Market Landscape: RAN Vendors 2023

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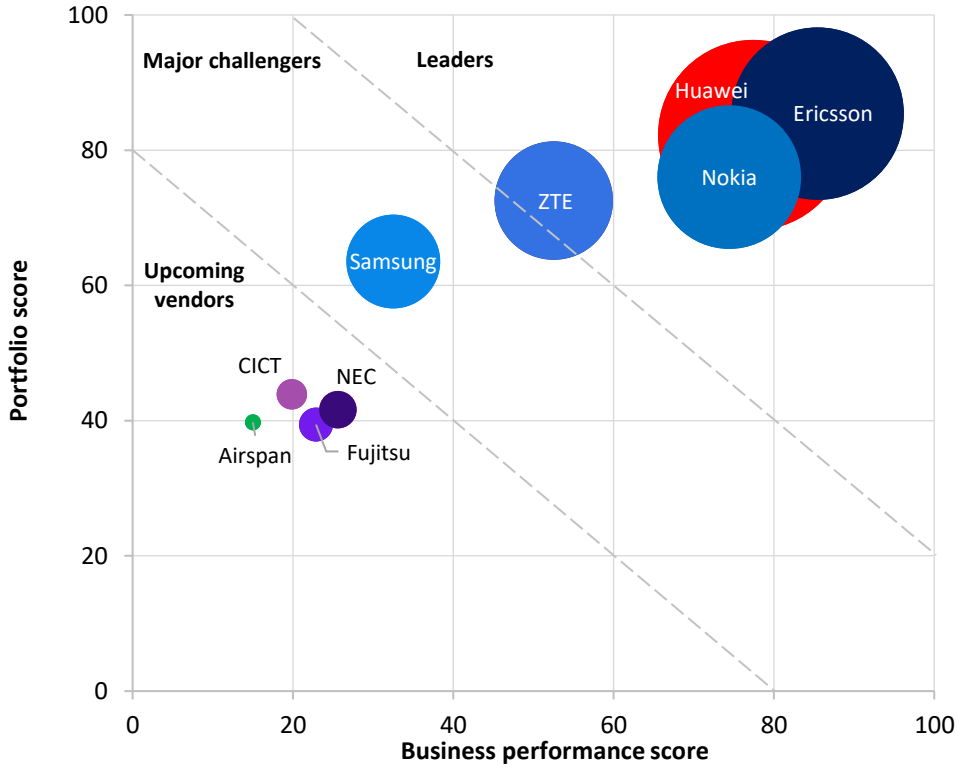
Summary

Summary (1/4)

- Five vendors essentially control the radio access network (RAN) equipment market, with a combined market share of 94.6% in 2022, slightly down from 95.1% in 2021. Of those five, three captured 74.9% of market revenue. With so much share concentrated among so few vendors, each vendor works to be perceived as a market leader. However, measuring leadership in this market has its challenges.
- Considering two dimensions, their business performance and portfolio, Omdia positioned 9 RAN vendors into three groups: market leaders, major challengers, and upcoming vendors. All vendors belong to the same group as in the 2022 edition of this report, except ZTE which moved from major challenger to leader.
- The scores indicate the relative position of each vendor in comparison with the others. For example, if a vendor has a lower portfolio score in the 2023 edition than in the 2022 edition, it does not mean that this vendor's offering is weaker in 2023 than in 2022, but that its portfolio has not improved at the same pace as other vendors. There were also slight changes in the weighting of a few metrics, which also affected the scores (see methodology).
- There are four market leaders: Ericsson, Huawei, Nokia, and ZTE. Ericsson ranked first in both business performance and portfolio, followed by Huawei and Nokia, which ranked second and third, respectively, on both dimensions. Samsung Electronics is the only vendor labeled as a major challenger this year. The "upcoming vendors" group is made up of Airspan, CICT, Fujitsu, and NEC, the latter of which leads this group.

Overall RAN vendor positioning



Notes: Size of the bubble corresponds to the 2022 RAN revenue for each vendor.
Source: Omdia

Summary (2/4)

Summary of categories, score weight, and top three vendors per category

Dimensions and categories	Score weight	#1	#2	#3
Business performance	**100**	**Ericsson**	**Huawei**	**Nokia**
Total RAN revenue market share	40	Huawei	Ericsson	Nokia
5G share of total RAN revenue	20	Fujitsu	NEC	ZTE
5G deals with CSP	30	Nokia	Ericsson	Huawei
New logos	10	Nokia	Ericsson	Samsung
Portfolio breadth and competitiveness	**100**	**Ericsson**	**Huawei**	**Nokia**
Radio portfolio	60	Ericsson	Huawei	Nokia
Baseband portfolio	40	Nokia, Huawei, Ericsson		

Source: Omdia

Summary (3/4)

Summary by vendor: Leaders and major challengers

Vendor	Analysis
Ericsson	Ericsson is the leader across both business performance and portfolio dimensions. Ericsson is strong across all categories, and its key strengths include its radio portfolio breadth, massive MIMO products, and baseband units' power efficiency.
Huawei	Huawei is the runner-up in both portfolio and business performance. Huawei's strengths include its radio portfolio breadth, massive MIMO products, and baseband units' capacity. Its lack of vRAN and open RAN support limits choices for operators and the size of the vendor's total addressable market.
Nokia	Nokia ranks third on the two dimensions with notable improvements to business performance compared with the previous edition of the report, thanks especially to a higher market share and number of new logos. Nokia's portfolio of RAN solutions has no weaknesses, but it is less extensive than the portfolios of the other two leaders. Baseband is one of the vendor's key strengths.
ZTE	ZTE was already close to leaders' territory in 2022 and moved into the first group thanks to improvements across both categories. Its portfolio of products, however, is still a notch under the leading trio, especially in terms of radio portfolio breadth.
Samsung	Samsung improved its product portfolio score, but although it is very strong in some segments, its portfolio is not as extensive as the leaders'. Samsung generally achieves higher scores on the radio portfolio metrics than on the baseband portfolio metrics. What lacks for the vendor to reach leaders' territory is a more global presence and a higher number of deals. Samsung focuses on a few key strategic deals, which automatically reduces its addressable market in terms of both revenue and the number of deals.

