

Motorola's 5G Moto Mod will have proximity shutoff sensors to limit exposure to millimeter waves

Last August, Motorola announced what might still wind up being the world's first true 5G phone – the Verizon-exclusive Moto Z3 with an optional 5G Moto Mod. It's a snap-on module that the company promised would give you an insanely fast 5Gbps cellular connection, faster than most *landlines* these days. But Moto Z3 buyers had to take the company's word for that, because the 5G Mod wouldn't be available until "early 2019," when Verizon's 5G NR network is due to launch in the United States.

Well, the 5G Moto Mod just crossed the FCC today, and it came with a surprise in tow – a document that has more details about how it'll work than I thought the company would ever publicly reveal.

And one of those details is sure to surprise some people, even if it's not necessarily something anyone should actually worry about. Namely, the 5G Moto Mod will feature proximity sensors that shut off any of its four millimeter wave 5G antennas if your fingers get too close.

Here's a portion of Motorola's description:

As mentioned in the device description, capacitive and proximity sensors are used to disable transmission from a given mm-wave antenna array module when a user may be located in close proximity to the module and in a direction in which the module may transmit. The control mechanism is a simple one in which, if proximity detectors indicate the potential presence of the user within a roughly conical region in front

of the module where power density may approach the MPE limit, that module is disabled from use by the modem. This terminates and prevents transmission from the module in question until the condition is cleared.

Before you react to that, a few things you should know:

- Millimeter wave radiation is considered non-ionizing – it doesn't have enough energy to tear apart living tissue.
- You've probably already encountered millimeter wave radiation if you've gone through an airport body scanner. The FDA says there are "no known adverse health effects" from that kind of dose.
- The FCC has millimeter wave exposure limits already, and that's what Motorola's system is complying with.
- Motorola goes on to say that the proximity sensors aren't the only way that it's shutting off these antennas – the Mod will also automatically pick an antenna with better signal strength if your fingers are blocking others.

But it's pretty interesting that Motorola felt the need to include such a system, and I'm curious if other 5G devices will have one as well.

We'd previously learned that the 5G Moto Mod contains practically all the guts of a high-end smartphone inside, including its own Snapdragon 855 processor, X50 5G modem, 10 antennas, and its own 2,000mAh battery so it doesn't need to drain your connected phone, but the FCC filing reveals one less-exciting spec as well: the Mod appears to be 7mm thick at its thickest point, meaning it'll more than double the thickness of your admittedly fairly thin 6.75mm Moto Z3 phone.

