3GPP standards and operate in accordance with these standards, thus meeting this limitation. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the Accused Huawei '334 Products do not convert the first communication signal into a voice signal code, on information and belief, each of these products includes software, hardware, or a combination of the two that performs the equivalent function of converting communication signals into voice signal codes. Using this software,

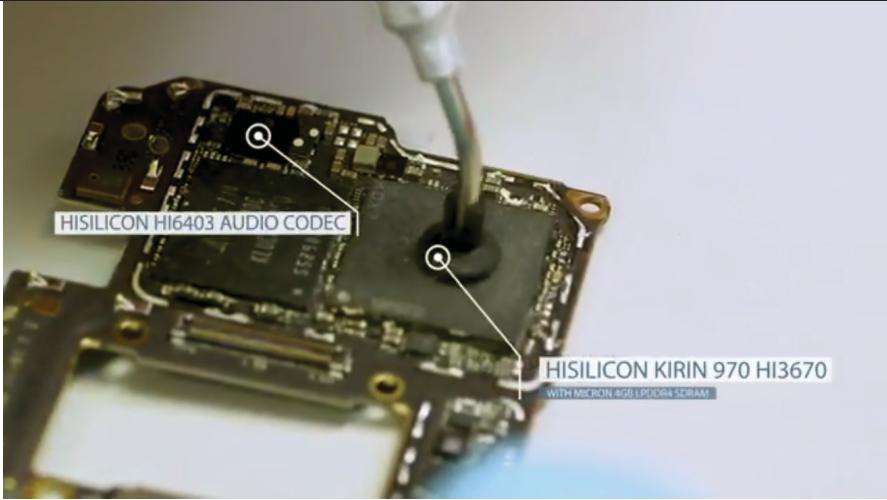
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	hardware, or combination of the two, these products perform substantially the same function (for example, converting received signals into signal codes representative of a voice) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, allowing the cellular device to interpret a received communication signal.
[4.d] converting said voice signal code into an audio signal for driving an acoustic transducer of said cellular telephone,	Each of the Accused Huawei '334 Products converts the voice signal code into an audio signal for driving an acoustic transducer of the cellular telephone. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices each have a microphone, earphone, and /or speaker, and that the devices convert voice signal code into an audio signal and converting audio signals into voice signal codes). The microphone, earphone, and/or speaker operate in combination with other electronic components (e.g. Analog-to-Digital and Digital-to-Analog converters) as one or more acoustic transducer of the Accused Huawei '334 Products. As one example of Huawei's infringement, the Huawei Mate 10 converts voice signal code into an audio signal for driving an acoustic transducer. For example, the device converts received voice signal codes into audio signals that can be outputted in audible form by a speaker, headset, or similar listening device. For example, the Huawei Mate 10 includes a microphone and earpiece and/or speaker associated with an acoustic transducer for converting voice signal code into audio signals and vice versa:

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	 (Huawei Mate 10 User Guide at 12 (annotations added).) Third-party teardowns of the Mate 10 further confirm the presence of an acoustic transducer and related functionality recited by this limitation:

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	 (https://www.youtube.com/watch?v=LQwkUqbZda0 at 0:46.)

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	 移除底部扬声器BOX，即可拆解副板 https://www.myfixguide.com/huawei-mate-10-teardown/. The Accused Huawei '334 Product includes audio codecs and sound playback codecs for converting audio signals demodulated from first communication signals received from cell-site stations into voice signals and audio signals that can be outputted as audible sounds by the earphone and/or speaker, or a headphone connected to the headphone jack. AUDIO Audio File Formats MP3, MP4, 3GP, OGG, AMR, AAC, FLAC, WAV, MIDI

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	(https://consumer.huawei.com/en/phones/mate10/specs/) In addition, because each of the Accused Huawei '334 Products (including the Mate 10) operates in accordance with the 3GPP standards, each of these devices necessarily convert voice signal code into audio signals (such as through digital-to-analogue (D/A) conversion) and audio input signals to input voice code signals (such as through analogue-to-digital (A/D) conversion) using an acoustic transducer: 4.1 Functional description of audio parts The analogue-to-digital and digital-to-analogue conversion will in principle comprise the following elements: 1) Analogue to uniform digital PCM - microphone; - input level adjustment device; - input anti-aliasing filter; - sample-hold device sampling at 8 kHz; - analogue-to-uniform digital conversion to 13-bit representation. The uniform format shall be represented in two's complement. 2) Uniform digital PCM to analogue - conversion from 13-bit/8 kHz uniform PCM to analogue; - a hold device; - reconstruction filter including $x/\sin(x)$ correction; - output level adjustment device; - earphone or loudspeaker. In the terminal equipment, the A/D function may be achieved either: - by direct conversion to 13-bit uniform PCM format; - or by conversion to 8-bit A-law or μ-law compounded format, based on a standard A-law or μ-law codec/filter according to ITU-T Recommendations G.711 [6] and G.714, followed by the 8-bit to 13-bit conversion as specified in clause 4.2.1. For the D/A operation, the inverse operations take place. 3GPP TS 26.090 (v10.0.0), § 4.1. On information and belief, each of the Accused Huawei '334 Products (including the Mate 10) has an encoder/decoder or similar component that plays a role in this

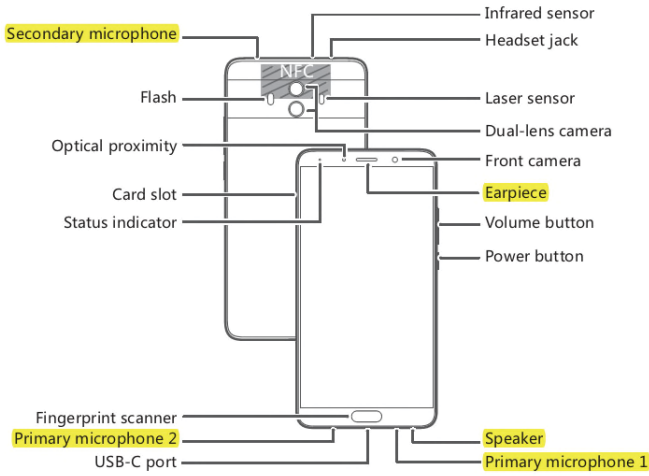
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	conversion. Also on information and belief, the encoder/decoders in these devices are operatively connected to an acoustic transducer in order to process the signals as described in 3GPP TS 26.090 and 26.102. <i>See, e.g., id.</i> at §§ 4.3, 4.4. Discovery from Huawei (and relevant third parties) is expected to confirm that the Accused Huawei '334 Products implement the 3GPP standards and operate in accordance with these standards, thus meeting this limitation. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the Accused Huawei '334 Products do not convert voice signal code into audio signals for driving an acoustic transducer, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent function of converting an audio input signal into an input voice code signal and vice versa. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, converting a voice signal code into an audio signal for driving an acoustic transducer) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, creating sounds from transmitted signals.
[4.e] converting an audio input signal from said acoustic transducer into an input voice code signal,	Each of the Accused Huawei '334 Products converts an audio input signal from the acoustic transducer into an input voice code signal. <i>See, e.g., See, e.g.,</i> User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend

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	Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices each have a microphone and speaker, and that the devices converts input audio signals into voice signal codes). Citations for claim element [4.d] above are incorporated herein. As one example of Huawei's infringement, the Huawei Mate 10 converts an audio input signal from the acoustic transducer into an input voice code signal. For example, the device converts incoming audio from a microphone into voice signal code for later transmission. For example, the Huawei Mate 10 includes a microphone and earpiece associated with transducers for converting input audio signals into voice signal codes:

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	 (Huawei Mate 10 User Guide at 12 (annotations added).) Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the Accused Huawei '334 Products do not convert voice signal code into audio signals for

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	driving an acoustic transducer, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent function of converting an audio input signal into an input voice code signal and vice versa. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, converting an audio input signal into an input voice code signal) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, converting sounds into signal codes for transmission
[4.f] converting said input voice code signal into a second communication signal,	Each of the Accused Huawei '334 Products convert the input voice code signal into a second communication signal. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices covert voice signals received by a microphone into communication signals). For example, on information and belief, each of the Accused Huawei '334 Products converts speech captured by a microphone on the device into RF signals that are transmitted in accordance with the supported standards. On information and belief, these devices convert speech signals received by the microphone into digital speech signals that are modulated and further processed by a modem before being converted into the RF signals for transmission (“a second communication signal”). On information and belief, a transmitter or equivalent component in each device transforms baseband signals from the modem into RF signals to be transmitted by an antenna. These transmitters convert audio signals into communication signals to be transmitted by the antenna through the duplexer in accordance with, for example, the WCDMA and TD-SCDMA specifications.

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	Because the Accused Huawei '334 Products each operates in accordance with the 3GPP/ETSI standards, these devices convert input voice code signals into communication signals: 4 Multiplexing, channel coding and interleaving 4.1 General Data stream from/to MAC and higher layers (Transport block / Transport block set) is encoded/decoded to offer transport services over the radio transmission link. Channel coding scheme is a combination of error detection, error correcting, rate matching, interleaving and transport channels mapping onto/splitting from physical channels. 3GPP TS 26.212 (v10.1.0), § 4.1.

