

5G is driving the RF front-end components market growth for telecom infrastructure¹

The RF component market for telecom infrastructure will peak at \$4.2B in 2023 thanks to active implementation of 5G.

OUTLINE:

- Market forecasts:
The telecom infrastructure RF² market today is estimated to be worth US\$2.7 billion in 2020.
It is expected to reach over US\$4.2 billion in 2023, before going down to US\$3.6 billion in 2025.
Yole Développement (Yole) expects a 6% CAGR³ between 2020 and 2025.
- Technology trends:
The first deployments for 5G are done through the usual equipment seen today for LTE⁴. Indoor units are expected to gain market acceptance once the industry and enterprises open up to the new capabilities brought by 5G and its network slicing.
- Supply chain:
5 major OEMs are leading the base station market.
In parallel, the market is more fragmented at the RF front-end level.
NXP, Qorvo and Sumitomo Electric Device Innovation are the TOP 3 RF FE⁵ players.

“The development of AAS⁶ for urban coverage, for both LTE and 5G equipment, can be seen as the main game changer in the telecom infrastructure RF component industry in the past few years.” asserts **Cédric Malaquin, Technology & Market Analyst, RF Devices & Technology at Yole Développement (Yole).**

¹ Extracted from: 5G's Impact on RF Front-Ends for Telecom Infrastructure 2021, Yole Développement, 2021

² RF: Radio Frequency

³ CAGR: Compound Annual Growth Rate

⁴ LTE: Long Term Evolution, part of 4G

⁵ FE: Front-End

⁶ AAS: Active Antenna Systems

These systems have changed in the number of RF chains and their power level. In previous passive approaches, a RRH⁷ with up to four independent streams would amplify the signal, with power levels in the 80W range on average. With active antennas, up to 64 independent RF lines are used, with power levels down to 5W and below. This has drastically changed the bill of material.

In this context, Yole investigates disruptive RF technologies and related markets in depth, to point out the latest innovations and underline the business opportunities. Released today, the [5G's Impact on RF Front-Ends for Telecom Infrastructure 2021 report](#) takes a deep dive into the technology itself. It provides detailed market forecasts down to wafer starts, depending on the substrates and addresses value chain problems and looks at revenue evolution for the different players...

What are the economic and technological challenges of the telecom infrastructure industry? What are the key drivers? What are the changes happening in the RF FE industry? Who are the suppliers to watch, and what innovative technologies are they working on? Will the technical choices made by the players, position them well for addressing 5G implementation? Yole presents today its vision of the 5G impact on RF front-end for telecom infrastructure industry.

Transition from remote radio unit to MA MIMO radio Number of RF lines in million units

(Source: 5G's Impact on RF Front-Ends for Telecom Infrastructure 2021, report, Yole Développement, 2021)



As analyzed by Yole’s team in the new [5G's Impact on RF Front-Ends for Telecom Infrastructure 2021 report](#), the need for pre-final stage amplification components such as gain blocks, pre-drivers and switches, and general amplification, has been multiplied by a factor 16 in some cases. Also, the main amplification is no longer high power by default.

According to **Antoine Bonnabel, Technology & Market Analyst, RF devices and Technology at Yole**: “There has been a change in frequencies with the arrival of 5G, adding

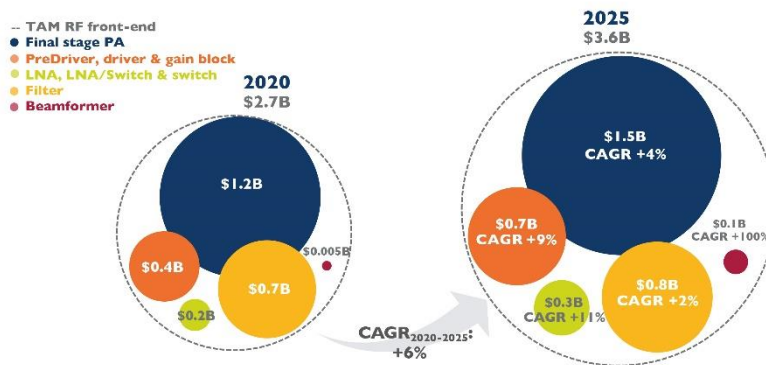
⁷ RRH: Remote Radio Head

frequency bands above 3GHz in FR1, and mmWaves in FR2. This and the system-level trend have had a profound impact on both the number of components, and the technology platforms on which they are built”.

GaN⁸ is gaining momentum against LDMOS⁹ for final stage amplification for performance reasons directly linked to operator’s operational expenditure in mid and high bands. Silicon-based technologies are arriving and will compete with GaAs¹⁰ for lower power amplification. Also BAW¹¹-type filters are happening for receive paths.

