5G EVOLVING INFRASTRUCTURE

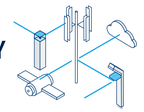
The user device evolution from simple telephones to application driven devices, with various use cases, implies strong demand for flexible infrastructure that can cope with eMBB, URLLC and mMTC 5G service requirements. Standalone or non-standalone deployment strategies require flexible hardware to interact with legacy technologies such as 4G. The ever-increasing 5G technical requirements and system complexity require future-proof test equipment, with dedicated application-optimized test solutions for the whole life cycle.

Learn more about 5G mobile network infrastructure testing:
https://www.rohde-schwarz.com/wireless/infrastructure-testing

NETWORK DENSIFICATION

Network densification complements macro cells to help cope with challenging requirements. Solutions range from repeaters and low power small cells, operating in FR1, to distributed antenna systems (DAS) and mmWave solutions. As one of the first use cases for 5G mmWave applications, last mile fixed wireless access (FWA) uses the massively increased capacity to bring broadband to private homes. The most promising and cost-effective solution for network densification is 3GPPs integrated access and backhaul (IAB) feature for access and backhaul via the same 5G air interface technology.

EVOLVING MOBILE NETWORK TECHNOLOGY



5G mobile network infrastructure is growing more important along with the need to secure network performance in various scenarios, ranging from sporadic data burst transmission to reliable and fast speeds with low latency requirements. Trends like cloudification, disaggregation and multi-access edge computing (MEC) target smart, agile and flexible networks. The challenge is bridging the right gap between centralization, for lower energy consumption and complexity as well as hierarchical disaggregated network deployment for low latency, intelligent RAN control and QoS optimized scheduling. Ubiquitous connection brings connectivity to rural areas and IoT networks in remote locations via non-terrestrial networks (NTN) where 5G services are delivered via satellite and other aerial communication systems. Unmanned aerial vehicles mounted base stations (UAV-BSs) will be one of the most relevant components of the next generation wireless networks (NGWNs).

Network energy saving (NES)

Base station equipment and components can save a lot of energy. Advanced power analysis, real-time power statistics over time and debugging device activity versus power consumption are important during R&D. Utilizing dedicated T&M equipment such as power supplies, power analyzers or high-performance oscilloscopes help achieve energy efficiency and sustainability goals.

What is massive MIMO?

MIMO stands for multiple-input multiple-output. MIMO mainly describes spatial multiplexing: a wireless network that allows more than one data signal layer to be transmitted and received over the same radio channel. Massive MIMO applies a large number of antenna elements and combines MIMO with beamforming, supporting single-user (SU-) and multi-user (MU-)MIMO.

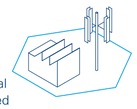
NETWORK DISAGGREGATION

Separating software and hardware enables a new way of networking. Software defined network methods, such as virtual RAN (vRAN) and Open RAN, allow virtualization of functions for faster, more flexible and easier deployment of new network functions. The functions are not bound to any hardware for an open multi-vendor concept. Opening the network architecture and standardizing interfaces can foster innovation, accommodate individual needs and enhance network efficiency. Network disaggregation brings new challenges for interoperability between the network equipment from different vendors.

What is beamforming?

Beamforming is an antenna technology for highly focused antenna directivity and improves overall system efficiency. Signals are transmitted in the form of targeted beams in order to manage transmission power based on current user demand.

PRIVATE/LOCAL NETWORKS



Industries, such as production facilities, use 5G technology to create a local or private network within a dedicated area. Based on network slicing or individual industry-owned networks, private networks have unified connectivity, use-case optimized services and a secure environment. Governments started to provide specific spectrum allocations for private networks. Network operators offer the operation of a non-public network (NPN) as a virtualized network as service to their customers.