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	6.2.2 UE maximum output power with HS-DPCCH and E-DCH The Maximum Power Reduction (MPR) for the nominal maximum output power defined in 6.2.1 is specified in table 6.1A for the values of β_c, β_d, β_{hs}, β_{e-c} and β_{e-d} defined in [8] fully or partially transmitted during a DPCCH timeslot Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH <table><tr><th>UE transmit channel configuration</th><th>CM (dB)</th><th>MPR (dB)</th></tr><tr><td>For all combinations of, DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH</td><td>$0 \leq CM \leq 3.5$</td><td>MAX (CM-1, 0)</td></tr></table> Note 1: CM = 1 for $\beta_d/\beta_c = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference. Where Cubic Metric (CM) is based on the UE transmit channel configuration and is given by $CM = \text{CEIL} \{ [20 * \log_{10} ((v_norm^3)_{rms}) - 20 * \log_{10} ((v_norm_ref^3)_{rms})] / k, 0.5 \}$ Where - CEIL { x, 0.5 } means rounding upwards to closest 0.5dB, i.e. CM ∈ [0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5] - k is 1.85 for signals where all channelisations codes meet the following criteria CSF, N where N < SF/2 - k is 1.56 for signals where any channelisations codes meet the following criteria C_{SF, N} where N ≥ SF/2 - v_norm is the normalized voltage waveform of the input signal - v_norm_ref is the normalized voltage waveform of the reference signal (12.2 kbps AMR Speech) and - $20 * \log_{10} ((v_norm_ref^3)_{rms}) = 1.52 \text{ dB}$ 3GPP TS 25.101 (v10.2.0), § 6.2.2.	UE transmit channel configuration	CM (dB)	MPR (dB)	For all combinations of, DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	MAX (CM-1, 0)
UE transmit channel configuration	CM (dB)	MPR (dB)					
For all combinations of, DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	MAX (CM-1, 0)					

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	6.2.2A UE maximum output power for DC-HSUPA The Maximum Power Reduction (MPR) for the nominal maximum output power defined in 6.2.1 is specified in table 6.1AA for the values of β_{cc}, β_{dc}, β_{sc} and β_{ed} defined in [8] fully or partially transmitted during a DPCCH timeslot Table 6.1AA: UE maximum output power for DC-HSUPA <table><tr><th>UE transmit channel configuration</th><th>CM (dB)</th><th>MPR (dB)</th></tr><tr><td>For all combinations of, DPCCH, HS-DPCCH, E-DPCCH and E-DPCCH</td><td>$0.22 \leq CM \leq 3.72$</td><td>MAX (CM-0.72, 0)</td></tr></table> Where Cubic Metric (CM) is based on the UE transmit channel configuration and is given by $CM = \text{CEIL} \{ [20 * \log_{10} ((v_norm^3)_{rms}) - 20 * \log_{10} ((v_norm_ref^3)_{rms})] / k, 0.22 \}$ Where - CEIL { x, 0.22 } means rounding upwards to closest 0.22dB with 0.5 dB granularity, i.e. CM ∈ {0.22, 0.72, 1.22, 1.72, 2.22, 2.72, 3.22, 3.72} - k is 1.66 for DC-HSUPA signals - v_norm is the normalized voltage waveform of the input signal - v_norm_ref is the normalized voltage waveform of the reference signal (12.2 kbps AMR Speech) and - $20 * \log_{10} ((v_norm_ref^3)_{rms}) = 1.52 \text{ dB}$ 3GPP TS 25.101 (v10.2.0), § 6.2.2.A. Discovery from Huawei (and relevant third parties) is expected to confirm that the Accused Huawei '334 Products each implement the 3GPP standards and operate in accordance with these standards, thus meeting this limitation. For example, Huawei's own promotional website for the Mate 10 confirms that the Accused Huawei '334 Products are configured to decode incoming voice signals received by the transmitter and encode outgoing voice signals prior to transmission.:	UE transmit channel configuration	CM (dB)	MPR (dB)	For all combinations of, DPCCH, HS-DPCCH, E-DPCCH and E-DPCCH	$0.22 \leq CM \leq 3.72$	MAX (CM-0.72, 0)
UE transmit channel configuration	CM (dB)	MPR (dB)					
For all combinations of, DPCCH, HS-DPCCH, E-DPCCH and E-DPCCH	$0.22 \leq CM \leq 3.72$	MAX (CM-0.72, 0)					

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	FASTER, ULTRA-STABLE CONNECTIVITY Intelligent cell search and handover technology means that your HUAWEI Mate 10 will stay connected, even when you're traveling at high speed.  BE HEARD WITH PERFECT CLARITY This integrated function means even the faintest whisper* spoken into the HUAWEI Mate 10 will be heard clearly at the other end. The HUAWEI Mate 10's AI technology will enhance and boost low volume calls*, while noisy calls** are transformed into high quality conversations with AI-advanced ambient noise cancellation. *Under average sound and reverberation level indoor conditions such as a quiet meeting room, office and living/bed room. **Traffic, train station and airport are main AI focused noisy environments. REAL-TIME TRANSLATOR Instantly translate text, voice, conversations, and images into 50+ languages with AI powered acceleration. With the pre-installed Translator you can translate one-to-one or group conversations across devices rapidly. Running within the HUAWEI Mate 10's AI-ecosystem means this app can translate text and images faster than ever. http://consumer.huawei.com/en/phones/mate10/.)

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	Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the Accused Huawei '334 Products do not convert input voice code signals into a second communication signal, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent function of converting input voice code signals into communication signals. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, converting input voice code signals into communication signals) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, converting sounds into signals for transmission.
[4.g] controlling said transmitter in such a manner that an open-loop power control is performed at first and	Each of the Accused Huawei '334 Products includes a transmitter that is controlled in such a manner that an open-loop power control is performed at first. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that each device controls transmission output parameters so that power control is performed). Because each of the Accused Huawei '334 Products operates in accordance with the

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	3GPP/ETSI standards, these devices perform open-loop power control in accordance with technical specifications of the 3GPP standards. For example, according to the standard, open-loop power is performed according to tolerance ranges that depend on the operating conditions of the accused device: 6.4 Output power dynamics Power control is used to limit the interference level. 6.4.1 Open loop power control Open loop power control is the ability of the UE transmitter to sets its output power to a specific value. The open loop power control tolerance is given in Table 6.3 6.4.1.1 Minimum requirement The UE open loop power is defined as the mean power in a timeslot or ON power duration, whichever is available. Table 6.3: Open loop power control tolerance <table data-bbox="734 1045 1115 1102"> <tr> <th>Conditions</th><th>Tolerance</th></tr> <tr> <td>Normal conditions</td><td>± 9 dB</td></tr> <tr> <td>Extreme conditions</td><td>± 12 dB</td></tr> </table> 6.4.1.1A Additional requirement for DC-HSUPA The open loop power control tolerance per carrier is given in Table 6.3. 3GPP TS 25.101 (v10.2.0), § 6.4.1. On information and belief, during a physical random access procedure, the Accused Huawei '334 Products perform uplink power control (e.g. open loop power control) but do not perform inner loop power control.	Conditions	Tolerance	Normal conditions	± 9 dB	Extreme conditions	± 12 dB
Conditions	Tolerance						
Normal conditions	± 9 dB						
Extreme conditions	± 12 dB						

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	5.4.1 Open Loop Power Control in the Uplink 5.4.1.1 Definition and applicability Open loop power control in the uplink is the ability of the UE transmitter to set its output power to a specific value. This function is used for PRACH transmission and based on the information from Node B using BCCH and the downlink received signal power level of the CPICH. The information from Node B includes transmission power of CPICH and uplink interference power level. The requirements and this test apply to all types of UTRA for the FDD UE. TS 34.121-1 version 10.2.1, § 5.4.1.1. 5.1 Uplink power control 5.1.1 PRACH 5.1.1.1 General The power control during the physical random access procedure is described in clause 6. The setting of power of the message control and data parts is described in the next subclause. 5.1.1.2 Setting of PRACH control and data part power difference The message part of the uplink PRACH channel shall employ gain factors to control the control/data part relative power similar to the uplink dedicated physical channels. Hence, subclause 5.1.2.5 applies also for the RACH message part, with the differences that: - β_1 is the gain factor for the control part (similar to DPCCH); - β_2 is the gain factor for the data part (similar to DPDCH); - no inner loop power control is performed. TS 25.214 version 10.2.0, § 5.1.1. Discovery from Huawei (and relevant third parties) is expected to confirm that each of the Accused Huawei '334 Products implement the 3GPP standards and operate in accordance with these standards, thus meeting this limitation. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30

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	days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the controllers in the Accused Huawei '334 Products do not control the transmitters so that an open-loop power control is performed at first, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent function of performing open-loop power control before closed-loop power control. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, performing open-loop power control prior to closed-loop power control) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, power control using an open-loop method.
[4.h] then a closed-loop power control is performed according to said power control signal so as to control transmitted power to converge into a range required by said cell-site station, and	Each of the Accused Huawei '334 Products includes a transmitter that is controlled, after open-loop power control, to then perform a closed-loop power control according to the power control signal so as to control transmitted power to converge into a range required by the cell-site station. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that each device controls transmission output parameters so that power control is performed). Because the Accused Huawei '334 Products each operates in accordance with the

