

# RF front-end market leaders still resist the competition pressure<sup>1</sup>

## OUTLINES:

- RF front-end market is driven by OEM's strategy.
- The RF front-end and connectivity markets content increases year over year while cost pressure remains important.
- From the selected smartphones<sup>2</sup>, System Plus Consulting confirms:
  - Murata mainly supplies discrete filters and Qorvo supplies antenna tuner. Qualcomm is more spread within entire chipset supply in term of design win.
  - Broadcom is pointed as a leader on the market: by supplying only HB/MB PAMiD and some multiplexer in the three phones, the company managed to get 44% of the market.
- The competitive landscape is intense. Yole Développement's analysts point out the evolution of the market shares of leading RF companies.

*"A deep understanding of the mobile phone's RF front-end architecture is critical to understand the RF front-end modules market", asserts **Stéphane Elisabeth, Technology & Cost Analyst from [System Plus Consulting](#)**.*

Pushed by 5G megatrend, the competition is fierce. System Plus Consulting's partner, [Yole Développement \(Yole\)](#) announces a 8% CAGR<sup>3</sup> between 2018 and 2025 for the RF front-end market. With US\$15 billion in 2018, this industry should reach US\$25.8 billion by 2025, confirms the RF electronics team at Yole.

Both companies, System Plus Consulting and Yole have built an overall and detailed picture of the RF front-end architecture as well as a comprehensive industry outlook. The technical analysis is based on an impressive project including more than 50 phone teardown realized and is now available in a new report, titled [RF Front-End Module Comparison 2020 – Volume I](#). Performed by System Plus Consulting's team, this first volume has been conducted to provide insight on technology data for RF front-end modules and components in a selection of smartphones. The report delivers the study of at least twenty FEM and several components

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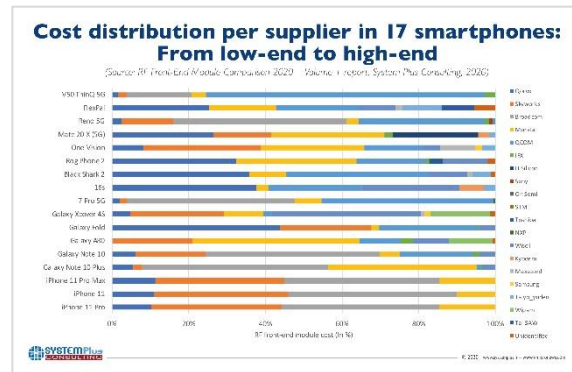
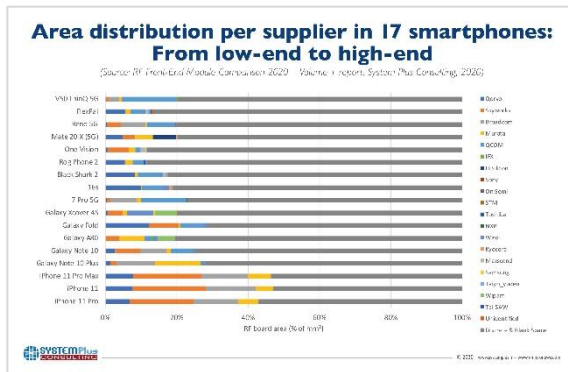
<sup>1</sup> Extracted from :

- [RF Front-End Module Comparison 2020 – Volume I report](#), System Plus Consulting, 2020
- [5G's Impact on RF Front-End Module and Connectivity for Cell phones report](#), Yole Développement, 2020

<sup>2</sup> Apple iPhone 11 Pro, Samsung Galaxy Note 10+ and OnePlus 7 Pro 5G

<sup>3</sup> CAGR : Compound Annual Growth Rate

found in three smartphones: Apple iPhone 11 Pro, Samsung Galaxy Note10+ and OnePlus 7 Pro 5G and an extensive database of FEM found in 17 smartphones from 2019.



The main phone manufacturers differentiate from each other in the RF field by adopting either an integrated or a discrete approach. In the former segment, market leaders Samsung and Apple, along with smaller OEMs<sup>4</sup> like Sony, LG, Google, and ZTE, are moving towards integration with complex RF modules from Broadcom, Skyworks, Qorvo, Qualcomm, and Murata. “Integrated” players prefer to focus on the user experience with innovative features like “Face ID”, wireless charging, AI camera, gesture recognition, and the human machine interface, thus leaving most of the RF front-end’s complexities to the RF module makers.

In System Plus Consulting’s comparative analysis, Stéphane Elisabeth explains:

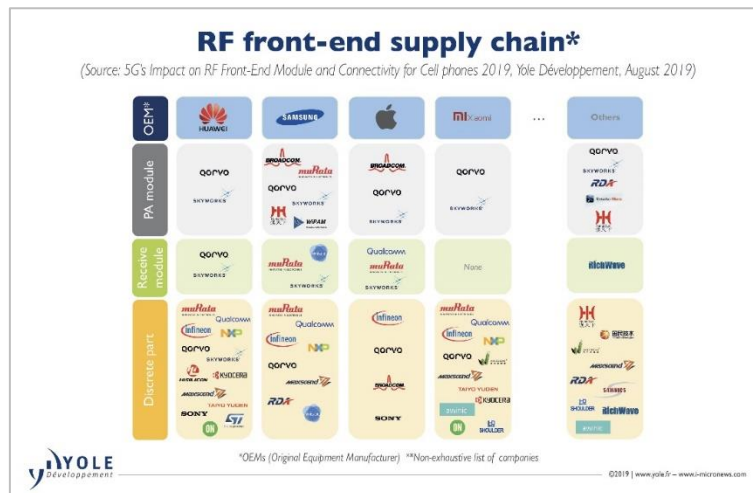
*“From the selected smartphones, most of the components are supplied by Qorvo in number. Moreover, based on the overall devices we identified, the majority is led by the antenna tuner which have 24 % of the share in the function distribution followed by the discrete filter, followed by Murata with 23 %, and Qualcomm with 19 % of the design win mainly due to the discrete filters and the chipset design.”*

