RAN Revenue & CAPEX 2024

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Abstract: A business-level view of the shifts in mobile infrastructure spending from hardware to software, from telcos to private cellular, and from mobile to fixed applications. Market shares of the top 30+ RAN suppliers are shown here and are updated quarterly.

New this year : We're covering more than 30 RAN suppliers in our market share tracking, and we improved our analysis of vRAN and SMO software separate from the Macro/massive MIMO base station hardware.

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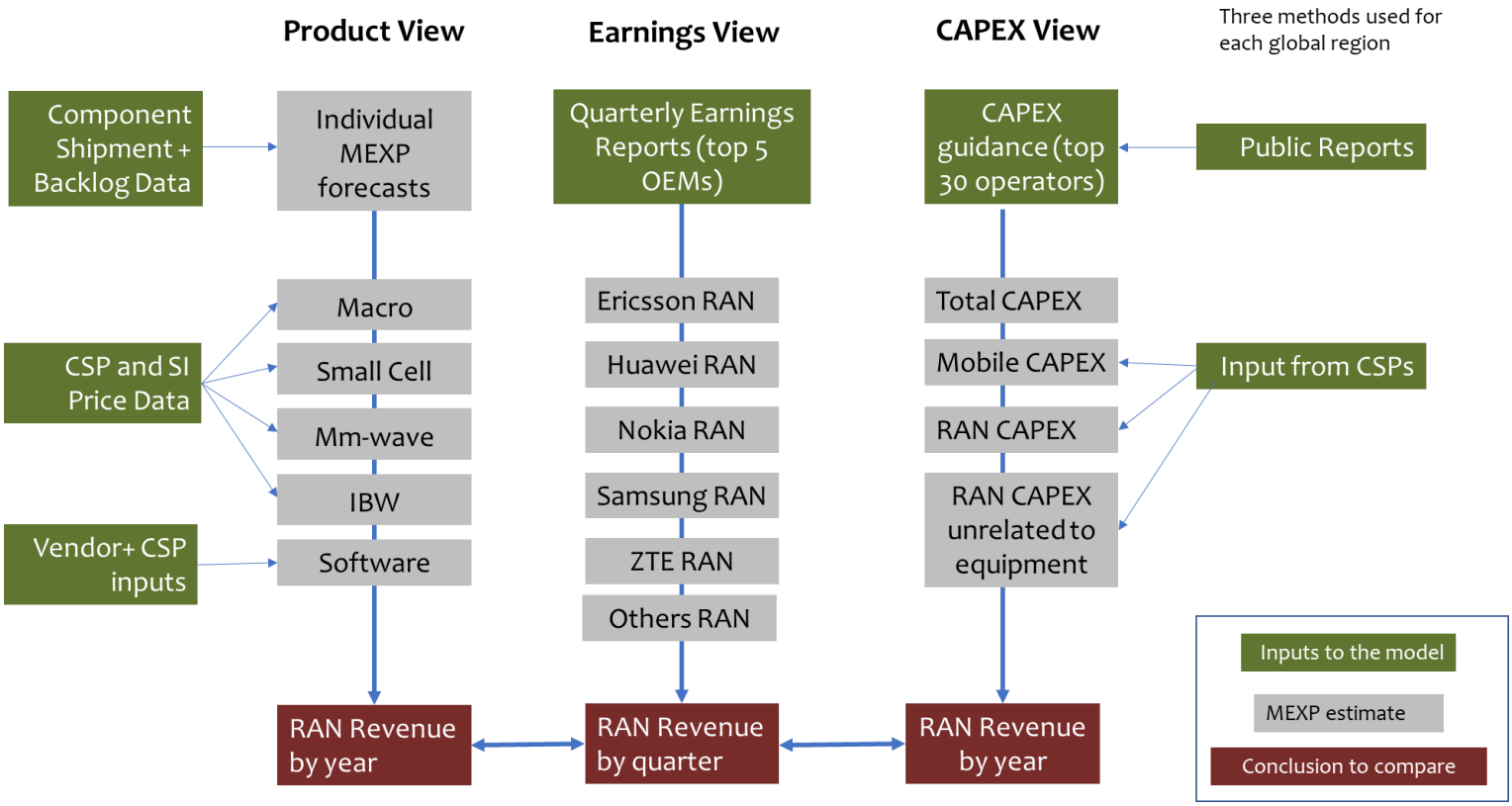
METHODOLOGY

Three methods to calculate RAN revenue

Mobile Experts uses three separate methods to calculate the RAN revenue in the marketplace. As shown in the nearby diagram, we rely on agreement between these different calculations in order to validate our model.



