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## INTRODUCTION

While the US-China trade dispute drags on and we all ponder Huawei's future, Huawei charges right on into the 5G arena with its new Mate 20 X 5G flagship smartphone. In today's teardown, we're curious to see what this plus-sized phablet conceals inside, and [how independent](#) the hardware might be—even as Huawei faces the possibility of being banned from doing business with US companies.

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### TOOLS:

- [Suction Handle](#) (1)
  - [Phillips #00 Screwdriver](#) (1)
  - [Halberd Spudger](#) (1)
  - [Spudger](#) (1)
  - [Tweezers](#) (1)
  - [Heat Gun Hakko HJ5000](#) (1)
  - [Technician's Razor Set](#) (1)
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## Step 1 — Huawei Mate 20 X 5G Teardown



- Here's the lowdown on this Mate 20 X 5G:
  - 7.2" OLED multitouch display with 1080 × 2244 resolution
  - Octa-core Huawei [Kirin 980](#) chipset, paired with 8 GB RAM
  - 256 GB onboard storage
  - Balong 5000 multi-mode 5G modem
  - 4,200 mAh battery with 40 W SuperCharge 2.0 support
  - Triple rear cameras: 40 MP  $f/1.8$ , 20 MP  $f/2.2$ , and 8 MP  $f/2.4$  lens with 5x optical zoom
- The front-facing camera resides in a "waterdrop" notch, and the rear protective cover comes with a neat reminder which we will dutifully ignore.

## Step 2



- On the bottom we recognize the usual suspects: a USB-C port, two microphone holes and a speaker grille.
- Along the top edge, we find another microphone hole, the infrared blaster, and the barest sliver of a grille for the earpiece speaker.
- Compared to the already-large Mate 20 Pro, the X 5G looks colossal. On its backside, we note the 5G branding, and the fingerprint sensor underneath its array of cameras.

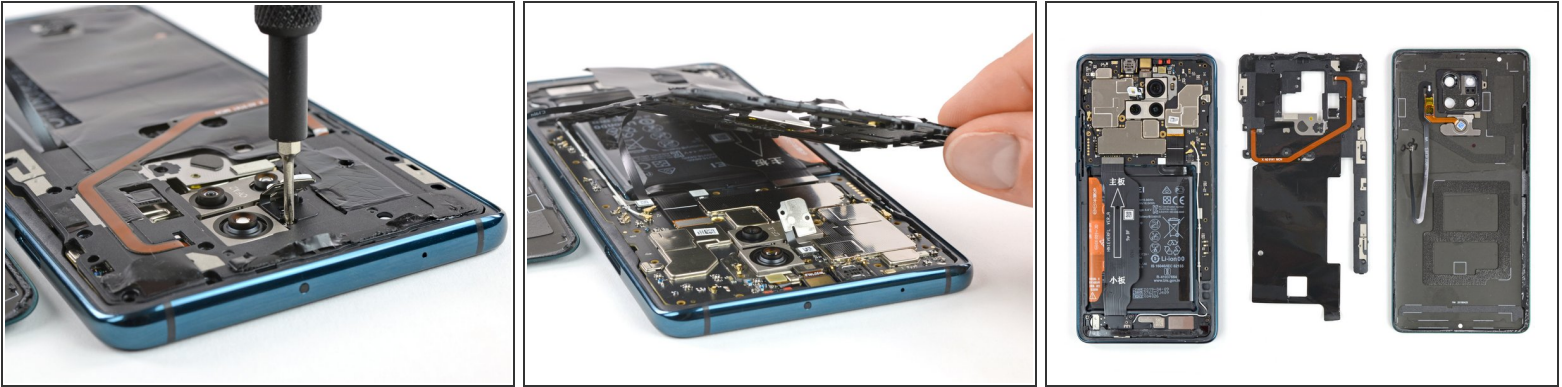
## Step 3



- Though this Mate is only rated IP53, the SIM card tray is equipped with a rubber gasket—something we usually see on "[waterproof](#)" smartphones these days.
  - ❗ Slot 1 of this SIM tray is reserved for 5G cards, whereas slot 2 only accepts up to 4G cards.
- To our surprise, we get the glued-down back cover off lickety-split—no heat required! A [suction handle](#) and a halberd spudger separates everything nicely.
  - ❗ Adhesives can harden with age, so maybe next time won't be so easy—but our fresh-from-the-factory unit was very cooperative.
- A generously proportioned fingerprint flex cable keeps the back cover tethered for now, but it's such a long leash that we don't mind. On to the next layer.