Source: Omdia

Summary (4/4)

Summary by vendor: Upcoming vendors

Vendor	Analysis
NEC	NEC is the leader of the upcoming vendors group. Although its portfolio of solutions has improved in the last few years, it is not as extensive as the portfolio of larger vendors. NEC is particularly well-positioned to target open vRAN projects but will need more deals and more revenue to move into major challengers' territory.
CICT	China Information and Communication Technology Group (CICT), which combines FiberHome and Datang Telecom, was a new entrant in this vendor landscape in 2022; it has improved its position on the portfolio dimension in 2023. CICT has a competitive baseband and radio portfolio built for the domestic market, but it is behind some competitors in terms of business performance, owing to a lack of business outside China.
Airspan	Airspan is the smallest player covered in this report in terms of revenue, but nonetheless has a competitive portfolio, particularly of radios, that it continuously improves. Airspan sells to Tier 1 operators around the world, including in Japan, India, and the US, which validates the vendor's capabilities.
Fujitsu	Fujitsu made improvements in its portfolio, but in some cases not as fast as its competitors. The vendor is currently dependent on a small number of clients, but demonstrating its capabilities with Tier 1 operators in Japan and the US gives it strong credentials to win new business in other parts of the world, particularly by targeting open vRAN projects.

Source: Omdia

Methodology

Methodology (1/2)

- The RAN as covered by Omdia in this report includes hardware and software for macro base stations and small cells. Services and other solutions that belong to other network domains such as transport and core networks are not included.
- Making head-to-head comparisons can be difficult; to overcome this difficulty, this report focuses as much as possible on measurable and comparable metrics, using the information provided by vendors themselves, rather than the analyst's or a third party's perceptions and opinions. Omdia also underlines some of the key caveats associated with the metrics that are used so that the reader is aware of limitations where they exist.
- Omdia selected two main dimensions for this evaluation: the RAN business performance and the RAN portfolio breadth and competitiveness. Each dimension is assessed by looking at different categories and metrics. Metrics mean different things to different vendors, and what one vendor perceives as important (specific geography, technology, or type of product) may not be as important to other vendors.
- For business performance, the categories are the global RAN revenue market share, the 5G share of each vendor's total RAN revenue, the number of 5G commercial deals with communications service providers (CSPs), and the number of new logos.
- For the portfolio dimension, Omdia looks separately at the radio portfolio and the baseband portfolio, with several sub-categories considered for each. Omdia takes into consideration the portfolio breadth (number and variety of radios, number of frequency bands supported by at least one product, number and variety of massive MIMO products, O-RAN compliant products, etc.), as well as competitiveness (by comparing product specifications including capacity, power consumption, and physical footprint of products with comparable configurations). Details for each category and their weighting in the total score are introduced in relevant sections of the report.
- Omdia considers only products that already are or will be available before the end of 2023. There is always a possibility that vendors may not meet all of their roadmap commitments and some of the products that are expected to become available before the end of the year could ultimately reach the market later than anticipated, or even in some cases, get canceled. The same is true when vendors present their respective roadmaps to operators.

Methodology (2/2)

- In this 2023 version of the report, Omdia made little changes in the methodology and modified the weighting for some subcategories slightly to reflect market trends and operators' priorities. The weight of massive MIMO radios power consumption was raised from 5 points to 10 points, and the weight of the open RAN portfolio category from 3 points to 5 points.
- Omdia does not suggest that open RAN or vRAN solutions are better or worse than integrated purpose-built RAN solutions; they are alternatives and included as such. Operators value choice, and because operators' interest in open RAN and vRAN is undeniable, these trends cannot be ignored.
- Open RAN and vRAN are considered under the portfolio dimension, but they have no impact on the business performance dimension. When measuring the business performance of a vendor, a dollar from a "traditional" RAN contract is worth the same as a dollar from an open RAN or vRAN contract.
- Other aspects would ideally be taken into consideration, but effectively are not. Price competitiveness is critical when an operator selects a vendor, but pricing information is highly confidential and specific to each client and each project. The actual performance of solutions in real life or demonstrated during trials is another critical point of differentiation, but Omdia does not have the tools and resources to conduct lab or field tests.
- Patents portfolios and contributions to standards are other interesting metrics, but claims from different vendors tend to be contradictory, and comparisons are difficult. Omdia also believes that these criteria are not as important as the ones included in this assessment. Patents matter, but Omdia argues that they are important for other reasons, not so much when it comes to assessing a vendor's position and competitiveness.
- Unlike in 2022, Mavenir and CommScope are not included in the 2023 edition of the report, because the companies chose not to participate.
- Omdia contacted other RAN vendors that have chosen not to participate or have not provided sufficient information. More vendors could be included in future editions of this report if they choose to participate. The door is open to them.

Business performance

Business performance

Summary of categories, score weight, and top three vendors per category

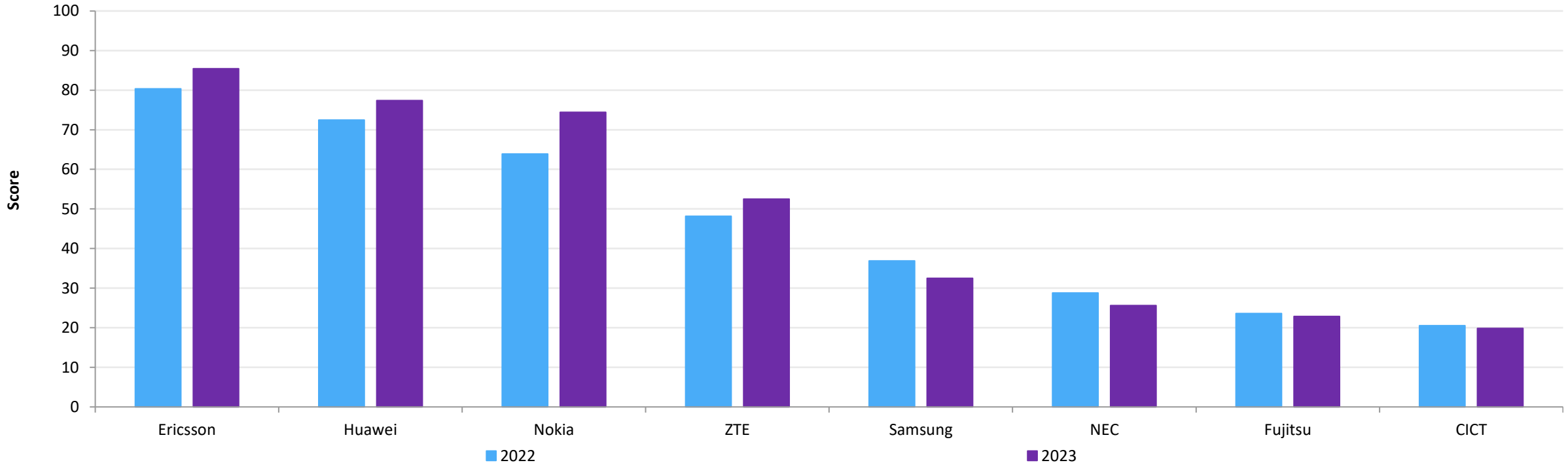
Categories	Score weight	#1	#2	#3
Total RAN revenue market share (for the year 2022)	40	Huawei	Ericsson	Nokia
5G share of total RAN revenue (for the year 2022)	20	Fujitsu	NEC	ZTE
5G deals with CSP	30	Nokia	Ericsson	Huawei
New logos	10	Nokia	Ericsson	Samsung
Total business performance	**100**	**Ericsson 85/100**	**Huawei 77/100**	**Nokia 74/100**