RF design, verification and conformance testing	Production testing	Rollout verification and acceptance
R&S®SMW200A/ SMBV100B vector signal generator	PVT360A performance vector tester	QualiPoc Android
		SmartAnalytics
R&S®FSW/FSV(A)3000 signal and spectrum analyzer	R&S®CMP200 radio communication tester	R&S®Cable Rider ZPH
Complex, digitally modulated generation and precise analysis of 5G NR wideband signals.	Fully integrated 5G FR1 and FR2 testing with small footprint, also for parallel testing of multiple devices.	Meet the expected performance during network deployment for single sites and clusters.

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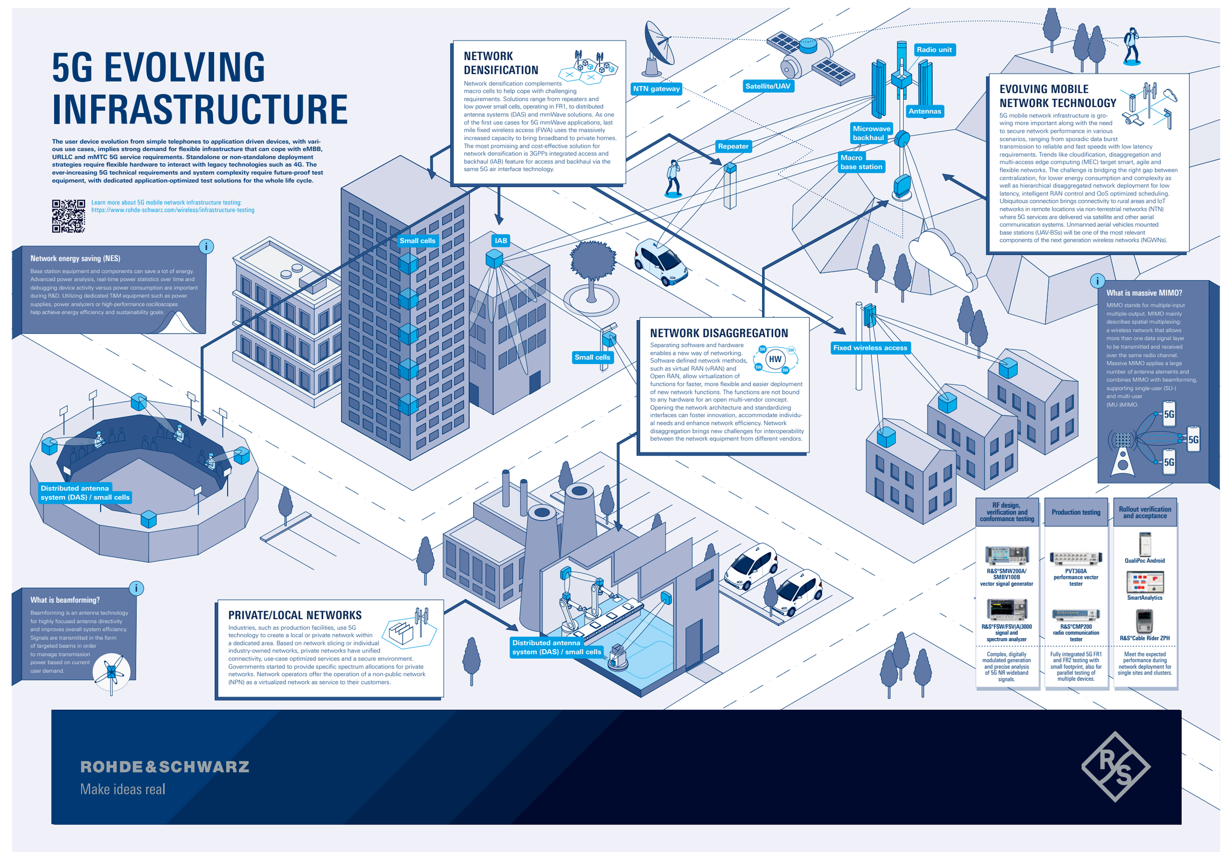
5G EVOLVING INFRASTRUCTURE



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