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	3GPP/ETSI standards, these devices each performs closed-loop (or “inner loop”) power control after open-loop power control in accordance with technical specifications of the 3GPP standards. For example, after physical dedicated channel establishment and/or activation, the Accused Huawei ’334 Products start receiving TPC commands on the downlink channel and use the TPC command to perform closed loop power control. The criteria for reporting synchronisation status are defined in two different phases. Each phase is performed by the UE for each individual downlink frequency associated with the activated uplink frequencies. The downlink synchronization primitives are also reported to higher layers for each individual downlink frequency associated with the activated uplink frequencies. The first phase starts when higher layers initiate physical dedicated channel establishment (as described in [5]) or whenever the UE initiates synchronisation procedure A or synchronisation procedure AA (as described in section 4.3.2.1 and 4.3.2.3A) and lasts until 160 ms after the downlink dedicated channel is considered established by higher layers (physical channel establishment is defined in [5]). During this time out-of-sync shall not be reported and in-sync shall be reported using the CPHY-Sync-IND primitive if the following criterion is fulfilled: - The UE estimates the DPCH quality or the quality of the TPC fields of the F-DPCH frame received from the associated serving HS-DSCH cell (or secondary serving HS-DSCH cell) over the previous 40 ms period to be better than a threshold Q_{in}. This criterion shall be assumed not to be fulfilled before 40 ms of DPCH quality measurements have been collected. Q_{in} is defined implicitly by the relevant tests in [7]. The second phase starts 160 ms after the downlink dedicated channel is considered established by higher layers. During this phase both out-of-sync and in-sync are reported as follows. TS 25.214 version 10.2.0, § 4.3.1.2. 5.1.2 DPCH/DPDCH 5.1.2.1 General The initial uplink DPCH transmit power is set by higher layers. Subsequently the uplink transmit power control procedure simultaneously and independently controls the power of a DPCH on each activated uplink frequency and its corresponding DPDCHs (if present). The relative transmit power offset between DPCH and DPDCHs is determined by the network and is computed according to subclause 5.1.2.5 using the gain factors signalled to the UE using higher layer signalling. The operation of the inner power control loop, described in sub clause 5.1.2.2, adjusts the power of the DPCH and DPDCHs by the same amount, provided there are no changes in gain factors. Additional adjustments to the power of the DPCH associated with the use of compressed mode are described in sub clause 5.1.2.3. TS 25.214 version 10.2.0, § 5.1.2.1. The UMTS/WCDMA standard specifies transmitter power control ranges associated

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	with the power control commands, such as TPC commands received by the accused devices from the cell-site station: 6.4.2 Inner loop power control in the uplink Inner loop power control in the Uplink is the ability of the UE transmitter to adjust its output power in accordance with one or more TPC commands received in the downlink. 6.4.2.1 Power control steps The power control step is the change in the UE transmitter output power in response to a single TPC command, TPC_cmd, derived at the UE. 6.4.2.1.1 Minimum requirement The UE transmitter shall have the capability of changing the output power with a step size of 1, 2 and 3 dB according to the value of Δ_{TPC} or $\Delta_{RPA-TPC}$, in the slot immediately after the TPC_cmd as follows a) The transmitter output power step due to inner loop power control shall be within the range shown in Table 6.4. b) The transmitter average output power step due to inner loop power control shall be within the range shown in Table 6.5. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of TPC commands of the same duration. The inner loop power step is defined as the relative power difference between the mean power of the original (reference) timeslot and the mean power of the target timeslot, not including the transient duration. The transient duration is from 25μs before the slot boundary to 25μs after the slot boundary. 3GPP TS 25.101 (v10.2.0), § 6.4.2. Table 6.4: Transmitter power control range <table><tr><th rowspan="3">TPC_cmd</th><th colspan="6">Transmitter power control range</th></tr><tr><th colspan="2">1 dB step size</th><th colspan="2">2 dB step size</th><th colspan="2">3 dB step size</th></tr><tr><th>Lower</th><th>Upper</th><th>Lower</th><th>Upper</th><th>Lower</th><th>Upper</th></tr><tr><td>+ 1</td><td>+0.5 dB</td><td>+1.5 dB</td><td>+1 dB</td><td>+3 dB</td><td>+1.5 dB</td><td>+4.5 dB</td></tr><tr><td>0</td><td>-0.5 dB</td><td>+0.5 dB</td><td>-0.5 dB</td><td>+0.5 dB</td><td>-0.5 dB</td><td>+0.5 dB</td></tr><tr><td>-1</td><td>-0.5 dB</td><td>-1.5 dB</td><td>-1 dB</td><td>-3 dB</td><td>-1.5 dB</td><td>-4.5 dB</td></tr></table> <i>Id.</i>	TPC_cmd	Transmitter power control range						1 dB step size		2 dB step size		3 dB step size		Lower	Upper	Lower	Upper	Lower	Upper	+ 1	+0.5 dB	+1.5 dB	+1 dB	+3 dB	+1.5 dB	+4.5 dB	0	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB	-1	-0.5 dB	-1.5 dB	-1 dB	-3 dB	-1.5 dB	-4.5 dB
TPC_cmd	Transmitter power control range																																								
	1 dB step size		2 dB step size		3 dB step size																																				
	Lower	Upper	Lower	Upper	Lower	Upper																																			
+ 1	+0.5 dB	+1.5 dB	+1 dB	+3 dB	+1.5 dB	+4.5 dB																																			
0	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB																																			
-1	-0.5 dB	-1.5 dB	-1 dB	-3 dB	-1.5 dB	-4.5 dB																																			

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Table 6.5: Transmitter aggregate power control range

TPC_cmd group	Transmitter power control range after 10 equal TPC_cmd groups				Transmitter power control range after 7 equal TPC_cmd groups	
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+1	+8 dB	+12 dB	+16 dB	+24 dB	+16 dB	+26 dB
0	-1 dB	+1 dB	-1 dB	+1 dB	-1 dB	+1 dB
-1	-8 dB	-12 dB	-16 dB	-24 dB	-16 dB	-26 dB
0,0,0,0,+1	+6 dB	+14 dB	N/A	N/A	N/A	N/A
0,0,0,0,-1	-6 dB	-14 dB	N/A	N/A	N/A	N/A

The UE shall meet the above requirements for inner loop power control over the power range bounded by the Minimum output power as defined in subclause 6.4.3, and the Maximum output power supported by the UE (i.e. the actual power as would be measured assuming no measurement error). This power shall be in the range specified for the power class of the UE in subclause 6.2.1.

Id.

By performing power control in accordance with the 3GPP standards, the transmitted power in each of the Accused Huawei '334 Products is controlled to converge into a range required by the cell-site (base) station. *See, e.g., id.*

Upon information and belief the Mate 10 implements an RF Front End Control Interface similar to and/or in accordance with the MIPI Alliance Specification for RF Front-End Control Interface. *See e.g.,* <https://mipi.org/membership/board-and-contributor-members> indicating that HiSilicon and Skyworks are both “contributor[s]” to the MIPI alliance specifications and components of both are included in the Mate 10:



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	 1 Introduction 1 The RF Front-End Control Interface (later referred to as RFFE) was developed to offer a common and wide-spread method for controlling RF front-end devices. There are a variety of front-end devices, including Power Amplifiers (PA), Low-Noise Amplifiers (LNA), filters, switches, power management modules, antenna tuners and sensors. These functions may be located either in separate devices or integrated into a single device, depending on the application. MIPI Alliance Specification for RFFE Ver. 1.10 at 10. 4.1 Overview 86 RFFE is a two-wire, serial interface intended to be used to connect Radio Frequency ICs (RFIC) of a mobile terminal to their related Front-End Modules (FEM). The RFFE interface enables systems to efficiently control various FEMs in next generation mobile terminals with increased complexity of performance supporting multi-mode, multi-band and multiple antennas, all with a minimum number of wires and pins using a single RFFE bus. It is designed to support existing 3GPP standards such as LTE, EGPRS, UMTS, HSPA, etc. and also other, non-3GPP air interfaces. The RFFE interface is based on <i>MIPI Alliance Specification for System Power Management Interface (SPMI)</i> [MIPI03]. The RFFE interface is intended to be efficient, flexible, and extensible, accommodating many variations in the overlying system design, while providing interoperability at the interface level between compliant RFICs and FEMs. The ability to design one common control interface which may be reused for all of these modules helps reduce front-end complexity, and hence speed up the time-to-market for these terminals. <i>Id.</i> at 19.

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	4.1.1.1 Basic 96 Figure 2 shows a Basic Configuration of an RFBE bus implementation based on a minimal topology consisting of a RFIC with one RX and one TX path connected to one antenna. The main characteristic of the Basic Configuration is that there is only one RFBE bus where all front-end components are connected. The RFIC is the Master on the RFBE bus and all front-end components act as Slaves. The TX signal path starts at the RFIC and may comprise various outputs for different radio standards or frequency bands. Depending on the detailed architecture these analog outputs may be connected to a set of different gain or power amplifiers, which usually need to be controlled. These gain or power amplifiers may be separate for each output or may also be shared for several outputs. Following the TX direction towards the antenna there are bandlimiting filters, which may be configurable for different scenarios, the antenna switch used to select RX and TX directions as well as different bands, and finally the antenna tuning-module. In addition, these components may be accompanied by various sensors for temperature, power, voltage, etc. and adjustable power supplies for the front-end components like LDOs or DC/DC converters for PAs. <i>Id.</i> at 20. Discovery from Huawei (and relevant third parties) is expected to confirm that the Accused Huawei '334 Products each implement the 3GPP standards and operate in accordance with these standards, thus meeting this limitation. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the controllers in the Accused Huawei '334 Products do not perform closed-loop power according to the power control signal so as to control the transmitted power to converge into a range required by the cell-site station, on information and belief, each of these products include software, hardware, or a combination of the two that perform the

