

Smartphones effects and impacts : Samsung Galaxy S22 technical description and take a apart

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Abstract—Smartphones are one of the greatest innovations at all which became a part of our lives, this research contains a quick review of Galaxy S series, quite look on Galaxy S22 specifically and a partial hardware teardown. Moreover, smartphones impact on our lives and how they affect it whether positively or negatively,

Keywords—smartphones, S22, Galaxy, Impacts, Snapdragon, teardown

I. INTRODUCTION

Samsung Galaxy S series is a high-end smartphones series developed by Samsung Electronics and the first device of the series named Galaxy S was released upon 2010 [1]. The Galaxy S made its name for being the smartphone with the fastest graphical processing unit, thinnest smartphone at 9.9mm and first Android phone to be certified for DivX HD at the time of the release, with the following specifications shown in Table 1 [2].

TABLE 1. GALAXY S SPECIFICATIONS

Specification	Description
Processor	1 GHz ARM
GPU	PowerVR
Flash Memory	2-4 Gb
Display	Super AMOLED capacitive touchscreen
Wi-fi Connectivity	Yes
Primary Camera	5 megapixel
Secondary front-facing camera	0.3 megapixel

The Galaxy S series name continued to widespread worldwide with Snapdragon-based Galaxy S Plus and NovaThor-based Galaxy S Advance smartphones [2]. Lately the latest series of Galaxy S was released as Galaxy S22 by 25/Feb/2022 which contains 3 different models S22, S22+ and S22 Ultra [3].

The completely new series contains three different smartphones, The Galaxy S22 which has a similar design to S21 and camera layout, with a brief change in the phone's rear since its made of glass now instead of plastic [3].

II. GALAXY S22 ULTRA OVERVIEW

The Samsung Galaxy S22 Ultra is the headliner of the S22 series. Being the first S series with Samsung's S Pen. The smartphone has a different look from the 2 other models mentioned earlier, different shape and camera module.

The Chipset is the same compared to other modules, it has 8 GB RAM only with 128 GB storage or 12 GB RAM with 256GB, 512GB or 1 TB of storage.

The phone battery is big with 5000mAh. It has 45w wired and 25 wireless charging speed [3]. It has 40Mp, f/2.2 front camera and 4 rear cameras with the following specifications:

- A. 108Mp , f/1.8 and OIS main camera.
- B. 12MP, f/2.2 ultra-wide camera
- C. 10Mp, f/2.4, OIS 3x zoom telephoto camera
- D. 10Mp, f/4.9, OIS 10x zoom telephoto camera

It also supports many features, such as Bluetooth 5.2, Gorilla Glass Victus+, Android 12 with One UI 4.1 and 5G. Also, S22 Ultra has UWB which is a modern technology that allows the user to communicate using radio technology with fast data transfer, high frequency and many other uses.

III. A DEEP VIEW OF GALAXY S22 ULTRA CHIP

A. Processor

The new Samsung Galaxy S22 Ultra has the masterpiece Snapdragon 8 Gen 1 Octa-Core Processor which is the most advanced 5G platform by the end of April, since a new Qualcomm Snapdragon 8+ Gen 1 processor unveiled. The processor supports the X65 5G Modem-RF System with up to 10 Gbps speed that uses AI to support signal boost while supporting all-day power and more locations than before [5].

Moreover, this processor can support Wi-Fi 6 & 6E with multi-gig speeds which offers additional non-overlapping channels and communicating with up to 8 devices at the same time [5,6].

The Fig1 shows the mainboard of the Galaxy S22 Ultra which was torn down by ifixit team.