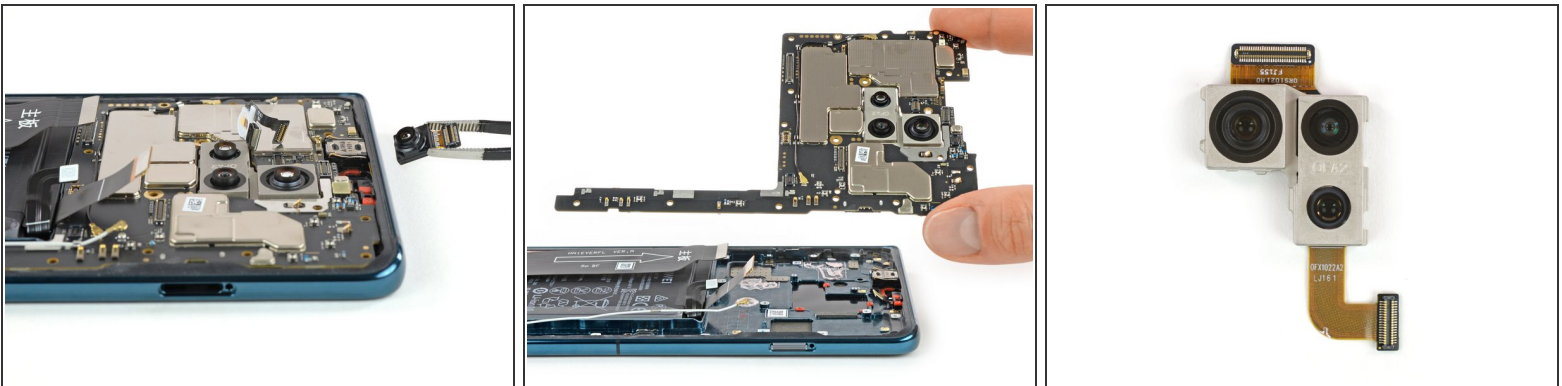


## Step 4



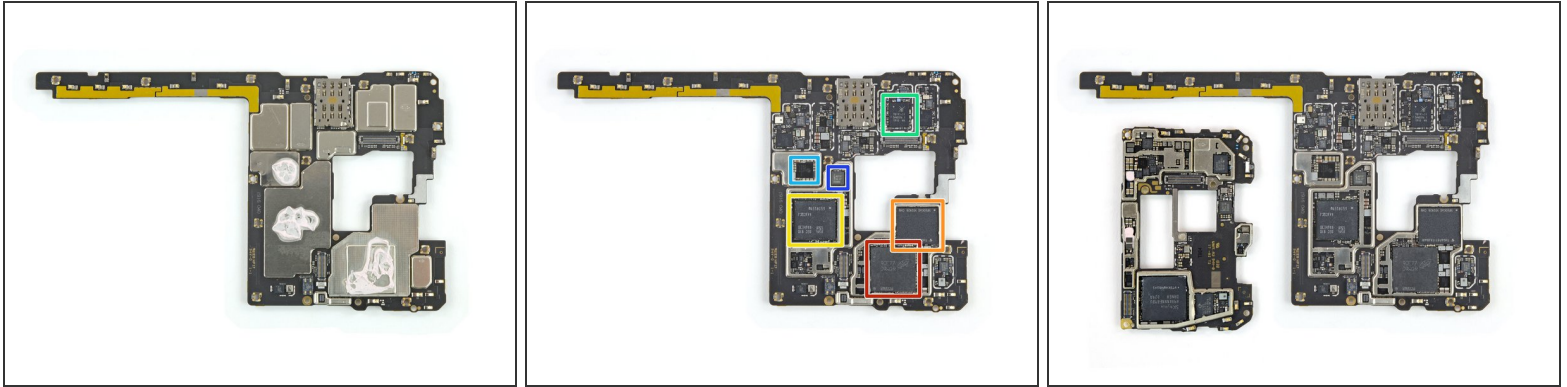
- A flock of screws hold the NFC coil, antenna, and graphite heat conductor pad in place. One hides behind a tamper-proof sticker, and another one lurks under the camera flash module—a strange place for a screw.
- With those bits out of the way, we can finally disconnect the fingerprint sensor and get our first good look inside this phone.