Source: Omdia

- There are some caveats to basing leadership totally on market share, but market shares are important and a generally accepted way of measuring market leadership. Of all categories across the two dimensions considered in this report, market shares carry the largest weight (40% of the business performance score and 20% of the grand total).
- Omdia prefers to use revenue rather than units for market shares because revenue is the most common indicator of business performance and revenue data tends to be more reliable. The revenue market share shows a company's scale, its business momentum, and its ability to win new business.
- Omdia also looks at the number of commercial 5G deals with CSPs (excluding free trials, non-revenue-generating activities, and non-CSP deals). If a vendor has several 5G contracts with the same operator in the same country, it is counted only once, but in the case of multi-country deals with one telecom group (e.g., Vodafone UK and Vodafone Germany), each country counts for one deal.
- Omdia considers the number of deals to be less important than revenue in assessing leadership and therefore applies a smaller weighting to deals when calculating scores. Not all deals are equal. A deal with a Tier 1 operator in a big country tends to be worth more in monetary value than multiple deals with Tier 2 and Tier 3 operators in smaller countries. Nonetheless, deals are another indication of a vendor's reach and capacity to win requests for proposals (RFPs), and more broadly, of its business momentum, so deals are worth looking at.
- Ericsson remained the leader in business performance in 2023 with a score of 85/100, followed by Huawei (77/100) and Nokia (74/100).

Business performance scores, 2022 and 2023

Business performance scores (maximum 100 points)



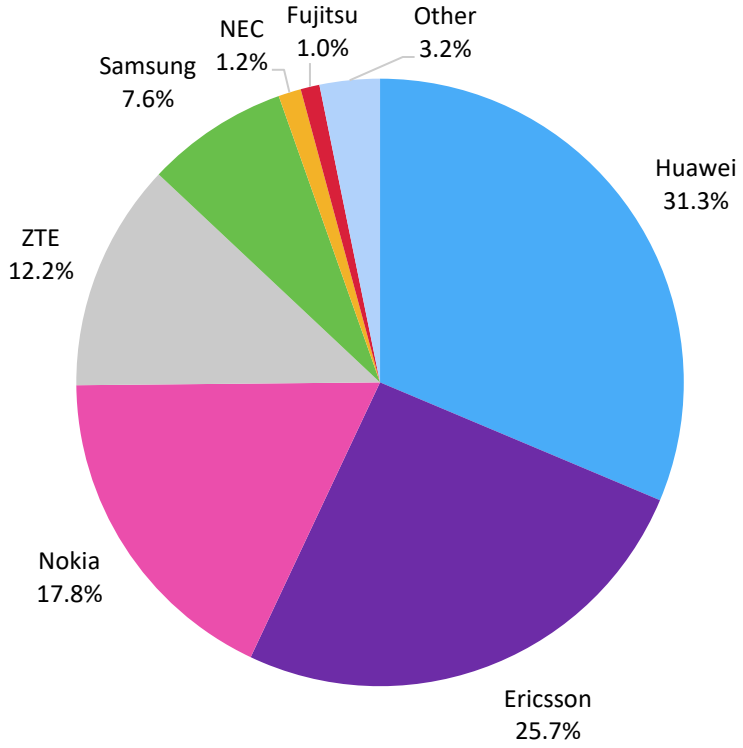
Notes: Scores are relative. If a vendor has a lower score than in the previous edition, it does not mean that this vendor's performance was necessarily weaker than before, but that the status of each vendor relative to the others has changed.

Source: Omdia

Revenue market share

- In 2022, despite a difficult environment for the vendor and market share losses, Huawei remained the RAN revenue market leader, followed by Ericsson, Nokia, ZTE, and Samsung Electronics.
- Note that this is the 2022 revenue, and it does not presume evolutions in 2023. This is because Huawei continues to face challenges and China's share of the global RAN market is expected to diminish after two years of massive 5G rollout.
- Combined, Huawei, Ericsson, and Nokia captured 74.9% of global RAN revenue in 2022. When adding ZTE and Samsung Electronics, the top five companies generated 94.6% of total RAN revenue during the year. This is very high but less than the 95.1% captured by these vendors in 2021 and 97% in 2020, which indicates that upcoming vendors have collectively gained market share.
- One thing to keep in mind is how market share fits into a vendor's strategy. Some vendors are willing to sacrifice short-term margins to gain shares, winning business thanks to lower prices. Conversely, other vendors are willing to sacrifice shares and top line to protect their margins. A single vendor may even use both strategies depending on the geography, project, or time.
- Market shares also determine the size of the bubbles on the summary chart.
- Omdia provides extensive market share data and analysis on a quarterly basis in its *Mobile Infrastructure Market Tracker* report series.