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	equivalent function of performing close-loop power control. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, performing closed-loop power control) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, meeting the power requirements of a cell-site (base) station.
[4.i] controlling a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function defining a relation between bias data and gain data stored in said memory,	Each of the Accused Huawei '334 Products includes a transmitter that has a variable amplitude/gain amplifier and a power amplifier. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices have an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station). On information and belief, the operating conditions of the amplifiers including variable amplitude/gain amplifiers and power amplifiers in the Accused Huawei '334 Products are controlled at least by electronic components or processors that incorporate memory for storing bias and gain data. For example, on information and belief, the electronic components or processors store gain/bias factors and gain/bias parameters in memory. For example, a modem in the accused devices adapts the operating conditions of the power amplifiers in accordance with the requirements of the 2G, 3G, and 4G cellular standards supported by the Accused Huawei '334 Products. On information and belief, these devices includes different bias and gains associated with different operating conditions of the power amplifier, or depending on the mode of operation of the multimode power amplifier, or depending on the band of operation of the multiband power amplifier. In addition, the Accused Huawei '334 Products are set to operate at multiple power

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	levels so as to use only the power required to reach the network. The user guides for each product explain this in a section titled “FCC RF Exposure Information (SAR)” or similar title. (<i>See, e.g.</i>, Huawei Mate 10 User Guide at 148-49.) On information and belief, each of the multiple power levels is associated with a bias condition that represents a fraction or ratio of the maximum bias value that can be applied to achieve a maximum power level not exceeding the highest certified power level in all tested frequency bands. Furthermore, when the accused devices are closer to a wireless base antenna, the output power is lower. (<i>See, e.g., id.</i>) Accordingly, the output power (and thus the bias condition) increases the further the accused device is from the wireless base station. (<i>See, e.g., id.</i>) As described in the user guides for each device, the Accused Huawei '334 Products operate at multiple power levels, which require corresponding bias voltages/currents for amplifiers within the device. On information and belief, the Accused Huawei '334 Products maintain information in memory for characterizing a relationship between a required bias condition and a desired gain associated with a desired power level. For example, in response to a TPC command from the network, the devices are required to change their output power with a step of 1, 2, or 3 dB, in accordance with the 3GPP standards. <i>See</i> 3GPP TS 125.101, § 6.4.2.1.1. On information and belief, the accused devices are configured to associate a bias condition to the desired gain represented by a step of 1, 2, or 3 dB depending on the current operating conditions (such as the current power level) of the device. On information and belief, the operating conditions of the power amplifier in the Accused Huawei '334 Products is controlled at least by the modem, which incorporates memory for storing a function involving bias data and gain data used to control the variable amplitude/gain amplifier and a bias condition of the power amplifier. For example, the modem, transceiver, or controller in these devices stores gain factors and gain parameters in memory. As one example of Huawei's infringement, the modem in the accused devices adapts the operating conditions of the variable amplitude/gain amplifiers in accordance with the requirements of the 2G, 3G, and 4G cellular technologies supported by the Accused

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	Huawei '334 Products. On information and belief, these devices include different bias and gains associated with different operating conditions of the variable amplitude/gain amplifier. Because the Accused Huawei '334 Products each operates in accordance with the 3GPP/ETSI standards, these devices control their variable amplitude amplifier using a function stored in memory. For example, the 3GPP standards specify a set of maximum output power parameters and gain factors to control the amplifiers' gain and bias conditions using these parameters: 6.2 Transmit power 6.2.1 UE maximum output power The following Power Classes define the nominal maximum output power. The nominal power defined is the broadband transmit power of the UE, i.e. the power in a bandwidth of at least $(1+\alpha)$ times the chip rate of the radio access mode. The period of measurement shall be at least one timeslot. For DC-HSUPA, the nominal transmit power is defined by the sum of the broadband transmit power of each carrier in the UE.

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Table 6.1: UE Power Classes

Operating Band	Power Class 1		Power Class 2		Power Class 3		Power Class 3bis		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
Band I	+33	+1/-3	+27	+1/-3	+24	+1/-3	23	+2/-2	+21	+2/-2
Band II	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band III	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band IV	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band V	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band VI	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band VII	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band VIII	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band IX	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band X	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XI	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XII	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XIII	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XIV	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XIX	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XX	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XXI	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XXII	-	-	-	-	+24	+1/-4.5	23	+2/-3.5	+21	+2/-3.5
Band XXV	-	-	-	-	+24	+1/-4	23	+2/-3	+21	+2/-3
Band XXVI (Note 1)	-	-	-	-	+24	+1/-4	23	+2/-3	+21	+2/-3

NOTE 1 For the UE which supports both Band V and Band XXVI operating frequencies, the UE maximum output power of Band V shall apply for Band XXVI when the carrier frequency of the assigned UTRA channel is within 824-845 MHz.

NOTE: The tolerance allowed for the nominal maximum output power applies even for the multi-code DPDCH transmission mode.

For the UE which supports DB-DC-HSDPA configuration in Table 6.1aB, the lower side of the tolerance in Table 6.1 is allowed to be adjusted by the amount given in Table 6.1aB for the applicable bands.

Table 6.1aB Allowed adjustment in lower side of tolerance for UE which supports DB-DC-HSDPA

DB-DC-HSDPA Configuration	Maximum allowed adjustment in lower side of tolerance (dB)	Applicable bands
1	-0.3	I, VIII
2	-1	II, IV
3	-0.3	I, V
4	-1	I, XI
5	-0.3	II, V
6	-0.3	I

NOTE: The requirements reflect what can be achieved with the present state of the art technology. They shall be reconsidered when the state of the art technology progresses.

For the UE which supports dual band 4C-HSDPA configuration in Table 6.1aC, the lower side of the tolerance in Table 6.1 is allowed to be adjusted by the amount given in Table 6.1aC for the applicable bands.

3GPP TS 25.101 (v10.2.0), § 6.2.1.

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	6.2.2A UE maximum output power for DC-HSUPA The Maximum Power Reduction (MPR) for the nominal maximum output power defined in 6.2.1 is specified for the values of β_c, β_d, β_{hs}, β_{sc} and β_{ed} defined in [8] fully or partially transmitted during a DPCCH timeslot, and defined through calculation of the Raw Cubic Metric (Raw CM) which is based on the UE transmit channel configuration and is given by $\text{Raw CM} = 20 * \log_{10} ((v_norm^3)_{rms}) - 20 * \log_{10} ((v_norm_ref^3)_{rms})$ where - v_norm is the normalized voltage waveform of the input signal - v_norm_ref is the normalized voltage waveform of the reference signal (12.2 kbps AMR Speech) and - $20 * \log_{10} ((v_norm_ref^3)_{rms}) = 1.52 \text{ dB}$ For any DC-HSUPA signal not employing 16QAM modulation on any of the carriers, the MPR is specified in Table 6.1AA. Table 6.1AA: UE maximum output power for DC-HSUPA signals not employing 16QAM modulation on any of the carriers <table><tr><th>UE transmit channel configuration</th><th>CM (dB)</th><th>MPR (dB)</th></tr><tr><td>When DPCCH2 is not configured: For all combinations of: DPCCH, DPDCH, HS-DPCCH, E-DPDCH and E-DPCCH</td><td>$0.22 \leq \text{CM} \leq 3.72$</td><td>MAX (CM-0.72, 0)</td></tr><tr><td>When DPCCH2 is configured: For all combinations of: DPCCH, DPDCH, HS-DPCCH, E-DPDCH, E-DPCCH and DPCCH2</td><td>$0.22 \leq \text{CM} \leq 3.72$</td><td>MAX (CM-0.72, 0)</td></tr></table> where Cubic Metric (CM) is based on the Raw CM and is given by $\text{CM} = \text{CEIL} \{ \text{Raw CM} / k, 0.22 \}$ where - CEIL { x, 0.22 } means rounding upwards to closest 0.22dB with 0.5 dB granularity, i.e. CM = [0.22, 0.72, 1.22, 1.72, 2.22, 2.72, 3.22, 3.72] - k is 1.66 Id. at § 6.2.2A.	UE transmit channel configuration	CM (dB)	MPR (dB)	When DPCCH2 is not configured: For all combinations of: DPCCH, DPDCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0.22 \leq \text{CM} \leq 3.72$	MAX (CM-0.72, 0)	When DPCCH2 is configured: For all combinations of: DPCCH, DPDCH, HS-DPCCH, E-DPDCH, E-DPCCH and DPCCH2	$0.22 \leq \text{CM} \leq 3.72$	MAX (CM-0.72, 0)
UE transmit channel configuration	CM (dB)	MPR (dB)								
When DPCCH2 is not configured: For all combinations of: DPCCH, DPDCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0.22 \leq \text{CM} \leq 3.72$	MAX (CM-0.72, 0)								
When DPCCH2 is configured: For all combinations of: DPCCH, DPDCH, HS-DPCCH, E-DPDCH, E-DPCCH and DPCCH2	$0.22 \leq \text{CM} \leq 3.72$	MAX (CM-0.72, 0)								