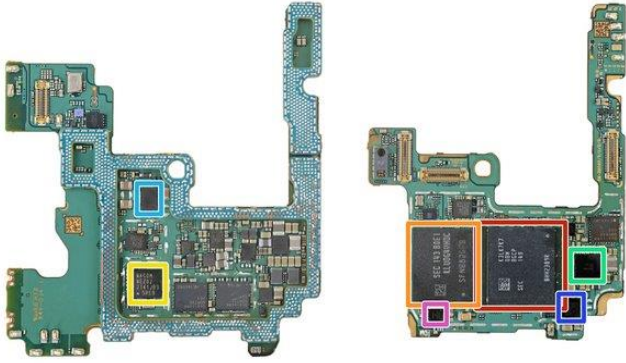


Fig 1. Galaxy S22 Ultra Mainboard [4]

- Qualcomm SM8450 Snapdragon 8 Gen 1 Octa-Core Processor layered under a Samsung K3LK7K70BM-BGCP 8 GB Mobile LPDDR5 SDRAM Memory
- Samsung KLUDG4UHC-B0E1 128 GB NAND Flash Memory (UFS 3.1)
- Wacom WEZ02 Digitizer Controller
- Maxim MAX77705C Power Management
- Renesas P9320S Wireless Power Transceiver
- NXP Semiconductor PCA9468 Battery Charger
- Cirrus Logic CS35L40 Audio Amplifier

B. Heat Dissipation

The Snapdragon 8 Gen 1 has 10 billion transistors with high-end performance that requires a lot of power, which made Samsung engineers think about heat dissipation, especially that Samsung smartphones are well-known for running too hot. The S22 combines an approach that heavily depends on materials as well as layout.

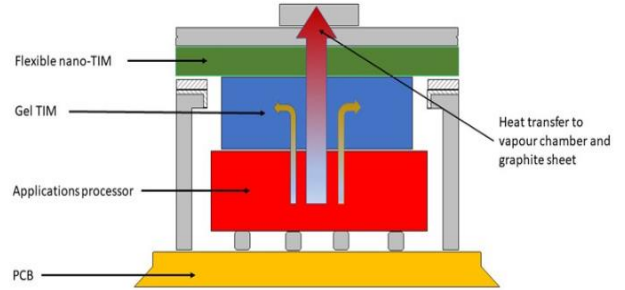


Fig 2. Heat Dissipation features – Galaxy S22 Ultra [7]

In this design shown in Fig 2 we have two new thermal-interface materials. A Gel TIM sits on top of processor, which is mainly made from silicone to transfer heat between two or more solid surfaces, this TIM uses thicker gel than earlier versions, then another nanofiber follows to shield electromagnetic interference from the Snapdragon [7].

Then, next follows is a vapor chamber which is a vacuum sealed flat metal structure that contains working fluid which changes from liquid to gas when heat is applied anywhere on its surface, that gas moves quickly and whenever it finds a cooler place than its boiling point, it condenses then travels back to the heat source, what makes vapor chamber much reliable is the way it spreads the heat out in any direction unlike heat pipes which has smaller section area and only spread the heat in one way, which makes the snapdragon efficiently used by reducing the power dissipation. Finally, there is a thin sheet of graphite sits on top of these enhanced features and the ifixit team who made the teardown for this device has also found a thermal paste inside the device [7,8].

IV. SMARTPHONES EFFECTS ON OUR LIFE

Without a doubt smartphones became a huge part of our lives, connected the whole world together to become a small village. Impacts of smartphones are obvious, diverse and both positive and negative in many life fields, such as business, education, health and social life.

A. Business

Smartphones impacts on this field was huge making new dimensions for business, not only for vendors but many companies, ISPs and small enterprises which implicitly compete to take full advantage of smartphones.

Positive Impacts

Many markets have been introduced, such as Mobile Application Market results in a competitive environment that includes many companies competing with each other to offer the best service, performance and products which lead to a new level of advertising strategies and techniques. Distance is no more an issue since online markets are a huge change making an easy access to many products and companies all over the world and no need for face-to-face meetings to make a deal [9].

Negative Impacts

On the other hand, one of the biggest negative impacts of smartphones was on PC market, since most of the people “almost 65%” use pc to do some easy tasks, browse the internet, read news and use social media which smartphones can offer with easy use and much cheaper price, so people chose to use smartphones instead [9].

Moreover, it's true that PCs are being sold everyday with huge income and will continue to be sold every year, but smartphones have more considerable growth and will grow more in the future as the graph in Fig3 shows [9].