Infrastructure RF front end market forecast By type of component

(Source: 5G’s Impact on RF Front-Ends for Telecom Infrastructure 2021, report, Yole Développement, 2021)



The RF component market is expected to grow in the next few years. This is quite unusual for this industry as the investment put in by operators in improving the network is supposed to remain steady. But with the arrival of AAS, the bill of material for radio units has increased. Telecom operators therefore had to separate value from cost of operation of equipment. The market is supposed to grow in the next few years for two reasons. First, the penetration of active antenna systems should reach its maximum in 2023. But, once representing over 40% of the general system market, RRHs will still be used in lower user equipment density areas thanks to their lower cost. Second, 5G rollout is ongoing now and should peak in 2023. Past this date, radio installs will slowly transition from deployments to upgrades, thus reducing the volumes needed. The telecom infrastructure RF market today is estimated by Yole to be worth US\$2.7 billion in 2020, reaching over US\$4.2 billion in 2023, before going down to US\$3.6 billion in 2025.

For Mohammed Tmimi, Ph.D., Technology and Market Analyst for the RF devices & Technologies Group at Yole: “The value of the market for components is expected to

⁸ GaN: Gallium Nitride

⁹ LDMOS: Laterally Diffused Metal Oxide Semiconductor

¹⁰ GaAs: Gallium Arsenide

¹¹ BAW: Bulk Acoustic Wave

contract between 2023 and 2025. But this does not mean that it will do so for every technology platform used”.

All year long, Yole Développement publishes numerous RF-related reports and monitors. In addition, experts realize various key presentations and organize key conferences.

Make sure to be aware of the latest news coming from the industry and get an overview of our activities, including interviews with leading companies and more on i-Micronews. Stay tuned!

Press contacts

Sandrine Leroy, Director, Public Relations, leroy@yole.fr

Marion Barrier, Assistant, Public Relations, marion.barrier@yole.fr

Le Quartz, 75 Cours Emile Zola – 69100 Villeurbanne – Lyon – France – +33472830189

www.yole.fr - www.i-micronews.com – [LinkedIn](#) – [Twitter](#)

About our analysts

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. Prior his mission at Yole, Cédric first served Soitec as a process integration engineer during 9 years, then as an electrical characterization engineer during 6 years. He deeply contributed to FDSOI and RFSOI products characterization. He has also authored or co-authored three patents and five international publications in the semiconductor field. Cédric graduated from Polytech Lille in France with an engineering degree in microelectronics and material sciences.

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).

Mohammed Tmimi, Ph.D., is a Technology and Market Analyst for the RF devices & Technologies Group at Yole Développement (Yole). Prior to Yole, Mohammed was engaged in developing a novel approach for RF/mmW high-speed serial links for high-performance chips at STMicroelectronics' Crolles R&D site in France as part of his Ph.D. During his Ph.D., he also worked on mmW design in advanced FD-SOI nodes and proposed an original interconnect technique for 2.5D/3D packaging. Mohammed now holds a patent on these serial links and has published two scientific papers. Mohammed graduated from INP Grenoble (France) with a master's in microelectronics and an electronics engineering degree from ENSAO (Morocco). He was awarded his Ph.D. in Nano Electronics and Nano Technologies from the University of Grenoble Alpes, France.

About the report

5G's Impact on RF Front-Ends for Telecom Infrastructure 2021

The RF component market for telecom infrastructure will peak at \$4.2B in 2023 thanks to active implementation of 5G. – Performed by Yole Développement

Companies cited:

Airgain, Airspan, Akash Systems, Altum RF, Amphenol, Ampleon, Analog Devices, Anokiwave, AT&T, Baicells, Beamwave, BLU wireless, Bowei, BridgeWave, Broadcom, Cambium Networks, CCS, CETC, China Mobile, China Telecom, China Unicom, Comba, Commscope, Cree, DragonWave, E band communication, EE, Ericsson, Eta Devices, Etisalat, Dynax, Filtronic, Fujikura, Fujitsu, GCT, Guerilla RF, HiSilicon, Huawei, Iconic RF, IDT, IgniteNet, Infineon, Jio, JMA Wireless, Kathrein, KDDI, KT, Kumu Networks, LG U+, LightPointe, Linear Technology, MACOM, Marvell, Mathworks, Maxim Integrated, MCV microwave, Microchip, and more...

Related reports:

- [5G's Impact on RF Front-End and Connectivity for Cellphones 2020](#)
- [RF Front-End Module Comparison 2021 – Vol. 1 – Focus on Apple](#)
- [RF Front-End Module Comparison 2020 – Volume 4](#)

About Yole Développement

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 and well as IP and patent analysis. 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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