Market shares for combined 2G, 3G, 4G, and 5G RAN in 2022

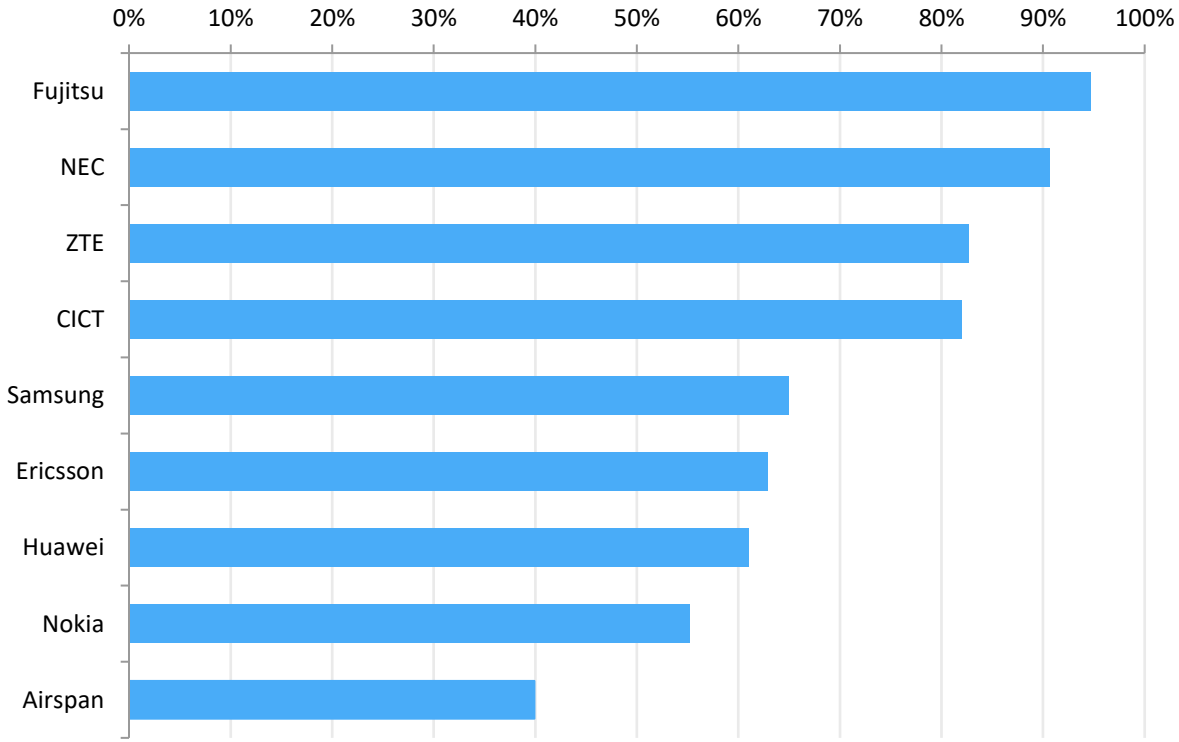


Source: Omdia

5G share of total RAN revenue

- To complement the revenue market share analysis, Omdia also considers the share of 5G as a percentage of each vendor's total RAN revenue in 2022.
- A dollar or yuan from the sale of 2G, 3G, or 4G equipment is worth the same as a dollar or yuan from the sale of 5G equipment; nonetheless, Omdia and many of our readers consider the 5G revenue to be a relevant indicator of a vendors' commercial momentum and how fast the vendor is able to shift its revenue mix toward the fastest (and only) growing segment of the RAN market (i.e., 5G).
- Most vendors generated more than 50% of their revenue from 5G in 2022, with the highest percentages observed at Fujitsu and NEC (>90%) followed by ZTE, and CICT.
- This metric largely depends on each vendor's revenue geographical mix. NEC and Fujitsu benefitted from their strong 5G business in their domestic market, Japan, while ZTE and CICT similarly benefitted from 5G deployments in China—both early 5G-adopting countries where most investment has already shifted from 4G to 5G.
- Inversely, Huawei, Ericsson, and Nokia are global vendors with a more diversified client base and revenue mix, including some advanced and some less advanced markets (those that are late 5G adopters), which drags the percentage down. On the other hand, for these larger global vendors, their presence in both developed and developing markets is an advantage over other metrics, including the total RAN revenue and the number of 5G deals. One vendor cannot win in all categories.
- The percentage was generally higher this year as the transition to 5G progresses.

5G share of each vendor's RAN revenue in 2022

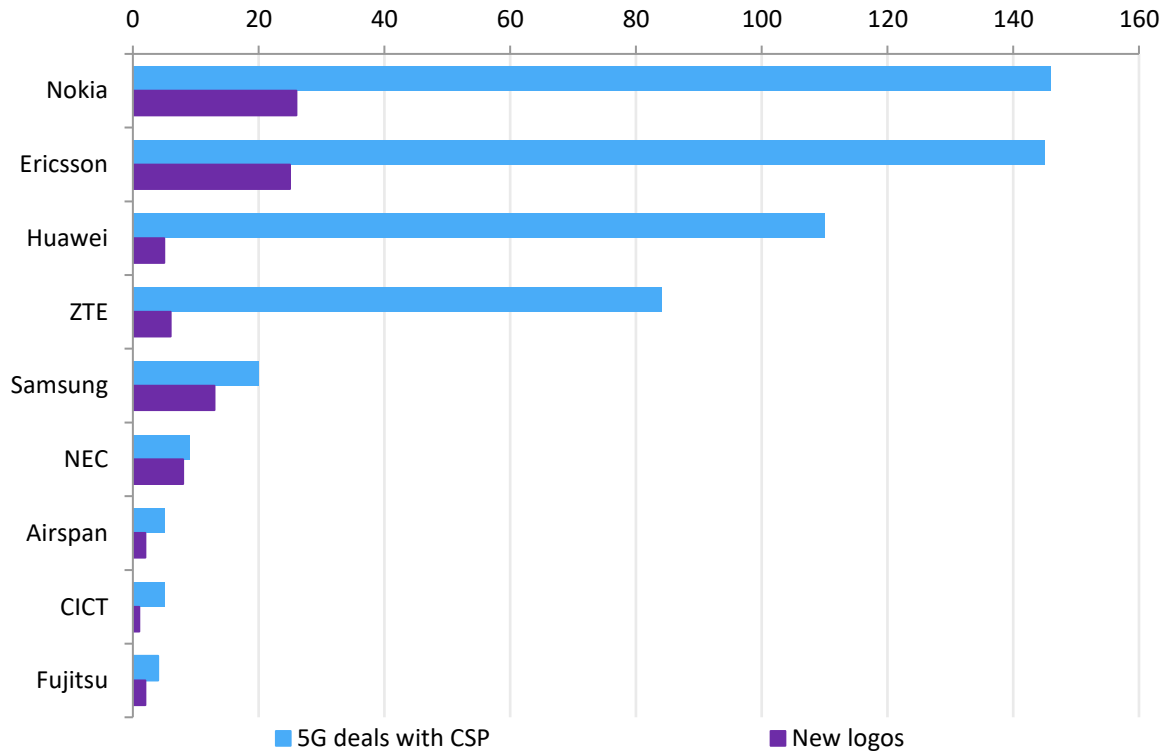


Source: Omdia

5G deals with CSPs and new logos

- Nokia and Ericsson had the most 5G deals with CSPs, ahead of Huawei. Nokia and Ericsson are particularly strong in Europe, where the market is very fragmented, and the high number of operators means there are many deals up for grabs. These vendors captured a significant portion of these deals.
- The new logo metric indicates whether a vendor has gained 5G business at the expense of a competitor or with a greenfield operator. With non-standalone (NSA) 5G, most operators use their existing LTE vendor(s) to supply 5G new radio (NR), but there are exceptions. Given the tight relationship between LTE and 5G in NSA, winning 5G contracts where a vendor did not already provide LTE is a strong endorsement of its solutions. This shows an operator is willing to rip and replace an incumbent LTE vendor or go through the challenges of interoperability between two vendors to use a different vendor's 5G kit.
- Nokia and Ericsson added the highest number of new logos in the past 12 months. Samsung has also enjoyed strong commercial momentum in the past couple of years, notably in the Five Eyes countries (Australia, Canada, New Zealand, the UK, and the US).
- These vendors have, in some cases, benefitted from policies against Huawei or broadly against Chinese vendors in the Five Eyes countries and Europe. However, in many other cases, new logo deals counted here have no link with Chinese vendors (for example, one European vendor swapping another European vendor). In the meantime, Chinese vendors have also won some new logos, albeit not as many.