## Step 5



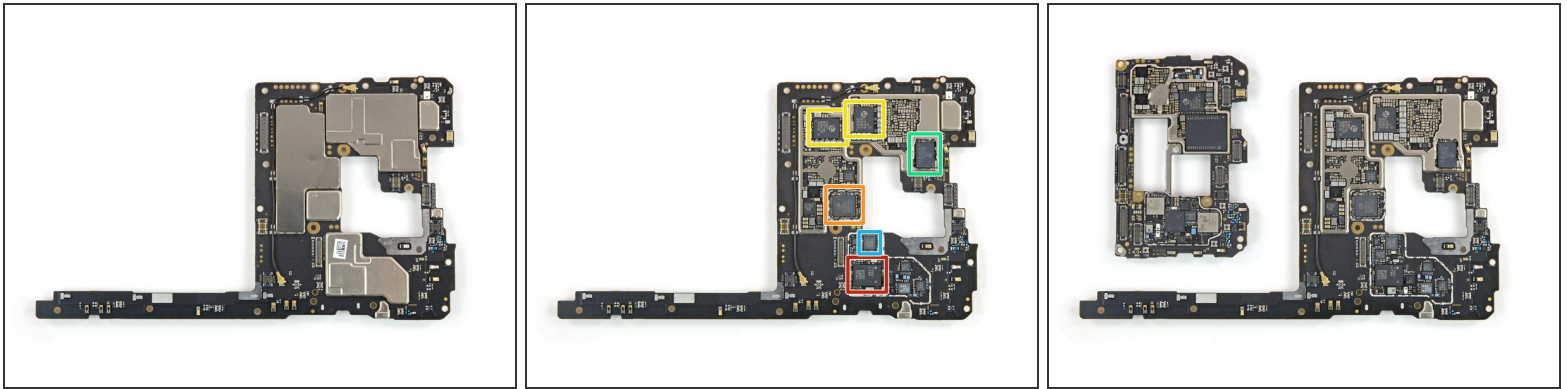
- The 24 MP,  $f/2.0$  front-facing peeper comes out with a simple pry. We'll never grow tired of these repair-friendly press-fit connectors.
- The motherboard also comes out easily, allowing us to unplug the three-eyed rear camera block from the back.
- This [triclops](#) carries the [same tech as the Mate 20 Pro](#) from October 2018—a 40 MP  $f/1.8$  wide angle, a 20 MP  $f/2.2$  ultra wide angle, and an 8 MP  $f/2.4$  telephoto lens.

## Step 6




- Finally, we get to the nitty-gritty of this Mate's iteration—the motherboard:
  - Micron D9WGR (MT53D1G64D8NZ-046 WT:E) 8 GB LPDDR4 with Kirin 980 SoC layered underneath
  - Toshiba [THGAF8T1T83BAIR](#) 256 GB NAND flash
  - Samsung [K4UHE3D4AA-CGCJ](#) 3 GB LPDDR4X—more on that later
  - Skyworks 78191-11 low-band front-end module for WCDMA/LTE
  - HiSilicon Hi6526 PMU
  - NXP 80T37 (likely NFC controller)
- ① For comparison, the smaller board on the lower left belongs to the [Mate 20 Pro](#).

