

TELECOMMUNICATION APPLICATIONS AND MOBILE RADIO CHIP TESTING | VECTOR SIGNAL GENERATORS

Blog Post

In the fast and ever-growing industry of Telecommunications, mobile standards have come an extremely long way since the first transcontinental landline telephone call by AT&T, which occurred back in 1946. As of September 2023, there are numerous telecom providers and operators spread all over the United States along with advancements in 5G/6G Technology to revolutionizeprecedented wireless communication. Everyone has come to a point where calls, SMS (Short Message Service), and MMS (Multimedia Messaging Service) texts are “everyday” necessities, let alone high-speed wireless communication. Therefore, this leads us to our main talk about ***Mobile Radio Chip Testing***.



First Transcontinental Landline Telephone by AT&T [1]

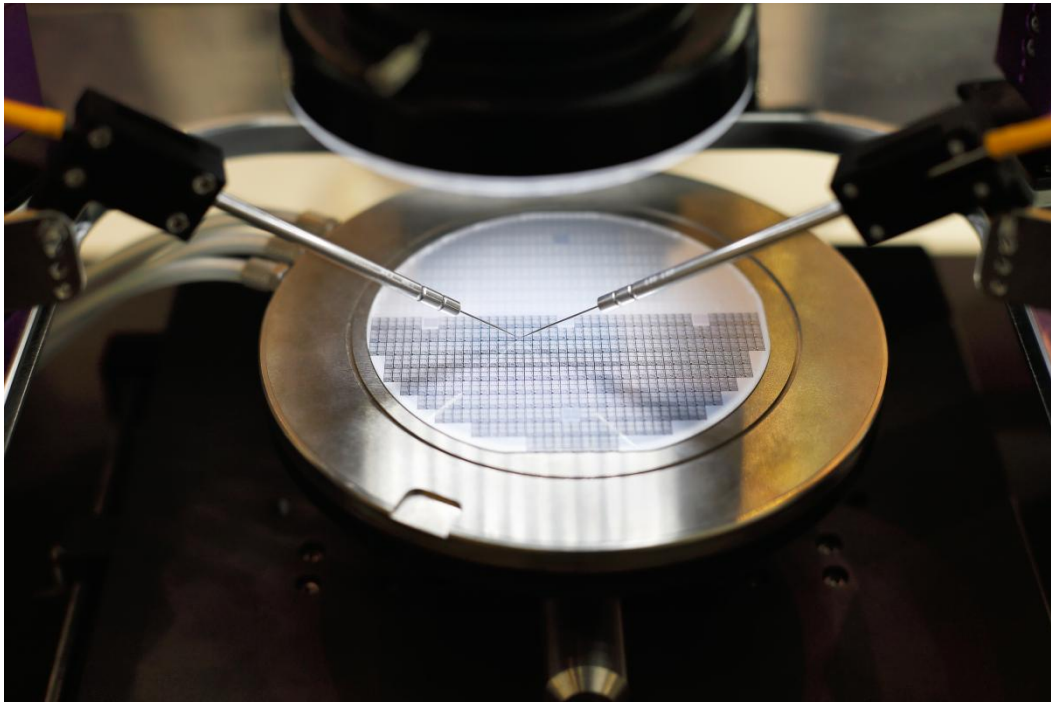
From Base Station Development to Global Positioning System (GPS) Advancements, the heart of RF Telecommunications lies in the Mobile Radio Frequency Chip. Companies like Skyworks, Qorvo, and Qualcomm are all current leaders in the Smartphone RF Front-End (RFFE) market. In Q1 2022, Skyworks and Qorvo had managed to expand their market share by 16.8% and 17%, respectively, while [Qualcomm had a staggering 23.5% expansion](#) [2]. All of these companies produce RF chips for larger smartphone companies like Apple and Samsung, as their main suppliers and manufacturers. Nevertheless, other notable existing and rising RF Telecommunication companies include BroadCom, Murata, and various international companies, who are all competing to be at the forefront of 6G Technology innovation.

Although many service providers and operators claim 5G Communication is commercially available throughout the US, this is not the case. 5G Wireless Communication has been primarily developed for military applications and specific purposes. The commercial deployment 5G Technology has yet to be

realized in the commercial space, which could be due to current technological limitations or power-related issues (i.e. insufficient power, power constraints, heating issues, or high-demanding power specifications). Even so, research and development of 6G Technology has been the headlines for several countries and corporations for the past year, despite the progressing rollout of 5G Communication.



As the Telecommunication industry progresses in 5G Technology Commercialization and ventures into 6G Communication R&D, further in-depth experimentation of Mobile Radio Chip components will be required. These components consist of the following: RF Power Amplifiers, RF Integrated Circuits (RFICs) / Monolithic Microwave Integrated Circuits (MMICs), Low Noise Amplifiers, Mixers, Modulators, Voltage-Controlled Oscillators, Phase-Locked Loops and more. Several of these components require semiconductors, which require another set of testing that Berkeley Nucleonics could assist with. In a [previous Technical Blog Post](#), we discussed semiconductor testing within the San Francisco Bay Area and Silicon Valley using our Signal Generators. The BNC Model 875 - Vector Signal Generator could test a diverse range of semiconductor materials ranging from Silicon-based Semiconductors like Silicon Germanium - SiGe and Silicon Carbide - SiC; to Gallium-based Semiconductors such as Gallium Arsenide - GaAs, Gallium Nitride - GaN, and Indium Gallium Nitride - InGaN. If anyone is interested in the [Model 685 - Arbitrary Waveform Generator](#), read our previous article on [how the ARB / AWG is used in semiconductor wafer testing](#).



Recent reports highlight significant investments by semiconductor foundries throughout the United States, pouring billions of dollars into high-volume semiconductor wafer manufacturing, which is largely attributed to the [White House CHIPS Act](#) [3]. With the addition of more foundry funding, wafer chip testing will require the needs of state-of-the-art instruments like Berkeley Nucleonics' [Model 875 Vector Signal Generator](#). The Race to 5G Commercialization and 6G Development is on, and Berkeley Nucleonics Corporation remains at the forefront of pioneering cutting-edge equipment for telecommunication advancements.



References

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