Number of 5G commercial deals with CSPs and new logos (as of March 2023)



Source: Omdia

Portfolio assessment

Radio portfolio

- For the portfolio breadth and competitiveness dimension, Omdia applies a 60% weight to the radio portfolio and 40% to the baseband portfolio. Radio portfolios encompass a much higher number of unique products and contribute a larger portion of total RAN revenue compared with the baseband portfolio, both at the industry level as well as for most vendors.
- As stated previously, these rankings are based on portfolio offerings and product specifications but not on actual performance in the field. This is because Omdia lacks the means to test the performance of vendors' gear.
- For this report, Omdia collected information about more than 1,800 radio products from 9 vendors, of which more than 500 were massive MIMO radio products and over 100 were O-RAN–compliant radios. The wealth and variety of equipment are impressive, and the high number of new products added by vendors since last year's edition testifies to this industry's continuous innovation.
- In 2022, a new category was added to take into consideration the offering of O-RAN–compliant radios. In 2023, the weight of this category was slightly increased from 3 to 5 points (out of 60) reflecting the growing importance of open RAN.
- The weight of the massive MIMO power consumption category was also increased from 5 to 10 points.
- Ericsson remained the industry leader for the radio portfolio with a score of 53/60, followed by Huawei (49/60) and Nokia (43/60).

Summary of categories, score weight, and top three vendors per category

Categories	Score weight	#1	#2	#3
Radio portfolio basics	5	More than five vendors with maximum score		
Combined radio portfolio breadth metrics	20	Huawei	Ericsson	Nokia
Massive MIMO portfolio breadth and competitiveness	15	Ericsson	Huawei	ZTE
Massive MIMO power consumption	10	Huawei	Ericsson	Nokia
mmWave portfolio	5	Ericsson	Samsung	Nokia
Open RAN portfolio	5	NEC	Fujitsu	Samsung
Total radio portfolio	60	**Ericsson 53/60**	**Huawei 49/60**	**Nokia 43/60**

Source: Omdia

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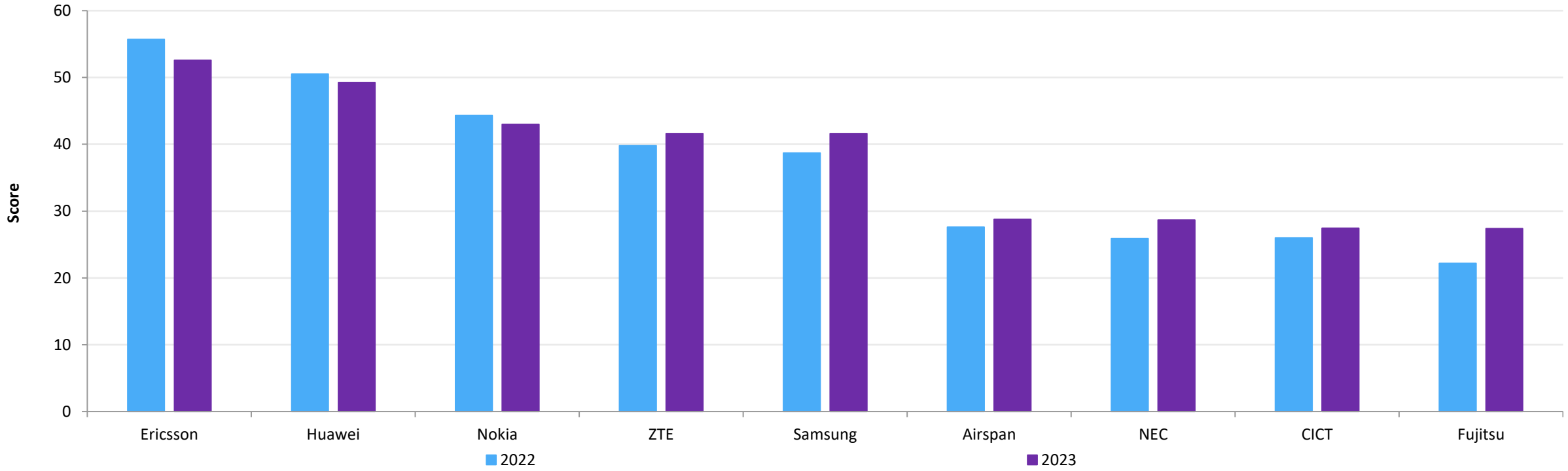
Radio portfolio scores, 2022 and 2023

Radio portfolio overall scores (maximum 60 points)



Notes: Scores are relative. If a vendor has a lower score than in the previous edition, it does not mean that this vendor's portfolio is weaker in 2023 than 2022, but that the status of each vendor relative to the others has changed. Weighting has also slightly changed which affects the total score.

Source: Omdia

Radio portfolio basics

- The radio portfolio basics category considers the availability of 4G and 5G solutions, the variety of product types available (macro and small cells, outdoor and indoor), and the variety of radio units in terms of transceiver and receiver configurations, including the availability of 2T2R, 4T4R, and 8T8R radios.
- 2T2R and 4T4R make up the bulk of all radio unit products and constitute the foundation of a competitive radio portfolio. There is an immense variety of products supporting one or several technologies, single- or multiple-frequency bands, different bandwidths and output power, and so on.
- These products are essential but generally not sufficient to establish a clear competitive advantage. Price is a key element of differentiation in this segment, but as mentioned earlier, it is not considered here.
- One area of interest is the 8T8R radio unit segment. 8T8R radios fill the gap between 4T4R radio units and massive MIMO active antennas, and these solutions will be increasingly used in the coming years for suburban to rural areas and in specific scenarios such as along roads, tunnels, and rails. They are also useful for operators that want to boost capacity but may not have the financial resources to deploy massive MIMO widely, typically in emerging markets.
- Eight vendors offer 8T8R time division duplex (TDD) radios. Huawei, Ericsson, ZTE, and Samsung have the strongest 8T8R portfolios.