The last three suppliers, Infineon Technologies, NXP and Wisol, have a very small fraction of the design win share because of their single appliance in the smartphones (Switch/LNA, LNA, Discrete filter)...

A detailed description of System Plus Consulting comparison is available on i-Micronews, within the [RF devices & technologies report collection](#).

The RF front-end industry is showing an intense competition and the market research and strategy consulting company Yole investigates this sector for a while and analyzes the evolution of the market shares. Leveraging System Plus Consulting’s teardown analysis, a highly detailed market share is provided in Yole’s technology & market report, [5G’s Impact on RF Front-End Module and Connectivity for Cell phones](#).

<sup>4</sup> OEM : Original Equipment Manufacturer



“The RF front-end leaders still share 81% of the market, with Murata leading ahead of Skyworks and Broadcom”, details **Cédric Malaquin, Technology & Market Analyst, RF Devices & Technologies at Yole**. And he adds: “Qualcomm, which is already strong in LNA, is catching up along with Qorvo, thanks to the aggregation of TDK Epcos’ filter business. Established companies like Infineon Technologies, Sony, Taiyo Yuden, NXP, and Wisol also possess a market slice.”

These companies generally have manufacturing capabilities for supplying LNA, switches, tuners, and filters, which gives OEMs an alternative to the RF front-end market leaders. Moreover, a variety of fabless companies are emerging, especially in China. Unisoc RDA, Airoha, Richwave, Smarter Micro, Huntersun, and Maxscend are several examples of players scoring more and more design wins amongst the Chinese OEM brands. Obviously, foundries and design houses support this business model for compound semiconductor, silicon, and even acoustic wave filter.

For each player in the RF front-end, a market share breakdown by component is included in Yole’s report, along with a company outlook describing each player’s development strategy for 5G and beyond.

*All year long, System Plus Consulting and Yole Développement publish numerous RF Electronics reports. In addition our experts realize various key presentations all year long. Discover them on i-Micronews and well as the 2020 program. Stay tuned!*

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### About our Analysts

**Antoine Bonnabel** works as a Technology & Market Analyst for the Power & Wireless team of Yole Développement (Yole). He carries out technical, marketing and strategic analyses focused on RF devices, related technologies and markets.

Prior to Yole, Antoine was R&D Program Manager for DelfMEMS (FR), a company specializing in RF switches and supervised Intellectual Property and Business Intelligence activities of this company. In addition, he also has co-authored several market reports and is co-inventor of three patents in RF MEMS design.

Antoine holds a M.Sc. in Microelectronics from Grenoble Institute of Technologies (France) and a M.Sc. in Management from Grenoble Graduate School of Business (France).

**Guillaume Chevalier** has joined System Plus Consulting in early 2018 to perform physical analyses. He holds a two-year university degree in technology of physical measurements and instrumentation technics.

**Dr. Stéphane Elisabeth** has joined System Plus Consulting's team last year. He has a deep knowledge of Materials characterizations and Electronics systems. He holds an Engineering Degree in Electronics and Numerical Technology, and a PhD in Materials for Microelectronics.

As a Technology & Market Analyst, specialized in RF devices & technologies within the Power & Wireless division at Yole Développement (Yole), **Cédric Malaquin** is involved in the development of technology & market reports as well as the production of custom consulting projects.

Cédric graduated from Polytech Lille in France with an engineering degree in microelectronics and material sciences.

**Nicolas Radufe** is in charge of physical analysis at System Plus Consulting. He has a deep knowledge in chemical and physical analyses. He previously worked in microelectronics R&D for CEA/LETI in Grenoble and for STMicroelectronics in Crolles.

### About the reports

#### **RF Front-End Module Comparison 2020 – Volume I**

*Technical and cost overview of the latest Radio Frequency Front-End module technologies, with deep analysis of the Apple iPhone 11 Pro, Samsung Galaxy Note 10+ and OnePlus 7 Pro 5G. - Performed by System Plus Consulting*

#### **5G's Impact on RF Front-End Module and Connectivity for Cell phones 2019**

*The battle for 5G still rages: integration in-module or with discrete parts? - Performed by Yole Développement*

### About System Plus Consulting

System Plus Consulting specializes in the cost analysis of electronics, from semiconductor devices to electronic systems. Created more than 20 years ago, System Plus Consulting has developed a complete range of services, costing tools and reports to deliver in-depth production cost studies and estimate the objective selling price of a product... [More](#)

### About Yole Développement

Founded in 1998, Yole Développement (Yole) has grown to become 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 80 collaborators worldwide... [More](#)

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