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	6.4.2 Inner loop power control in the uplink Inner loop power control in the Uplink is the ability of the UE transmitter to adjust its output power in accordance with one or more TPC commands received in the downlink. There are two inner loop power control loops defined , one that controls the DPCH and one that controls the DPCH2 power when DPCH2 is configured. 6.4.2.1 Power control steps The power control step is the change in the UE transmitter output power in response to a single TPC command, TPC_cmd, derived at the UE. 6.4.2.1.1 Minimum requirement The UE transmitter shall when DPCH2 is not configured have the capability of changing the output power with a step size of 1, 2 and 3 dB according to the value of Δ_{TPC} or Δ_{RP-TPC}, in the slot immediately after the TPC_cmd as follows a) The transmitter output power step due to inner loop power control shall be within the range shown in Table 6.4. b) The transmitter average output power step due to inner loop power control shall be within the range shown in Table 6.5. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of TPC commands of the same duration. The inner loop power step is defined as the relative power difference between the mean power of the original (reference) timeslot and the mean power of the target timeslot, not including the transient duration. The transient duration is from 25μs before the slot boundary to 25μs after the slot boundary. Table 6.4: Transmitter power control range <table><tr><th rowspan="3">TPC_cmd</th><th colspan="6">Transmitter power control range</th></tr><tr><th colspan="2">1 dB step size</th><th colspan="2">2 dB step size</th><th colspan="2">3 dB step size</th></tr><tr><th>Lower</th><th>Upper</th><th>Lower</th><th>Upper</th><th>Lower</th><th>Upper</th></tr><tr><td>+ 1</td><td>+0.5 dB</td><td>+1.5 dB</td><td>+1 dB</td><td>+3 dB</td><td>+1.5 dB</td><td>+4.5 dB</td></tr><tr><td>0</td><td>-0.5 dB</td><td>+0.5 dB</td><td>-0.5 dB</td><td>+0.5 dB</td><td>-0.5 dB</td><td>+0.5 dB</td></tr><tr><td>-1</td><td>-0.5 dB</td><td>-1.5 dB</td><td>-1 dB</td><td>-3 dB</td><td>-1.5 dB</td><td>-4.5 dB</td></tr></table> Id. at § 6.4.2. The inner loop power step is defined as the relative power difference between the mean code power of the original (reference) timeslot and the mean code power of the target timeslot, not including the transient duration. The transient duration is from 25μs before the slot boundary to 25μs after the slot boundary.	TPC_cmd	Transmitter power control range						1 dB step size		2 dB step size		3 dB step size		Lower	Upper	Lower	Upper	Lower	Upper	+ 1	+0.5 dB	+1.5 dB	+1 dB	+3 dB	+1.5 dB	+4.5 dB	0	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB	-1	-0.5 dB	-1.5 dB	-1 dB	-3 dB	-1.5 dB	-4.5 dB
TPC_cmd	Transmitter power control range																																								
	1 dB step size		2 dB step size		3 dB step size																																				
	Lower	Upper	Lower	Upper	Lower	Upper																																			
+ 1	+0.5 dB	+1.5 dB	+1 dB	+3 dB	+1.5 dB	+4.5 dB																																			
0	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB																																			
-1	-0.5 dB	-1.5 dB	-1 dB	-3 dB	-1.5 dB	-4.5 dB																																			

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Table 6.4A: Transmitter power control range

TPC_cmd	Transmitter power control range					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+ 1	+1.0 dB	+2.0 dB	+1.5 dB	+3.5 dB	+2 dB	+5 dB
0	-1 dB	+1 dB	-1 dB	+1 dB	-1 dB	+1 dB
-1	-1 dB	-2 dB	-1.5 dB	-3.5 dB	-2 dB	-5 dB

Table 6.4A: Transmitter power control range for exceptions

TPC_cmd	Transmitter power control range					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+ 1	-0.5 dB	+2.5 dB	+0.5 dB	+3.5 dB	+1.5 dB	+4.5 dB
0	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB
-1	0.5 dB	-2.5 dB	-0.5 dB	-3.5 dB	-1.5 dB	-4.5 dB

Table 6.5: Transmitter aggregate power control range

TPC_cmd group	Transmitter power control range after 10 equal TPC_cmd groups				Transmitter power control range after 7 equal TPC_cmd groups	
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+1	+8 dB	+12 dB	+16 dB	+24 dB	+16 dB	+26 dB
0	-1 dB	+1 dB	-1 dB	+1 dB	-1 dB	+1 dB
-1	-8 dB	-12 dB	-16 dB	-24 dB	-16 dB	-26 dB
0,0,0,0,+1	+6 dB	+14 dB	N/A	N/A	N/A	N/A
0,0,0,0,-1	-6 dB	-14 dB	N/A	N/A	N/A	N/A

The UE shall meet the above requirements with the exceptions defined below for inner loop power control over the power range bounded by the Minimum output power as defined in subclause 6.4.3, and the Maximum output power supported by the UE (i.e. the actual power as would be measured assuming no measurement error). This power shall be in the range specified for the power class of the UE in subclause 6.2.1. For each direction, up to 2 exceptions to the transmitter power control range defined in table 6.4 shall be allowed. The transmitter power control range for exceptions is defined in table 6.4A.

Id.

Discovery from Huawei (and relevant third parties) is expected to confirm that the

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	Accused Huawei '334 Products each implement the 3GPP standards and operate in accordance with these standards, thus meeting this limitation. Skyworks frontend modules include power amplifiers: Front-end Modules for Cellular Designed with cost and space savings in mind, Skyworks front-end modules combine the company's industry-leading power amplifier (PA) module and switch functions into single low-cost, laminate-based multi-chip modules (MCM), 40 percent smaller than alternative solutions. Key features of the transmit front-end modules include multi-band / multi-mode power amplifiers, current sensing power control, high-linearity transmit/receive switches and all associated filtering, duplexing and control functions. Further, the new module requires no external matching components, accelerating time-to-market. Manufactured using Skyworks proprietary heterojunction bipolar transistor (HBT) power amplifier process and low-loss pseudomorphic high electron mobility transistor (PHEMT) switch technologies, front-end modules deliver superior handset talk and standby time. The Front-end Modules Feature: • Multi-band / Multi-mode power amplifiers • High linearity TX/RX switches • Single multi-chip module design • Reduced handset design time • Superior handset talk and standby times See http://www.skyworksinc.com/Products_FEMs_Cellular.aspx Upon information and belief the Mate 10 implements an RF Front End Control Interface similar to and/or in accordance with the MIPI Alliance Specification for RF Front-End Control Interface. See e.g., https://mipi.org/membership/board-and-contributor-members indicating that HiSilicon and Skyworks are both “contributor[s]” to the MIPI alliance specifications and components of both are included in the Mate 10: 

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	 1 Introduction 1 The RF Front-End Control Interface (later referred to as RFFE) was developed to offer a common and wide-spread method for controlling RF front-end devices. There are a variety of front-end devices, including Power Amplifiers (PA), Low-Noise Amplifiers (LNA), filters, switches, power management modules, antenna tuners and sensors. These functions may be located either in separate devices or integrated into a single device, depending on the application. MIPI Alliance Specification for RFFE Ver. 1.10 at 10. 4.1 Overview 86 RFFE is a two-wire, serial interface intended to be used to connect Radio Frequency ICs (RFIC) of a mobile terminal to their related Front-End Modules (FEM). The RFFE interface enables systems to efficiently control various FEMs in next generation mobile terminals with increased complexity of performance supporting multi-mode, multi-band and multiple antennas, all with a minimum number of wires and pins using a single RFFE bus. It is designed to support existing 3GPP standards such as LTE, EGPRS, UMTS, HSPA, etc. and also other, non-3GPP air interfaces. The RFFE interface is based on <i>MIPI Alliance Specification for System Power Management Interface (SPMI)</i> [MIPI03]. The RFFE interface is intended to be efficient, flexible, and extensible, accommodating many variations in the overlying system design, while providing interoperability at the interface level between compliant RFICs and FEMs. The ability to design one common control interface which may be reused for all of these modules helps reduce front-end complexity, and hence speed up the time-to-market for these terminals. <i>Id.</i> at 19.

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	4.1.1.1 Basic 96 Figure 2 shows a Basic Configuration of an RFBE bus implementation based on a minimal topology consisting of a RFIC with one RX and one TX path connected to one antenna. The main characteristic of the Basic Configuration is that there is only one RFBE bus where all front-end components are connected. The RFIC is the Master on the RFBE bus and all front-end components act as Slaves. The TX signal path starts at the RFIC and may comprise various outputs for different radio standards or frequency bands. Depending on the detailed architecture these analog outputs may be connected to a set of different gain or power amplifiers, which usually need to be controlled. These gain or power amplifiers may be separate for each output or may also be shared for several outputs. Following the TX direction towards the antenna there are bandlimiting filters, which may be configurable for different scenarios, the antenna switch used to select RX and TX directions as well as different bands, and finally the antenna tuning-module. In addition, these components may be accompanied by various sensors for temperature, power, voltage, etc. and adjustable power supplies for the front-end components like LDOs or DC/DC converters for PAs. <i>Id.</i> at 20.

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	Figure 2 Basic Configuration <i>Id.</i> at 21. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the

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	controllers in the Accused Huawei '334 Products do not control amplifiers using a set of bias and gain data stored in memory, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent function of using bias and gain data to control amplifiers. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, using bias and gain data to control amplifiers) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, adjusting transmission parameters prior to transmission of a signal so as to conserve power while still ensuring a reliable transmission to a cell-site (base) station.
[4.j] in such a manner that said function uses bias conditions defined in a ratio to the maximum bias voltage value and	Each of the Accused Huawei '334 Products operate in such a manner that the function uses bias conditions defined in a ratio to the maximum bias voltage value. <i>See, e.g.,</i> User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices have an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station). On information and belief, the operating conditions of the power amplifiers in the Accused Huawei '334 Products are controlled at least by electronic components or processors, which incorporate memory for storing bias and gain data. Thus, the electronic components or processors in these devices store gain factors and gain parameters in memory. For example, the devices' modem adapts the operating conditions of the power amplifiers in the accused device in accordance with the requirements of the 2G, 3G, and 4G cellular technologies supported by the Accused Huawei '334 Products. On information and belief, these devices each include different bias and gains associated with different operating conditions of the power amplifier, or depending on the mode of

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	operation of the multimode power amplifier, or depending on the band of operation of the multiband power amplifier. As discussed, because the Accused Huawei '334 Products operate in accordance with the 3GPP standards, each of these products controls their variable amplitude/gain and power amplifiers using a set of bias and gain data stored in memory. On information and belief and in accordance with the UMTS standard, the Accused Huawei '334 Products apply scaling factors and/or power ratios to adjust the total transmit power when the total transmit power would exceed the maximum allowed value to force the total transmit power to be equal to the maximum power. On information and belief, the maximum transmit power corresponds to a maximum bias voltage. The scaling, ratio, or gain factor applied to the total transmit power corresponds to a scaling or ratio to the maximum bias voltage.