Radio portfolio breadth

- The radio portfolio breadth category combines several metrics including the number of unique radio products, the range of frequency bands supported by at least one product, and the availability and variety of multi-band (dual-band and tri-band) radios.
- Huawei has the highest number of unique radio products (over 500) and supports the highest number of frequency bands (over 40), despite the vendor being prevented from accessing some markets. Ericsson is the only vendor matching these numbers.
- Nokia, Samsung, ZTE, and Airspan also support a wide range of frequency bands, albeit not with the same variety of configurations.
- ZTE stands out with its range of multiband and multisector solutions, but they are increasingly common at all vendors.
- This category is not just about the sheer number of radios; the extent and variety of solutions mean that Huawei and Ericsson can address any needs of any operator with any spectrum assets, anywhere in the world. The ability to serve niche scenarios and less common frequency bands enhances a vendor’s competitiveness and translates into more deals won and a bigger share of the global market captured.
- However, Omdia is not suggesting that other vendors should follow the same path. Developing more radios means higher R&D costs and more difficulty in achieving a return on investment on every product. Therefore, smaller vendors act rationally by not trying to develop every imaginable solution; targeting niche markets will not make economic sense for everyone.

Massive MIMO portfolio breadth and competitiveness and power consumption

- Massive MIMO is considered by the industry as the flagship segment of the radio portfolio. Most vendors have multiple massive MIMO products, but Ericsson and Huawei have more than others, with over 140 unique products each.
- In addition to the more common 32T32R and 64T64R active antenna units, Ericsson, Nokia, Samsung Electronics, and ZTE also offer 16T16R products while other vendors do not. While 16T16R does not represent a large portion of the market, offering one more option between 8T8R and 32T32R (also in terms of pricing) can only be perceived positively by operators. Currently, 16T16R products are available for some FDD mid-bands (1, 3, 25, and 66) and the C-band (77 and 78).
- Variety aside, Omdia benchmarks products on weight and power consumption at comparable configurations. Weight comparisons come with some caveats, but weight is more than just a marketing claim. While a difference of a few hundred grams between two vendors' antennas with comparable specifications may not matter so much, a difference of several kilograms indicates that the vendor offering the lighter product generally uses more advanced chipsets or other components and can claim superiority in product design. Also, some operators rent tower space by weight, and therefore, lighter products have a direct impact on their tower rental costs.
- No single vendor consistently has the lightest active antennas in the industry; it depends on the configuration. When looking at 10 different massive MIMO products selected for this benchmark as the most relevant ones for a fair comparison, leaders on the weight metric appear to be ZTE and Ericsson, slightly ahead of Huawei and Nokia. Products benchmarked are 32T32R antennas for bands 42 and 78 and 64T64R antennas for bands 41, 42, and 78 in various configurations. Products compared have the same number of antenna elements (192), instantaneous bandwidth (IBW), and output power, with a few small differences between vendors in some cases.
- Using the same selection of products, Omdia similarly compared power consumption based on vendors' data for maximum consumption, corresponding to power consumption during busy hours. Huawei, Ericsson, Nokia, and ZTE all achieved high scores in this category, but there were significant differences between leaders and challengers.
- For the overall massive MIMO category combining subscores for portfolio breadth, weight, and power consumption, the leaders were Ericsson and Huawei.

mmWave portfolio and frequency bands supported

- While mmWave makes up a relatively small segment of the 5G market, it should not be neglected by vendors, especially if they operate in countries where mmWave spectrum has been allocated. As mentioned before, the ability for a vendor to also serve niche scenarios is important for operators in their vendor selection process.
- At the moment, the US and Japan are the two main destinations for mmWave product shipments, but other countries such as Australia, Italy, South Korea, Singapore and Thailand have started to deploy mmWave and the list will grow over time.
- The weighting for the mmWave category is relatively small, and Omdia considers both portfolio breadth and frequency bands supported.
- Ericsson and Samsung Electronics have the strongest mmWave portfolios with more bands supported (257, 258, 260, and 261) and a wider range of solutions, followed by Nokia.
- For Chinese vendors, mmWave is somewhat less important at the moment, given that both the US and Japanese markets are not open to them. However, they also have a growing portfolio of mmWave solutions.
- mmWave spectrum is yet to be allocated in China but based on guidance from authorities and discussions with stakeholders. Omdia believes that this could happen between 2H23 and 2024.

Open RAN support

- Open RAN support was factored into scoring for the first time in 2022; this year, the weighting for this category was slightly increased from 3 to 5 points (out of 60). Open RAN support here refers to compliance with the O-RAN Alliance's open fronthaul specifications.
- The maturity of the specifications is still debated, and some vendors report issues, particularly with the low layer split (O-LLS) uplink performance. They also make the argument that open RAN does not guarantee lower costs and instead risks creating higher costs and longer time to market (TTM) owing to required system integration.
- While arguments are heard, operators show an appetite for open RAN. When selecting suppliers, they will generally value the possibility of mixing and matching their vendors more easily. Omdia forecasts that the open vRAN market will represent 18.5% of total RAN spending by 2027, which means that vendors rejecting the concept will bar themselves from a non-negligible portion of the total addressable market.
- NEC, Fujitsu, Samsung, and Airspan have the widest portfolio of O-RAN–compliant radios.
- Ericsson, Nokia, and ZTE are also supportive to some extent. Ericsson does not currently support the O-LLS interface, but the vendor participates in the O-RAN Alliance's work—in particular Working Group 4, where the fronthaul interface is standardized.

Baseband portfolio

- While breadth is very important for the radio portfolio, it is somewhat less relevant for the baseband portfolio. Indeed, although some vendors have more products (Ericsson, Samsung, and ZTE), others have a modular platform approach (Nokia with AirScale). Both approaches have their pros and cons. Some operators may prefer one approach to the other, but it is difficult to generalize at a global market level, so breadth is therefore not one of the criteria here.
- The baseband portfolio basics category takes into consideration the support (or lack thereof) of all radio access technologies (from 2G to 5G), and the range of options available, including dedicated solutions for outdoor deployments.
- On portfolio basics, the top four vendors all obtained the maximum score; there is no differentiation between them in that category. Other vendors obtained a lower score on the basics because they did not support all radio access technologies or offer the same range of options.
- As for open RAN, taking the vRAN portfolio into consideration is not an endorsement of the approach by Omdia, but the valorization of increased choice and options being given to operators.
- For the overall baseband portfolio, Nokia, Huawei, and Ericsson are co-leaders with a score of 33/40.