Fig 3. Desktop vs Mobile vs Tablet Market Share Worldwide / July 2010 – Apr 2022 [10]

B. Education

Education has become much easier and abundant with smartphones implying easy access, because of the dimensions that internet and smartphones added to our lives including many paths for online learning, visual learning and many other benefits.

Positive Impacts

Education is a very wide field which requires a lot of data and resources that people depend on to collect useful information, with internet and smartphones easy access to web has been introduced. Education became much easier than before by developing touch screen in a handy device which makes user learn in an interactive environment. Distance is no longer a big deal for those who live in remote areas, with many helpful guides on the internet, many recorded lectures are available, live meetings to share ideas and experiences in a small portable device which is easy to use and convenient. One of the biggest deals is what really smartphone offers as there isn't much setup needed to access internet or use all the previous mentioned resources or services on such a handy device [9].

Negative Impacts

Despite the huge benefits that the smartphones presents but we still face some serious drawbacks out of using smartphones since a lot of students use smartphone to access internet in bad manner or as a distraction to shirk homework, play games, watch TV channels, use social media and much more which is negatively reflected on the students attitude and make them behave irresponsibly [9].

Cheating is not a tolerated behavior in most educational institution, but easy access to internet makes it much easier to cheat or maybe by text exchanging, using modern apps, finding answers on the internet, using advanced calculators, save notes on the smartphone and many other ways which make it hard to deal with students due to irresponsible behavior, since a lot of students rely on easy methods to cheat rather than studying well and prepare for exams [9].

V. CONCLUSION

Smartphones are a big part of our life, and they affect us and our behavior, they are almost in every field of life whether positively or negatively so we must consider that and pay attention to where we are heading.

The S22 Ultra is a good smartphone since it has high performance with a little drawbacks, it can be better with some improvements such as battery, but still not bad, the phone includes some nice modern features which is considered a good point too.

REFERENCES

- [1] "A brief timeline of the Samsung Galaxy S smartphone." verizon, <https://www.verizon.com/articles/A-brief-timeline-of-the-Samsung-Galaxy-S-smartphone/>.
- [2] "Samsung Galaxy S." wikipedia, https://en.wikipedia.org/wiki/Samsung_Galaxy_S.
- [3] Preston, Dominic. "Samsung Galaxy S22: Everything you need to know.", techadvisor, 11 Mar 2022, <https://www.techadvisor.com/news/mobile-phone/samsung-galaxy-s22-3806507/>.
- [4] CChin. "Samsung Galaxy S22 Ultra Chip ID." <https://www.ifixit.com/Guide/Samsung+Galaxy+S22+Ultra+Chip+ID/148073>.
- [5] "Snapdragon 8 Gen 1 Mobile Platform." qualcomm, <https://www.qualcomm.com/products/application/smartphones/snapdragon-8-series-mobile-platforms/snapdragon-8-gen-1-mobile-platform>.

- [6] Kastrenakes ,Jaccob. "Wi-Fi 6: is it really that much faster?." Theverge, Feb 21, 2019, <https://www.theverge.com/2019/2/21/18232026/wi-fi-6-speed-explained-router-wifi-how-does-work#:~:text=The%20technology%20allows%20a%20router,communicate%20with%20up%20to%20eight...>
- [7] Dempsey ,Paul. "Teardown: Samsung Galaxy S22 Ultra." theiet, Wednesday 18 May 2022 , <https://eandt.theiet.org/content/articles/2022/05/teardown-samsung-galaxy-s22-ultra/>.
- [8] "Galaxy S22/S22 Ultra Dual Teardown: Note what we expect." youtube, 3 March 2022, <https://www.youtube.com/watch?v=pSP6kCjTaSE>.
- [9] Gowthami, S., and S. V. K. Kumar. "Impact of smartphone: A pilot study on positive and negative effects." International Journal of Scientific Engineering and Applied Science (IJEAS) 2.3 (2016): 473-478.
- [10] "Desktop vs Mobile vs Tablet Market Share Worldwide." statcounter, <https://gs.statcounter.com/platform-market-share/desktop-mobile-tablet/worldwide/#monthly-201007-202204>.