

Small Cells 2023



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MOBILE EXPERTS



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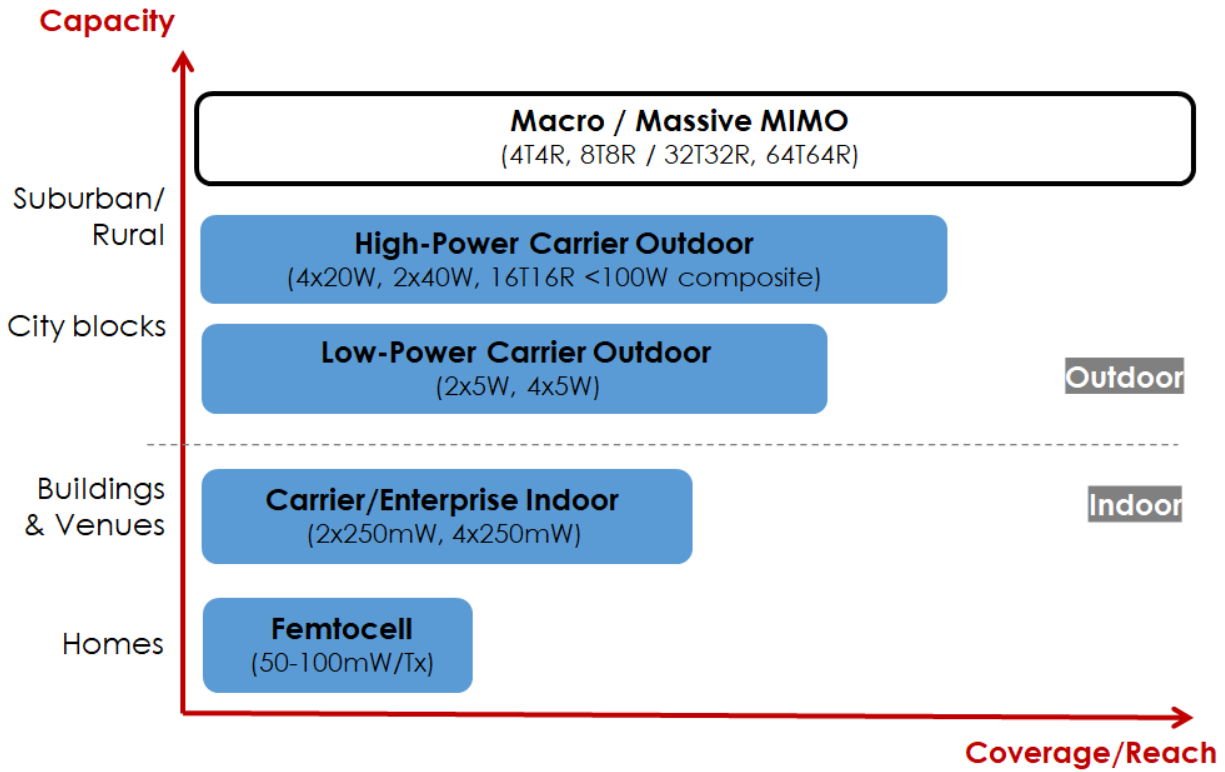
METHODOLOGY

Mobile Experts relied on direct input from more than 60 industry sources to create estimates and forecasts for small cell shipments and revenues, with 30 mobile operators contributing to the overall analysis to give a detailed global view of the market. First, Mobile Experts built a “top-down” forecast based on direct input from mobile operators and based on trends in end-user demand for mobile services. Then, Mobile Experts built a “bottom-up” forecast through discussions with the supply chain. Roughly 40 suppliers, integrators, and OEMs participated in this phase of the survey. Mobile Experts also used financial disclosures from publicly traded companies to assemble a quantitative view of the equipment market.

The small cell shipment and revenue figures are categorized across the different small cell product types. As shown in Figure 18, the categorization is primarily based on output power rating and user/data capacity handling capabilities.

The independent market for Carrier Wi-Fi is not included in this report, but the integration of Wi-Fi into licensed-band small cells is considered. In this report, we cover the integration of unlicensed and licensed-band connectivity and shed light on the prospects for specific LAA/NR-U/Wi-Fi/CBRS integration options. Also, the O-RAN small cells are tracked under the Carrier Indoor and Outdoor and Enterprise segment categories.

Figures 19 through 22 give the detailed definitions for each category of equipment, for regions of the world, for multimode vs. single-mode, for frequency band categorization, and for small cells as a service categorization.



Source: Mobile Experts

Figure 1. Small Cell Categories

Definitions	RF Power	Backhaul	Architecture
Macrocell	40W+ composite for 2G/3G, 100W+ composite for 4G/5G	Operator managed	Closely controlled cells
Traditional Microcell	5.1-39W composite	Operator managed	RNC or BSC architecture (2G/3G)
Traditional Picocell	300 mW to 5W composite	Operator managed	RNC or BSC architecture (2G/3G)
Low power CPRI RRH	up to 1W per antenna	CPRI, OBSAI, ORI to separate baseband unit	No baseband processing in radio unit
Low Power Split-Baseband RRH	up to 1W per antenna	Proprietary format	Split baseband with scheduler in RRH and other baseband functions centralized
Carrier Outdoor (High Power) Small Cell	5.1W/ant-40W composite (for 2G/3G); 5.1W/ant-below 100W composite (for LTE/5G)	Operator managed	Coordinated with macro layer, LTE or 3G gateway; some fixed wireless application
Carrier Outdoor (Low Power) Small Cell	300 mW to 5W per antenna	Operator managed	Coordinated with macro layer, LTE or 3G gateway
Carrier Indoor Small Cell	<300 mW per antenna	Operator managed	Lightly Coordinated with macro layer, LTE or 3G gateway
Distributed Radio System (DRS)	<300 mW per antenna	Operator managed	"Deeper" CRAN architecture where remote hub unit distribute IF signal to multiple radio units
Enterprise Small Cell	50 to 300 mW/antenna	Enterprise or Neutral Host purchased and managed	Autonomous node (Gateway) or local controller.
Residential Femtocell	<50 mW/antenna	Consumer or SOHO managed	Autonomous node (Gateway)

Source: Mobile Experts

Figure 2. Detailed Definitions for each equipment category

North America:	USA and Canada
Latin America:	Mexico through South America, including the Caribbean
Europe:	Western and Eastern Europe, including Russia
China:	China, including Tibet and Hong Kong
Asia Pacific:	India through Australia/Micronesia, excluding China
Middle East/Africa:	Pakistan and Turkey through Africa

Source: Mobile Experts

Figure 3. Detailed Definitions for regions

Multimode:	Capable of multiple simultaneous air interface standards (LTE, HSPA, GSM, etc.)
Adaptable:	Capable of one air interface standard at a time but reprogrammable
Single-mode:	Capable of only one air interface standard

Source: Mobile Experts

Figure 4. Detailed Definitions for multimode/single-mode

Multiband:	Capable of operating in multiple frequency bands, one at a time or simultaneously with separate baseband data streams
Carrier Aggregation Units:	Units that operate in multiple bands with a single baseband datastream (inter-band CA)

Source: Mobile Experts

Figure 5. Detailed Definitions for multiband and carrier aggregation