## Step 7

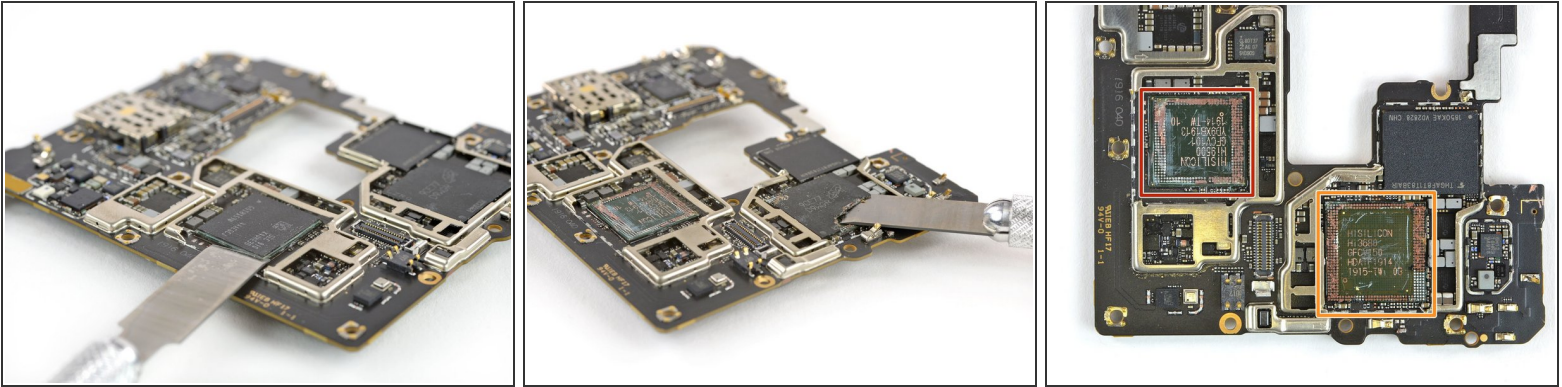


- ... more on the other side of the board:
  - Qorvo [77031 4T8R](#) mid/high-band module
  - HiSilicon Hi63650
  - HiSilicon Hi6421 power management IC
  - HiSilicon Hi1103 Wi-Fi module
  - HiSilicon Hi6D03

 And again the smaller Mate 20 Pro motherboard for comparison.



## Step 8



- Notably absent from our initial chip findings is the [Balong 5000](#), HiSilicon's multi-mode networking chipset that is supposed to be the powerhouse of this 5G cell.
- On a hunch, we coarsely chisel off the extra Samsung LPDDR4X chip to find ...
  - HiSilicon Hi9500 GFCV101! This is most likely the Balong 5000 we're looking for.
  - Just to be sure, we pry up the Micron memory chip as well. Sure enough, underneath slumbers the HiSilicon Hi3680 GFCV150, also known as Kirin 980.
- ⚠ Our [hot air station](#) had the day off. Deal with it.
- 📖 It looks like the 5G modem comes bundled with its own block of dedicated LPDDR4X memory—a whopping 3 GB of it, if we've decoded those Samsung package markings correctly. Is that a giant data buffer? This is the first 5G modem we've seen in the wild, so sound off in the comments if you know more than we do.

## Step 9



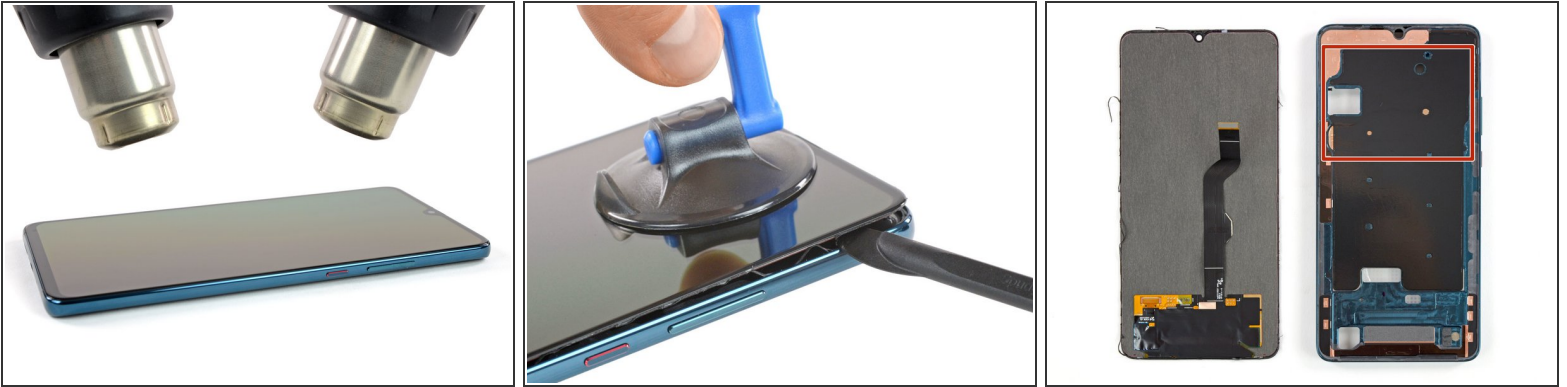
- To get unobstructed access to the battery, we remove the board interconnect cable.
- While we're at it, we also pry up the glued-in loudspeaker ...
- ... and the tiny daughterboard with the USB-C port soldered onto it.