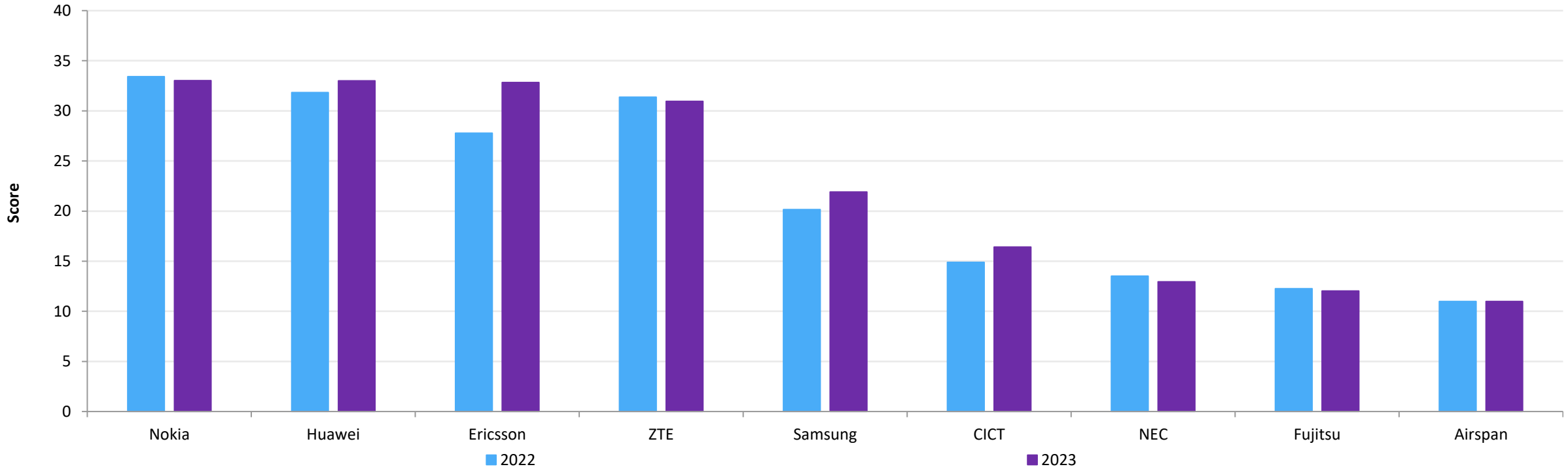
Summary of categories, score weight, and top three vendors per category

Categories	Score weight	#1	#2	#3
Baseband portfolio basics	5	Huawei, Ericsson, Nokia, and ZTE		
Combined capacity metrics	20	Huawei	ZTE	Nokia
Combined power consumption metrics	10	Ericsson	Nokia	Huawei
vRAN portfolio	5	More than five vendors with maximum score		
Total baseband portfolio	**40**	**Nokia, Huawei, Ericsson 33/40**		

Source: Omdia

Baseband portfolio scores, 2022 and 2023

Baseband portfolio overall scores (maximum 40 points)



Notes: Scores are relative. If a vendor has a lower score than in the previous edition, it does not mean that this vendor's portfolio is weaker in 2023 than 2022, but that the status of each vendor relative to the others has changed.

Source: Omdia

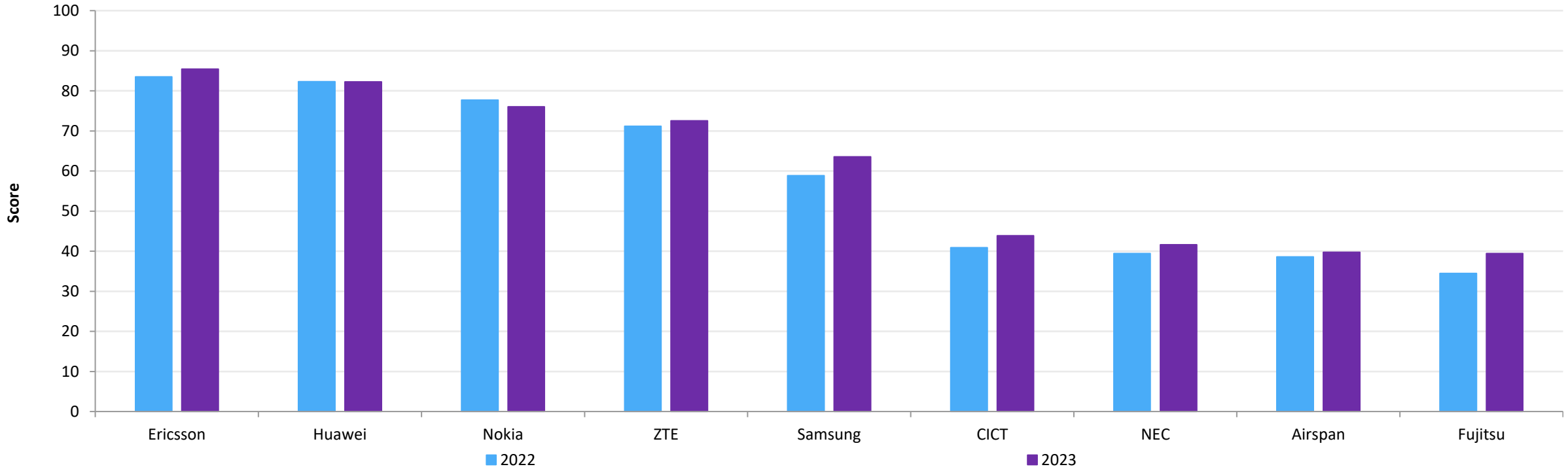
Baseband categories

- **Baseband capacity**
  - Omdia compares the capacity of flagship baseband products by measuring both the maximum number of LTE cells and 5G NR cells, as well as the maximum number of LTE users and 5G NR users that can be supported at an equivalent volume of equipment. Equal weight is given to both technologies (LTE and 5G NR) and to cell capacity and user capacity.
  - Assessing capacity, even at a comparable footprint, has its limits. The capacity offered by each vendor's flagship product is more than enough to cover the demand at a vast majority of sites. Deployed capacity should be adjusted to each site's needs and scaled up if and when needed. This is why some vendors are focusing more on TCO optimization (rather than maximizing capacity) and on offering lower capacity but smaller footprints and more energy-efficient baseband solutions. This is taken into consideration under the baseband power consumption metric in this report.
  - Another difficulty is comparing purpose-built baseband unit capacity with vRAN solutions capacity. This is because, for vRAN solutions, capacity depends on the commercial off-the-shelf (COTS) server configuration, which varies between partners and hardware configurations. Additionally, not all vendors provide clear information on the best capacity achievable with one virtualized distributed unit (vDU) server.
  - Having said that, in terms of pure capacity, Huawei leads, followed by ZTE and Nokia. Baseband capacity is also one of the categories in this report where we observed some of the largest differences between vendors.
- **Power consumption and efficiency**
  - Power consumption and efficiency are difficult to compare based only on theoretical product specifications. Nonetheless, because this topic is a growing priority, Omdia believes that it is useful to consider all the available data, even if imperfect.
  - Even if the level of details vary, Omdia recognizes and appreciates the efforts of most vendors to provide information about the power consumption of their products. It is also encouraging to see that all vendors now recognize the importance of this topic and are considering power efficiency a priority and a source of potential differentiation.
  - For this metric, Omdia compares the power consumption of flagship baseband products at comparable 4G LTE capacity and 5G NR capacity when operating at maximum load and high temperature. The power consumption is then normalized per cell and per user.
  - Even if methodology and measurements vary between vendors, the differences are big enough to identify differences between products and to spot leaders. In this category, they are Ericsson and Huawei, closely followed by Nokia and ZTE.
- **vRAN support**
  - The score depends on the vendors' offerings including virtualized central unit (vCU) and vDU software that can run on a third-party server or cloud infrastructure.
  - Six vendors obtained the maximum score.