Source: Mobile Experts

Figure 1. Three-way methodology for RAN Revenue Model

Each of the three methods is independent:

Method #1: The Product View:
Mobile Experts publishes high-accuracy forecasts in base stations, small cells, millimeter wave, and in-building wireless areas. In each of these research areas, our staff collects data from multiple component vendors in order to triangulate on the correct number of radios shipped each quarter. Power amplifiers, crystal oscillators, filters, LNAs, beamformers, ASICs, FPGAs, and antennas are all used as reference points for triangulation to get a consensus among multiple components.

During 2021, Mobile Experts added a forecast for RAN software to complete the bottom-up accounting for the RAN market globally. During 2024, we added the 6-7 GHz and 7-15 GHz bands with more detailed tracking of 5G-Advanced.

Note that in this method, tracking shipments on a regional basis is precise due to the unique frequency bands used in each country. By tracking shipments of frequency-sensitive components such as amplifiers and filters, we can precisely break out China and other countries.

Method #2: The Earnings View:

Every quarter, Ericsson, Nokia, and Samsung announce financial results to their public investors. Strict accounting standards are applied, making these reports highly reliable. Huawei and ZTE also report financial results every six months, but in their case we do not count their statements as reliable due to the poor standards for transparency in China.

These periodic public announcements typically provide revenue information for overall mobile networks, including non-RAN product lines such as core networks, microwave radio, and others. In addition, most of the results are not provided by region. Mobile Experts uses inputs from mobile operators to estimate the portion of each company's report that is attributable to RAN.

Note that Mobile Experts has relationships with other analysts in core networks, transport networks, and microwave radio. We rely on input from experts in these areas to subtract their revenue figures from each company's RAN total.

Method #3: The CAPEX View:

The third, and least reliable, method is based on CAPEX guidance and reports from the operators. While this approach can provide some directional information about the future market, the correlation between CAPEX and RAN revenue is weak.

Mobile Experts compares the CAPEX future guidance from each operator with our view of the capacity and density growth of mobile traffic, as a double-check of our estimates for future base station and other product sales.

How CAPEX estimates are flawed

Specifically, CAPEX is reported at a high level by global operators, typically including both wireline and wireless business areas into a single CAPEX estimate. The lines between wireline and wireless are blurred, as fiber is used in both areas, so each company will account for mobile CAPEX and RAN-related CAPEX in a different way. In addition, depreciation and accounting for network vendor financing can skew these results.

Accordingly, Mobile Experts does not expect to see a match between CAPEX-derived figures for equipment revenue and the other two methods. It's common to see a deviation of 20-30% from the other two models.

In short, we only use the CAPEX view to double-check against our modeling of capacity in the network and our forecasts at the product level for future spending. The CAPEX view is not the original source of anything in our model.

How we converge our model

Mobile Experts takes six separate forecasts for various products (Method 1, the Product View) and we compare the total revenue in each region directly to the regional revenue derived from Method 2 (Earnings View).

If these two models do not match for a specific reason, Mobile Experts must choose to adjust either the pricing of base stations/other products, or adjust the estimates for regional RAN revenue for the top 5 vendors.

Adjustments are made to the model so that in each region, multiple criteria must be met:

1. The total RAN revenue for the region must match (Product View vs. Earnings View) to within 5%;
2. The pricing data for base stations and other products must match the inputs from various industry sources;
3. Total global revenue must match between Product View and Earnings View to within 5% in each year;
4. Changing pricing assumptions must reflect the reality of products and volumes in the market;
5. On a quarter-to-quarter basis, the assumptions for RAN revenue for each vendor must match their actual shipment profiles.

Note that the variance between the Product View and the Earnings View can be found in the Excel sheet, on Page 2: Revenue Summary.

Definitions

Here are our precise definitions for market segments:

Macro:	Mobile communications infrastructure including radio and baseband hardware and software, above 100W for 4G/5G and above 40W for 2G/3G (below 20 GHz). Includes Massive MIMO configurations
Small Cell:	Mobile communications infrastructure including radio and baseband hardware and software, below 100W for 4G/5G and below 40W for 2G/3G (below 20 GHz)
Millimeter Wave:	Mobile communications infrastructure, including radio and baseband hardware and software, above 20 GHz
IBW:	In-Building Wireless hardware and software including DAS systems and booster/repeater systems below 20 GHz.
Software:	RAN software in this category refers to RAN orchestration and management software, including SON, Open RAN, RIC, xApp, rApp, and other RAN support, but not vDU or vCU software.
IPR/Other:	This segment includes revenue for antennas, jumper cables, and other base station accessories directly tied to RF, as well as IP licensing revenue for RAN technologies.

Source: Mobile Experts

Note: Microwave Radio, Fiber, Core Networks are excluded from RAN

Figure 2. Detailed Definitions for RAN product areas