A sharp transition toward 5G is ongoing in mobile devices. The number of 5G phones will more than double in 2021 compared to 2020. This is a significantly faster penetration rate than the LTE standard 10 years ago. And 5G is leading to an unprecedented increase in content of radio frequency (RF) devices, while previous radio standards still need to be supported. As a result, hundreds of RF components must be fitted into handheld format devices. This is now impacting mid-tier and entry-level phones, not only flagships. 5G features implemented in handsets focus on improving download speed and make the uplink more robust. In addition, there is an entirely new radio path created at millimeter wavelength (mmWave) frequencies, though this only applies to flagships right now. We estimate the RF content as $5-$8 higher in a 5G phone compared to a 4G version and an additional $10 for a mmWave version. As a result, the RF front-end market is booming. It should reach $17B by the end of 2021, up from $14B in calendar year 2020. From there, RF front-end market growth should slow. Average Selling Price (ASP) erosion will be stronger when 5G is mainstream and competition grows further. Overall, we expect an 8.3% annual growth rate (CAGR) between 2019, the year of 5G’s introduction, and 2026, leading to a $21B RF front-end market.

5G TO BOOST THE RF FRONT END MARKET

5G has entered the cell phone industry at a tough time, with health and geopolitical issues to be resolved. Despite this, the industry has remained fully committed to deliver 5G, from Mobile Network Operators, who are highly motivated to demonstrate the new technology’s value, to smartphone manufacturers and their suppliers. The initial 5G pull came from South Korea and China. Now post-COVID recovery is ongoing, 5G is spreading across North America, Europe and through the rest of the world. As a result, most smartphone manufacturers’ projects related to network connectivity are about 5G, which relates to the number of 5G phone models available or to be launched. With 5G becoming the new normal, competition between OEMs is increasing and the question of profitability is being raised. As an example, LG is giving up its mobile business. For others, 5G is about a growth opportunity, especially with Huawei facing supply difficulties. Oppo, Vivo and Xiaomi are among those gaining stronger momentum and growing their footprint in China. Samsung and Apple will also likely reinforce their market positions in Europe.

A CHANGE IN THE HANDSET MARKET DYNAMIC

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OPPORTUNITIES AND THREATS FOR THE RF FRONT-END PLAYERS

The introduction of 5G adds complexity to phones along with RF content. Building 5G phones using discrete components while keeping an acceptable form factor is a challenge, driving more integration. The RF front-end market leaders all have flexible module offerings adapting to multiple market requirements. Besides that, some also have custom-built modules for the flagships. As a result, Skyworks, Murata, Qualcomm, Qorvo and Broadcom together share 85% of the RF front-end market. Skyworks is the market leader. Qualcomm has the strongest growth. However, a variety of companies coming from China are emerging and experiencing double digit growth in the RF front-end space. Most started in the discrete business with standalone Low Noise Amplifiers (LNAs) or switches, which enabled them to accumulate know-how and establish trust with OEMs. The next step for these fabless Chinese companies is to bring integrated modules to the market. This has been supported by more investments in China over the past two years. It’s likely that not all will succeed, but we can expect more cooperation and consolidation over the next few years. A major difficulty for success will be the access to wafer capacity. There is not a shortage of RF components per se, more like tightness in the industry. This is pushing long term supply agreements that only big players can afford.
REPORT OBJECTIVES

The cellphone industry has entered a transition toward 5G. First use cases of the technology have matured and Mobile Network Operators (MNO) are proposing new services to the consumer. MNOs are strongly motivated to invest more resources and to demonstrate 5G’s added value to the consumers, as 5G is not the first thing they are thinking about. In addition, MNOs have developed advantageous commercial 5G packages, particularly in China, adding some more motivation to consumers to upgrade. In this context, 5G has strongly penetrated the smartphone market in 2020 and is expected to further grow as the network is expanding in China, in Europe and in the USA. A 5G phone is relatively more complex than a 4G phone at the RF Front End level. Therefore, it’s worth analyzing the technical trends and anticipating future changes to understand this complex market better.

Indeed, as for every new air standard, 5G represents a significant opportunity for industry players to differentiate, innovate and win the market in the end. In this report, we give our view on RF Front End market evolution and its associated ecosystem.

COMPANIES CITED IN THE REPORT (non exhaustive list)


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RELATED REPORTS, MONITORS & TRACKS

- 5G’s Impact on RF Front-End for Telecom Infrastructure 2021
- 5G Packaging Trends for Smartphones 2021
- RF Front-End Module Comparison 2021 – Vol. 2 – Focus on 5G Chipset
- Apple iPhone 12 series mmWave 5G Chipset and Antenna

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ABOUT YOLE DEVELOPPEMENT

Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 120 collaborators worldwide covering MEMS and Image Sensors, Compound Semiconductors, RF Electronics, Solid-state Lighting, Displays, Software, Optoelectronics, Microfluidics & Medical, Advanced Manufacturing, Power Electronics, Batteries & Energy Management and Memory.

The “More than Moore” market research, technology and strategy consulting company Yole Développement, along with its partners System Plus Consulting, PISEO and Blumorpho, supports industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business.

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“Contracting Parties”: The Seller and the Buyer.

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“IPR” means any rights arising from industrial design, model, copyright, trademarks, patents, databases rights, know-how and similar rights.

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