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	5.1.2.6 Maximum and minimum power limits When E-DCH is not configured, in the case that the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall apply additional scaling to the total transmit power so that it is equal to the maximum allowed power. This additional scaling shall be such that the power ratio between DPCCH and DPDCH and also DPCCH and HS-DPCCH remains as required by sub-clause 5.1.2.5 and 5.1.2.5A. When E-DCH is configured on a single frequency or E-DCH is configured on multiple frequencies but Secondary_EDCH_Cell_Active is 0, <i>ETSI</i> 3GPP TS 25.214 version 10.2.0 Release 10 33 ETSI TS 125 214 V10.2.0 (2011-04) - If the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall firstly reduce all the E-DPDCH gain factors $\beta_{ed,k}$ by an equal scaling factor to respective values $\beta_{ed,k, reduced}$ so that the total transmit power would be equal to the maximum allowed power. TS 25.214 version 10.2.0, § 5.1.2.6.

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	- In the following cases, the UE shall then apply additional scaling to the total transmit power so that it is equal to the maximum allowed power: - if a DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though DTX is used on all E-DPDCHs; - if no DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though $\beta_{\text{est},k}$ is equal to $\beta_{\text{est},k,\text{min}}$ for all k. - Any additional scaling of the total transmit power as described above shall be such that the power ratio between DPCCCH and DPDCH, between DPCCCH and HS-DPCCH, and between DPCCCH and E-DPCCH, remains as required by sub-clauses 5.1.2.5, 5.1.2.5A and 5.1.2.5B.1, and such that the power ratio between each E-DPDCH and DPCCCH remains as required by $\beta_{\text{est},k,\text{min}}/\beta_c$ if DTX is not used on E-DPDCH. Any slot-level scaling of β_{est} or DTX of E-DPDCH as described above is applied at layer 1 only and is transparent to higher layers. When Secondary_EDCH_Cell_Active is 1, - If the total UE transmit power (after applying DPCCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall start by reducing all the E-DPDCH gain factors $\beta_{\text{est},k}$ on the frequency with highest DPCCCH power by an equal scaling factor to respective values $\beta_{\text{est},k,\text{reduced}}$ so that the total transmit power would be equal to the maximum allowed power. TS 25.214 version 10.2.0, § 5.1.2.6. For example, the 3GPP standards specify a set of maximum output power parameters and gain factors to control the amplifiers' gain and bias conditions using these parameters in accordance with the power class of the the Accused Huawei '334 Products. In particular, the Accused Huawei '334 Products are required to limit their output to remain within a tolerance range from a nominal maximum output power in each operating band. The tolerance in dB is a logarithmic representation of a fraction or ratio of the nominal maximum output power. On information and belief, the nominal maximum output power corresponds to a maximum bias voltage or a nominal maximum bias voltage. The ratio or scaling of the nominal maximum output power corresponds to a ratio or scaling of the maximum bias voltage.

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	6.2 Transmit power 6.2.1 UE maximum output power The following Power Classes define the nominal maximum output power. The nominal power defined is the broadband transmit power of the UE, i.e. the power in a bandwidth of at least $(1+\alpha)$ times the chip rate of the radio access mode. The period of measurement shall be at least one timeslot. For DC-HSUPA, the nominal transmit power is defined by the sum of the broadband transmit power of each carrier in the UE.

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Table 6.1: UE Power Classes

Operating Band	Power Class 1		Power Class 2		Power Class 3		Power Class 3bis		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
Band I	+33	+1/-3	+27	+1/-3	+24	+1/-3	23	+2/-2	+21	+2/-2
Band II	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band III	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band IV	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band V	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band VI	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band VII	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band VIII	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band IX	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band X	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XI	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XII	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XIII	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XIV	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XIX	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XX	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XXI	-	-	-	-	+24	+1/-3	23	+2/-2	+21	+2/-2
Band XXII	-	-	-	-	+24	+1/-4.5	23	+2/-3.5	+21	+2/-3.5
Band XXV	-	-	-	-	+24	+1/-4	23	+2/-3	+21	+2/-3
Band XXVI (Note 1)	-	-	-	-	+24	+1/-4	23	+2/-3	+21	+2/-3

NOTE 1 For the UE which supports both Band V and Band XXVI operating frequencies, the UE maximum output power of Band V shall apply for Band XXVI when the carrier frequency of the assigned UTRA channel is within 824-845 MHz.

NOTE: The tolerance allowed for the nominal maximum output power applies even for the multi-code DPDCH transmission mode.

For the UE which supports DB-DC-HSDPA configuration in Table 6.1aB, the lower side of the tolerance in Table 6.1 is allowed to be adjusted by the amount given in Table 6.1aB for the applicable bands.

Table 6.1aB Allowed adjustment in lower side of tolerance for UE which supports DB-DC-HSDPA

DB-DC-HSDPA Configuration	Maximum allowed adjustment in lower side of tolerance (dB)	Applicable bands
1	-0.3	I, VIII
2	-1	II, IV
3	-0.3	I, V
4	-1	I, XI
5	-0.3	II, V
6	-0.3	I

NOTE: The requirements reflect what can be achieved with the present state of the art technology. They shall be reconsidered when the state of the art technology progresses.

For the UE which supports dual band 4C-HSDPA configuration in Table 6.1aC, the lower side of the tolerance in Table 6.1 is allowed to be adjusted by the amount given in Table 6.1aC for the applicable bands.

3GPP TS 25.101 (v10.2.0), § 6.2.1.

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	In another example, the Accused Huawei '334 Products are required to apply a maximum power reduction (MPR) for the nominal maximum power output. The MPR in dB is a logarithmic representation of a fraction or ratio of the nominal maximum output power. On information and belief, the nominal maximum output power corresponds to a maximum bias voltage or a nominal maximum bias voltage. The MPR ratio or scaling corresponds to a ratio or scaling of the maximum bias voltage. 6.2.2A UE maximum output power for DC-HSUPA The Maximum Power Reduction (MPR) for the nominal maximum output power defined in 6.2.1 is specified for the values of β_c, β_{ds}, β_{hs}, β_{ec} and β_{ed} defined in [8] fully or partially transmitted during a DPCH timeslot, and defined through calculation of the Raw Cubic Metric (Raw CM) which is based on the UE transmit channel configuration and is given by $\text{Raw CM} = 20 * \log_{10} ((v_norm^3)_{rms}) - 20 * \log_{10} ((v_norm_ref^3)_{rms})$ where - v_norm is the normalized voltage waveform of the input signal - v_norm_ref is the normalized voltage waveform of the reference signal (12.2 kbps AMR Speech) and - $20 * \log_{10} ((v_norm_ref^3)_{rms}) = 1.52 \text{ dB}$ For any DC-HSUPA signal not employing 16QAM modulation on any of the carriers, the MPR is specified in Table 6.1AA.

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	Table 6.1AA: UE maximum output power for DC-HSUPA signals not employing 16QAM modulation on any of the carriers <table><tr><th>UE transmit channel configuration</th><th>CM (dB)</th><th>MPR (dB)</th></tr><tr><td>When DPCCH2 is not configured: For all combinations of; DPCCH, DPDCH, HS-DPCCH, E-DPDCH and E-DPCCH</td><td>$0.22 \leq CM \leq 3.72$</td><td>MAX (CM-0.72, 0)</td></tr><tr><td>When DPCCH2 is configured: For all combinations of; DPCCH, DPDCH, HS-DPCCH, E-DPDCH, E-DPCCH and DPCCH2</td><td>$0.22 \leq CM \leq 3.72$</td><td>MAX (CM-0.72, 0)</td></tr></table> where Cubic Metric (CM) is based on the Raw CM and is given by $CM = \text{CEIL} \{ \text{Raw CM} / k, 0.22 \}$ where - CEIL { x, 0.22 } means rounding upwards to closest 0.22dB with 0.5 dB granularity, i.e. CM = [0.22, 0.72, 1.22, 1.72, 2.22, 2.72, 3.22, 3.72] - k is 1.66 3GPP TS 25.101 (v10.2.0), at § 6.2.2A. In another example, each of the Accused Huawei '334 Products is required to change its output power with a power control step size of 1, 2, and 3dB in the slot immediately after the TPC_cmd can be derived. See TS 25.101, § 6.4.2.1; See also TS 34.121-1 V10.2.1, § 5.4.2.2. For example, when the Accused HUAWEI '334 Product received a TPC_cmd with a downward adjustment from a maximum output power, the Accused HUAWEI '334 Products are required to reduce its output power from the maximum by the signaled step size in the slot immediately after the TPC_cmd. The power control step size in dB is a logarithmic representation of a fraction or ratio of the maximum output power. On information and belief, the maximum output power corresponds to a maximum bias voltage. The power control step size corresponds to a ratio or scaling of the maximum bias voltage to cause the Accused HUAWEI '334 Product to change its output power	UE transmit channel configuration	CM (dB)	MPR (dB)	When DPCCH2 is not configured: For all combinations of; DPCCH, DPDCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0.22 \leq CM \leq 3.72$	MAX (CM-0.72, 0)	When DPCCH2 is configured: For all combinations of; DPCCH, DPDCH, HS-DPCCH, E-DPDCH, E-DPCCH and DPCCH2	$0.22 \leq CM \leq 3.72$	MAX (CM-0.72, 0)
UE transmit channel configuration	CM (dB)	MPR (dB)								
When DPCCH2 is not configured: For all combinations of; DPCCH, DPDCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0.22 \leq CM \leq 3.72$	MAX (CM-0.72, 0)								
When DPCCH2 is configured: For all combinations of; DPCCH, DPDCH, HS-DPCCH, E-DPDCH, E-DPCCH and DPCCH2	$0.22 \leq CM \leq 3.72$	MAX (CM-0.72, 0)								