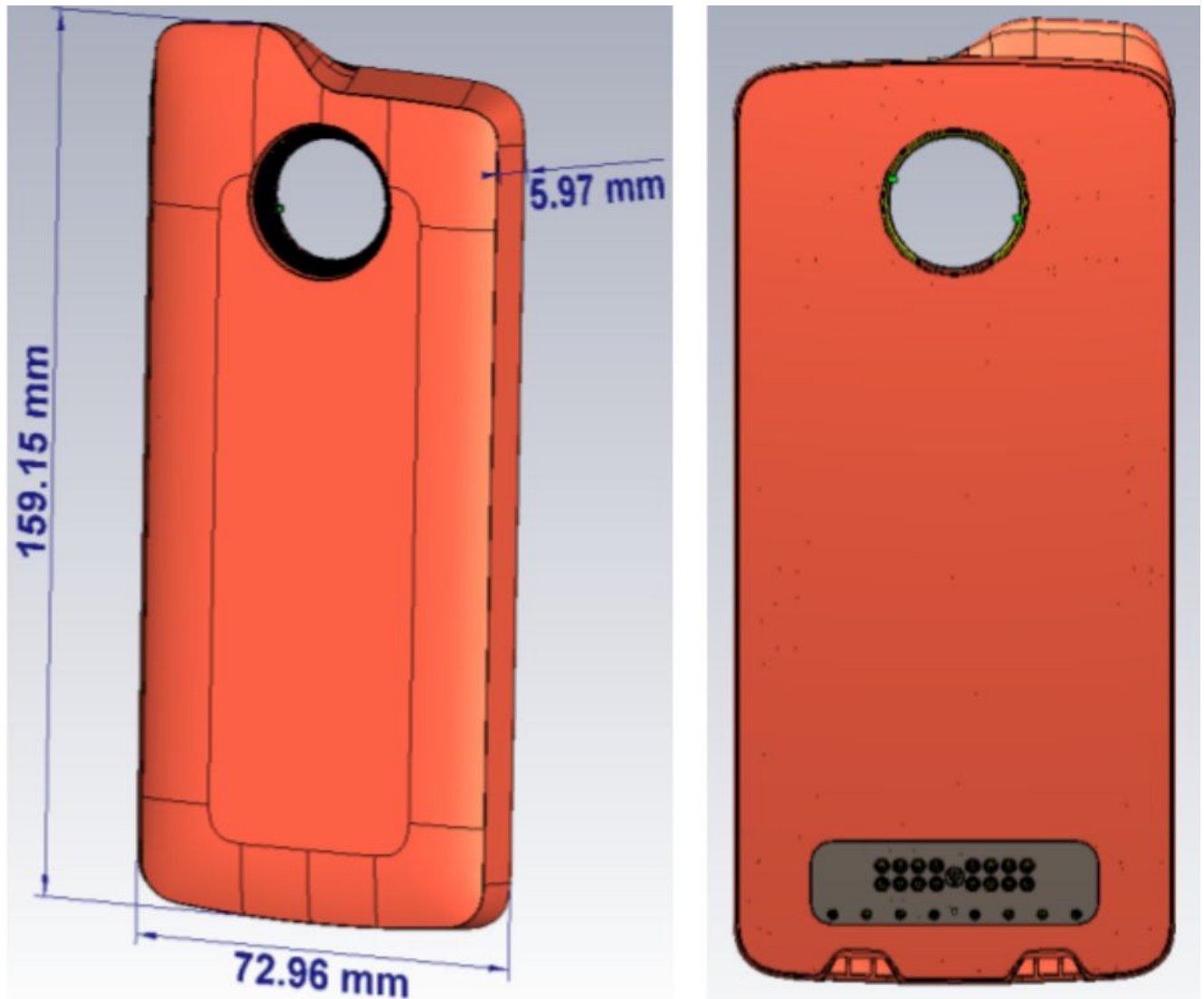


Figure 1: Exterior views of the 5G Mod

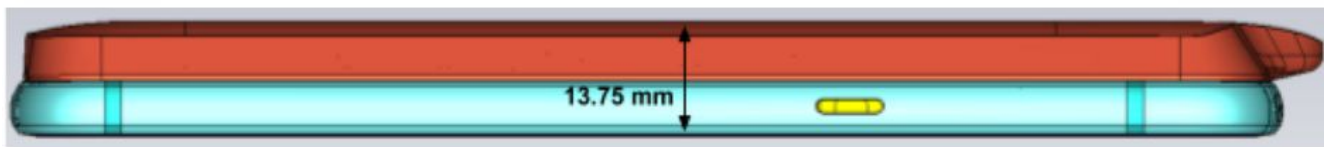


Figure 2: Edge view of the 5G Mod assembled to the host smartphone.

$13.75\text{mm total} - 6.75\text{mm phone} = 7\text{mm}$. Looks like the Mod tapers down to 5.97mm at the edges, though.

FCC

We still don't know how much the 5G Mod will cost, or quite how fast a connection you'll be able to get in Verizon's first 5G-equipped cities at launch – our early hands-on was hamstrung – but it's worth noting that Motorola's now only advertising a conservative estimate of 300 to 500Mbps, compared to the 5Gbps it's theoretically capable of.

Is there really a Moto Z3 Pro?

Oh, and I'll leave you with one final tidbit I spotted in the

FCC filing, though you might want to take this with a grain of salt: A sentence that reads “It functions only when it is snapped onto a 5G Mod-compatible smartphone device, such as the Moto Z3 Pro.”

The rest of the filing is pretty clear that the Mod was only tested with the existing Moto Z3 – I cross-referenced all the numbers to confirm – but I have to admit it was weird to see Motorola avoid launching a new high-end flagship phone last year. It wouldn’t be completely surprising if a “Pro” version of the phone arrives alongside the Mod when it shows up for real. Maybe we’ll hear something at Mobile World Congress next week?

<https://www.theverge.com/2019/2/16/18227951/motorola-5g-moto-mod-fcc-millimeter-wave-proximity-z3-pro>