## Step 10



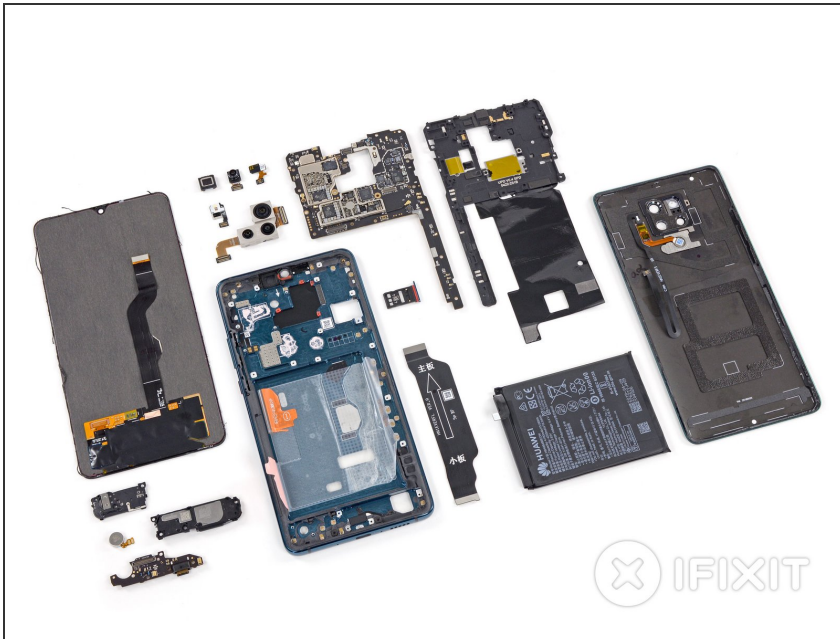
- We're always happy to see built-in battery removal instructions, and follow them step-by-step. It's as [easy as 1-2-3!](#)
- Though we didn't [need heat this time around](#), we are still rewarded with a clean battery extraction.
  - This is the exact same battery used in the Mate 20 Pro, weighing in at 16.04 Wh (4,200 mAh @ 3.82 V).
- ❗ That's well short of the whopping [19.1 Wh](#) (5,000 mAh) battery in the *standard* Mate 20 X—but it's still a monster compared to the iPhone XS Max's dual-cell, [12.08 Wh](#) (3,179 mAh) powerplant.

## Step 11



- The display adhesive holds on a bit tighter than the back cover adhesive, but gives way after some heat and skilled [halberd slicing](#).
- This Mate doesn't have any fancy [under-display fingerprint sensor](#). There's just a blank OLED screen and the aluminum frame.
- ❗ This 7.2 inch OLED panel is manufactured by Samsung.
- Much like in the standard Mate 20 X, there's a big [vapor chamber](#) hiding on the aluminum frame behind the graphite foil.

## Step 12



- With all the parts more or less gently removed, we have an overview of Huawei's foray into the mobile 5G sector.
- Except for three "US"-manufactured chips (Micron, Skyworks and Qorvo) and a dutch NXP module, the motherboard's major sockets are dominated by Huawei's in-house brand HiSilicon and other Asian manufacturers (Toshiba, Samsung).
- Want to see future smartphone guts from Huawei? Subscribe to our [newsletter](#) and stay in the loop.



## Step 13 — Final Thoughts

### REPAIRABILITY SCORE:



- The Huawei Mate 20 X 5G earns a **4 out of 10** on our repairability scale (10 is the easiest to repair):
  - Many components are modular and can be replaced independently.
  - The battery is accessible after removing the rear cover and midframe, and is equipped with pull tabs.
  - Standard Phillips screws are used along with an average amount of adhesive.
  - The midframe covers the battery and fingerprint sensor connectors, and is itself obstructed by the camera sensors and flash.
  - Glued-down front and back glass means greater risk of breakage, while making all repairs difficult to start.
  - Screen repairs will require near-complete disassembly.