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	from the maximum output power by the corresponding step size. Figure 5.4.2.4 Inner Loop Power Control Test Steps TS 34.121-1 V10.2.1, § 5.4.2.4.2. 5) Step D: Transmit the PHYSICAL CHANNEL RECONFIGURATION message to reconfigure the uplink channel in order to set the Power Control Algorithm to algorithm 1, and the TPC step size to 1 dB. Contents of the message is specified in the table 5.4.2.4.2.A. After the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message from the UE is received, transmit a sequence of TPC commands with the value 1 until the UE output power is above the maximum power threshold. 6) Step E: Transmit a sequence of 150 (note 1) TPC commands with the value 0. 7) Step F: Transmit a sequence of 150 (note 1) TPC commands with the value 1. 8) Step G: Transmit the PHYSICAL CHANNEL RECONFIGURATION message to reconfigure the uplink channel in order to set the TPC step size to 2 dB (with the Power Control Algorithm remaining as algorithm 1). Contents of the message is specified in the table 5.4.2.4.2.B. After the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message from the UE is received, transmit a sequence of TPC commands with the value 1 until the UE output power is above the maximum power threshold. Transmit a sequence of 75 (note 1) TPC commands with the value 0. TS 34.121-1 V10.2.1, § 5.4.2.4.2.

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	10) During steps A to H the mean power of every slot shall be measured, with the following exceptions: - In steps D and F, measurement of the mean power is not required in slots after the 10th slot after the mean power has exceeded the maximum power threshold; - In steps E and G, measurement of the mean power is not required in slots after the 10th slot after the mean power has fallen below the minimum power threshold. The transient periods of 25 μs before each slot boundary and 25 μs after each slot boundary shall not be included in the power measurements. TS 34.121-1 V10.2.1, § 5.4.2.4.2. On information and belief, the functions used by the Accused Huawei '334 Products use bias conditions defined in a ratio to the maximum bias voltage value. Also on information and belief, the bias condition or bias voltage of the power amplifier in the accused devices increases gradually to a maximum value as the device moves farther from the cell-site station it is currently transmitting to. On information and belief, this gradual increase continues until the device is "very far" from the cell-site (base) station, in other words, until the device reaches a distance from the cell-site (base) station at which the bias condition of the power amplifier reaches its maximum value (the farthest point at which the cellular telephone can still transmit to the cell-site station). The '334 Patent describes this concept at least at 8:34-39 and Figure 10(a). Skyworks frontend modules include power amplifiers:

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	Front-end Modules for Cellular Designed with cost and space savings in mind, Skyworks front-end modules combine the company's industry-leading power amplifier (PA) module and switch functions into single low-cost, laminate-based multi-chip modules (MCM), 40 percent smaller than alternative solutions. Key features of the transmit front-end modules include multi-band / multi-mode power amplifiers, current sensing power control, high-linearity transmit/receive switches and all associated filtering, duplexing and control functions. Further, the new module requires no external matching components, accelerating time-to-market. Manufactured using Skyworks proprietary heterojunction bipolar transistor (HBT) power amplifier process and low-loss pseudomorphic high electron mobility transistor (PHEMT) switch technologies, front-end modules deliver superior handset talk and standby time. The Front-end Modules Feature: • Multi-band / Multi-mode power amplifiers • High linearity TX/RX switches • Single multi-chip module design • Reduced handset design time • Superior handset talk and standby times See http://www.skyworksinc.com/Products_FEMs_Cellular.aspx Upon information and belief the Mate 10 implements an RF Front End Control Interface similar to and/or in accordance with the MIPI Alliance Specification for RF Front-End Control Interface. See e.g., https://mipi.org/membership/board-and-contributor-members indicating that HiSilicon and Skyworks are both “contributor[s]” to the MIPI alliance specifications and components of both are included in the Mate 10: 

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	1 Introduction 1 The RF Front-End Control Interface (later referred to as RFFE) was developed to offer a common and wide-spread method for controlling RF front-end devices. There are a variety of front-end devices, including Power Amplifiers (PA), Low-Noise Amplifiers (LNA), filters, switches, power management modules, antenna tuners and sensors. These functions may be located either in separate devices or integrated into a single device, depending on the application. MIPI Alliance Specification for RFFE Ver. 1.10 at 10. 4.1 Overview 86 RFFE is a two-wire, serial interface intended to be used to connect Radio Frequency ICs (RFIC) of a mobile terminal to their related Front-End Modules (FEM). The RFFE interface enables systems to efficiently control various FEMs in next generation mobile terminals with increased complexity of performance supporting multi-mode, multi-band and multiple antennas, all with a minimum number of wires and pins using a single RFFE bus. It is designed to support existing 3GPP standards such as LTE, EGPRS, UMTS, HSPA, etc. and also other, non-3GPP air interfaces. The RFFE interface is based on <i>MIPI Alliance Specification for System Power Management Interface (SPMI)</i> [MIPI03]. The RFFE interface is intended to be efficient, flexible, and extensible, accommodating many variations in the overlying system design, while providing interoperability at the interface level between compliant RFICs and FEMs. The ability to design one common control interface which may be reused for all of these modules helps reduce front-end complexity, and hence speed up the time-to-market for these terminals. <i>Id.</i> at 19.

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	4.1.1.1 Basic 96 Figure 2 shows a Basic Configuration of an RFBE bus implementation based on a minimal topology consisting of a RFIC with one RX and one TX path connected to one antenna. The main characteristic of the Basic Configuration is that there is only one RFBE bus where all front-end components are connected. The RFIC is the Master on the RFBE bus and all front-end components act as Slaves. The TX signal path starts at the RFIC and may comprise various outputs for different radio standards or frequency bands. Depending on the detailed architecture these analog outputs may be connected to a set of different gain or power amplifiers, which usually need to be controlled. These gain or power amplifiers may be separate for each output or may also be shared for several outputs. Following the TX direction towards the antenna there are bandlimiting filters, which may be configurable for different scenarios, the antenna switch used to select RX and TX directions as well as different bands, and finally the antenna tuning-module. In addition, these components may be accompanied by various sensors for temperature, power, voltage, etc. and adjustable power supplies for the front-end components like LDOs or DC/DC converters for PAs. <i>Id.</i> at 20.

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	Figure 2 Basic Configuration <i>Id.</i> at 21. Discovery from Huawei (and relevant third parties) is expected to confirm the exact manner in which the Accused Huawei '334 Products associate power control step sizes in a TPC command with bias adjustment in the RF frequency. Further, this limitation implicates the software, firmware, and/or source code of the Accused Huawei '334 Products. Therefore, Maxell will supplement these contentions 30 days after Defendants (or third-parties where appropriate) provide the source code for each of the Accused Huawei '334 Products in accordance with P.R. 3-1(g) as set forth in Judge Schroeder's standing Patent Discovery Order. To the extent Defendants argue that this limitation is not literally met in any Accused Huawei '334 Product, pursuant to P.R. 3-1(d), Maxell asserts that this limitation is met

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	under the doctrine of equivalents because the identified structure matches the function, way, and result of the claimed element and, to the extent there is a difference, the difference is insubstantial. For example, to the extent that Defendants argue that the controllers in the Accused Huawei '334 Products do not control amplifiers in such a manner that the function uses bias conditions defined in a ratio to the maximum bias voltage value and that the bias condition increases gradually to the maximum value when output intensity increases to the value taken when said cellular telephone is very far from the cell-site station, on information and belief, each of these products include software, hardware, or a combination of the two that perform the equivalent function of gradually increasing the bias condition of a power amplifier up to a maximum value as the device gets farther from the cell-site station. Using this software, hardware, or combination of the two, these products perform substantially the same function (for example, gradually increasing the bias condition of a power amplifier up to a maximum value as the device gets farther from the cell-site station) in substantially the same way as claimed. The performance of this function achieves substantially the same result, for example, adjusting transmission parameters prior to transmission of a signal so as to conserve power while still ensuring a reliable transmission to a cell-site (base) station.
[4.k] that said bias condition increases gradually to the maximum value when output intensity increases to the value taken when said cellular telephone is very far from the cell-site station.	Each of the Accused Huawei '334 Products operate in such a manner that the bias condition increases gradually to the maximum value when output intensity increases to the value taken when the cellular telephone is very far from the cell-site station. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite (showing that the accused devices have an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station).