Conclusion

Total portfolio scores, 2022 and 2023

Total portfolio scores (maximum 100 points)

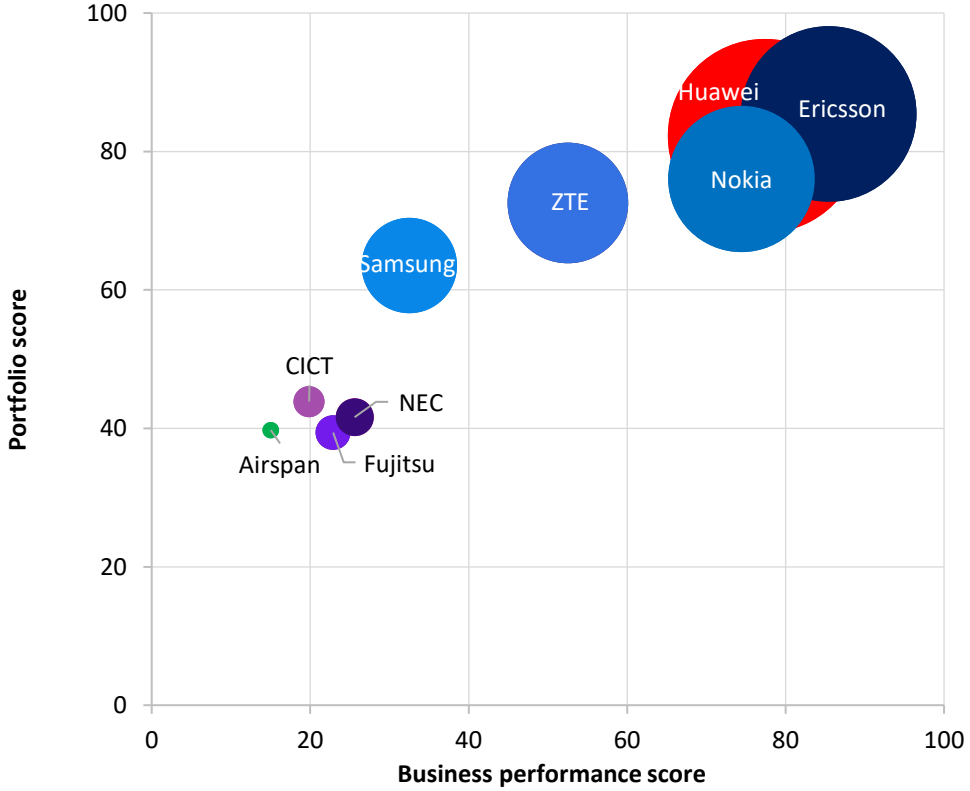


Notes: Scores are relative. If a vendor has a lower score than in the previous edition, it does not mean that this vendor's portfolio is weaker in 2023 than 2022, but that the status of each vendor relative to the others has changed.

Source: Omdia

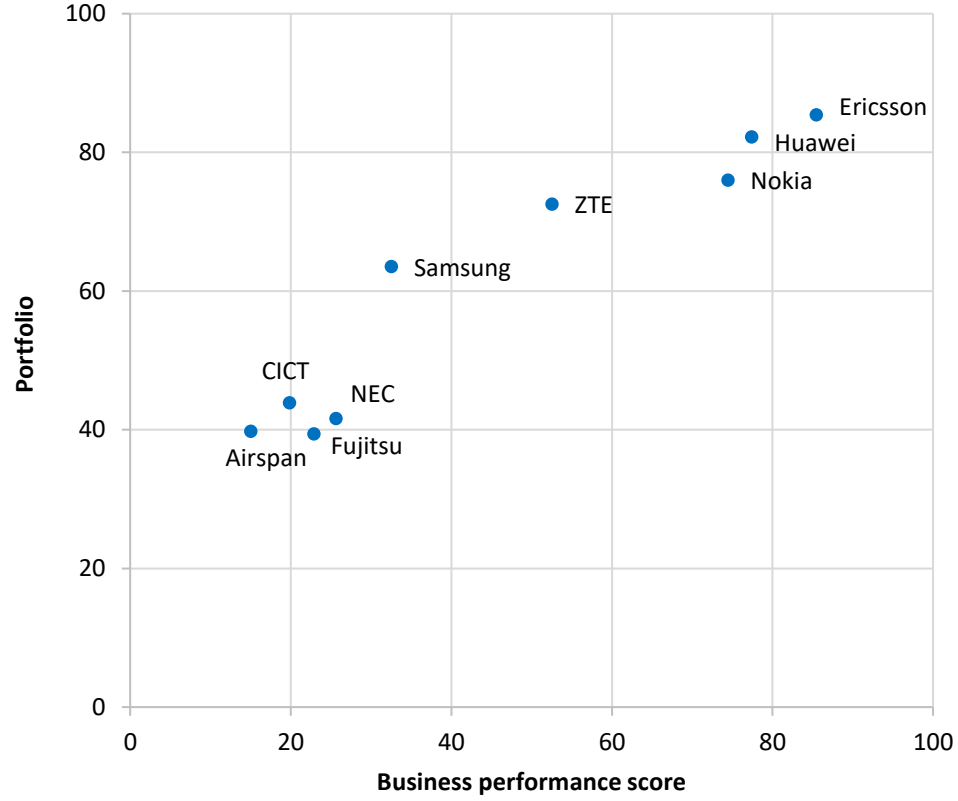
Conclusion

Overall RAN vendor positioning



Notes: Size of the bubble corresponds to the 2022 RAN revenue for each vendor
Source: Omdia

Overall RAN vendor positioning (with same-sized bubbles)



Source: Omdia

Appendix

Appendix

Further reading

Mobile Infrastructure Market Tracker – 4Q22 Data (February 2023)

Market landscape: RAN vendors 2022 (May 2022)

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Appendix

Omdia Consulting

We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Omdia's consulting team may be able to help you. For more information about Omdia's consulting capabilities, please contact us directly at consulting@omdia.com.

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