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	As an example, during physical random-access procedure, the Accused Huawei '334 Products are required to transmit a first preamble at an initial preamble power and to transmit subsequent preambles at gradually increasing power according to a power ramp step until the preamble transmission power reaches the maximum allowed power. On information and belief, higher preamble transmission power are required when the Accused Huawei '334 Product is very far from the cell-site station. The physical random-access procedure shall be performed as follows: 1 Derive the available uplink access slots, in the next full access slot set, for the set of available RACH sub-channels within the given ASC with the help of subclauses 6.1.1. and 6.1.2. Randomly select one access slot among the ones previously determined. If there is no access slot available in the selected set, randomly select one uplink access slot corresponding to the set of available RACH sub-channels within the given ASC from the next access slot set. The random function shall be such that each of the allowed selections is chosen with equal probability. 2 Randomly select a signature from the set of available signatures within the given ASC. The random function shall be such that each of the allowed selections is chosen with equal probability. 3 Set the Preamble Retransmission Counter to Preamble Retrans Max. 4 If the Preamble_Initial_Power is below the minimum level required in [7], set the Commanded Preamble Power to a value, which shall be at or above the Preamble_Initial_Power and at or below the required minimum power specified in [7]. Otherwise set the parameter Commanded Preamble Power to Preamble_Initial_Power. 5 In the case that the Commanded Preamble Power exceeds the maximum allowed value, set the preamble transmission power to the maximum allowed power. In the case that the Commanded Preamble Power is below the minimum level required in [7], set the preamble transmission power to a value, which shall be at or above the Commanded Preamble Power and at or below the required minimum power specified in [7]. Otherwise set the preamble transmission power to the Commanded Preamble Power. Transmit a preamble using the selected uplink access slot, signature, and preamble transmission power. 6 If no positive or negative acquisition indicator (AI = +1 nor -1) corresponding to the selected signature is detected in the downlink access slot corresponding to the selected uplink access slot: 6.1 Select the next available access slot in the set of available RACH sub-channels within the given ASC. 6.2 Randomly select a new signature from the set of available signatures within the given ASC. The random function shall be such that each of the allowed selections is chosen with equal probability. 6.3 Increase the Commanded Preamble Power by ΔP_0 = Power Ramp Step [dB]. If the Commanded Preamble Power exceeds the maximum allowed power by 6dB, the UE may pass L1 status ("No ack on AICH") to the higher layers (MAC) and exit the physical random access procedure. 6.4 Decrease the Preamble Retransmission Counter by one. 6.5 If the Preamble Retransmission Counter > 0 then repeat from step 5. Otherwise pass L1 status ("No ack on AICH") to the higher layers (MAC) and exit the physical random access procedure. 3GPP TS 25.214 (v10.2.0), § 6.1. As another example, during ordinary power control after communications channels have

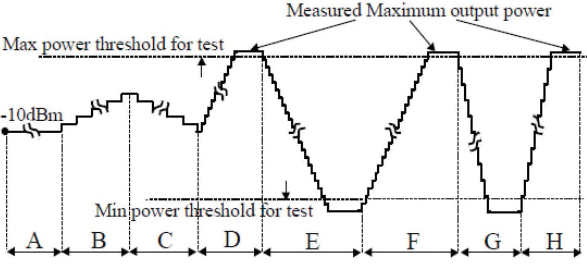
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	been activated, the transmit power of the Accused Huawei '334 Product is adjusted by the uplink inner loop power control in accordance with signal-to-interference ratio (SIR) in the uplink. For example, the Accused Huawei '334 Product receives TPC commands that require an increase in the transmitted output power when the estimated SIR in the uplink is less than a target SIR. On information and belief, the TPC_cmd requires the Accused Huawei '334 Product to increase its output power when the Accused Huawei '334 Product is very far from the cell-site station because the SIR is smaller at further distance from the cell-site station. The cells in the active set should estimate signal-to-interference ratio SIR_{est} of the received uplink DPCH. The cells in the active set should then generate TPC commands and transmit the commands once per slot according to the following rule: if $SIR_{est} > SIR_{target}$ then the TPC command to transmit is "0", while if $SIR_{est} < SIR_{target}$ then the TPC command to transmit is "1". When UL_DTX_Active is TRUE (see section 6C), a TPC command is not required to be transmitted in any downlink slot starting during an uplink DPCH slot which is in an uplink DPCH transmission gap as defined in subclause 6C.2, in which case it is not known to be present. Upon reception of one or more TPC commands in a TPC command combining period, the UE shall derive a single TPC command, TPC_cmd, for each TPC command combining period in which a TPC command is known to be present, combining multiple TPC commands if more than one is received in a TPC command combining period. The TPC command combining period has a length of one slot, beginning at the downlink slot boundary for DPCH, and 512 chips after the downlink slot boundary for F-DPCH. The UE shall ignore any TPC commands received in an F-DPCH slot starting during an uplink DPCH slot which is in an uplink DPCH transmission gap as defined in subclause 6C.2. 3GPP TS 25.214 (v10.2.0), § 5.1.2.2.1. On information and belief, the total bandwidth of the WCDMA system is shared by multiple users. The sharing of the WCDMA system requires power control mechanisms such as closed-loop power control to reduce a near-far effect. The near-far effect causes the signal of a terminal that is far from the serving base station to be dominated by the signals of other terminals that are closer from the base station. On information and belief, when the cellular telephone is very far from the cell-site station, the SIR measured at the cell-site station for the cellular telephone is lower than a target SIR, which forces the cellular telephone to increase its output intensity in accordance with the TPC commands transmitted by the cell-site station. See Heikki Kaaranen et al., UMTS Networks, Architecture, Mobility and Services, Second Edition, John Wiley & Sons Ltd, 2005, pages 122-128.

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6. A method according to claim 4	Citations for claim (e.g. claim elements [4.j]- [4.k]) above are incorporated herein.
[6.a] wherein said bias condition increases gradually to the maximum value when said output intensity increases within the range of -50 dB to 0 dB.	Each of the Accused Huawei '334 Products is required to be capable to change its output power within a range bounded by a minimum and maximum output power. <i>See, e.g.</i>, User Guides of MyTouch, Impulse 4G, Fusion, Fusion 2, Summit, Mercury, Mate 2, P8 Lite, GX8, SnapTo, Raven, Pronto, Union, Honor 8, Inspira, Premia 4G, Magma, Ascend II, Ascend Y, Ascend II, Ascend Y, Ascend Q, Ascend P1, Honor 6X, Honor 5X, Ascend W1, Glory, Huawei Ascend XT2, Huawei Honor 7X, Huawei Honor 7, Huawei Honor 6 Plus, Huawei Honor 9, Huawei Elate, Huawei Mate 10, Huawei Mate 10 Pro, Huawei P10 Lite, Huawei P10 Plus, Huawei Mate SE, Huawei Mate 9 Pro, Huawei Mate 9 Lite, Huawei P20 Pro, Huawei P20, and Huawei P20 Lite; <i>see also</i> TS 25.101, § 6.4.2.1. For example, when the Accused Huawei '334 Product received a TPC_cmd with a downward adjustment from a maximum output power, the Accused Huawei '334 Product is required to increase its output power from the minimum output power. For example, the Accused Huawei '334 Product is required to be able to respond to a sequence of TPC commands, for example a sequence of 50 or more TPC commands which can increase the output power within a range of -50dB or less to 0dB, with a step size of 1dB or more.

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	 Figure 5.4.2.4 Inner Loop Power Control Test Steps TS 34.121-1 V10.2.1, § 5.4.2.4.2. 3) Step B: Transmit a sequence of 50 TPC commands with the value 1. 4) Step C: Transmit a sequence of 50 TPC commands with the value 0. 5) Step D: Transmit the PHYSICAL CHANNEL RECONFIGURATION message to reconfigure the uplink channel in order to set the Power Control Algorithm to algorithm 1, and the TPC step size to 1 dB. Contents of the message is specified in the table 5.4.2.4.2.A. After the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message from the UE is received, transmit a sequence of TPC commands with the value 1 until the UE output power is above the maximum power threshold. 6) Step E: Transmit a sequence of 150 (note 1) TPC commands with the value 0. 7) Step F: Transmit a sequence of 150 (note 1) TPC commands with the value 1. 8) Step G: Transmit the PHYSICAL CHANNEL RECONFIGURATION message to reconfigure the uplink channel in order to set the TPC step size to 2 dB (with the Power Control Algorithm remaining as algorithm 1). Contents of the message is specified in the table 5.4.2.4.2.B. After the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message from the UE is received, transmit a sequence of TPC commands with the value 1 until the UE output power is above the maximum power threshold. Transmit a sequence of 75 (note 1) TPC commands with the value 0. 9) Step H: Transmit a sequence of 75 (note 1) TPC commands with the value 1.

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	TS 34.121-1 V10.2.1, § 5.4.2.4.2. 10) During steps A to H the mean power of every slot shall be measured, with the following exceptions: - In steps D and F, measurement of the mean power is not required in slots after the 10th slot after the mean power has exceeded the maximum power threshold; - In steps E and G, measurement of the mean power is not required in slots after the 10th slot after the mean power has fallen below the minimum power threshold. The transient periods of 25 μs before each slot boundary and 25 μs after each slot boundary shall not be included in the power measurements. NOTE 1: These numbers of TPC commands are given as examples. The actual number of TPC commands transmitted in these steps shall be at least 10 more than the number required to ensure that the UE reaches the relevant maximum or minimum power threshold in each step, as shown in figure 5.4.2.4. NOTE 2: In order to make it more practical to measure the entire power control dynamic range (between min power threshold and max power threshold with suitable margins), it is permissible to segment the power control sequences into smaller subsequence. For example, Step-E can be divided into different stages while still fulfilling the purpose of the test to measure the entire dynamic range. TS 34.121-1 V10.2.1, § 5.4.2.4.2.