5G EVOLVING INFRASTRUCTURE

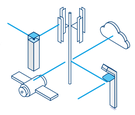
The user device evolution from a plain telephone to an application driven device, offering various use cases, implies a strong demand for a flexible infrastructure that can cope with 5G service requirements eMBB, URLLC and mMTC. 5G deployment strategies such as standalone or non-standalone require flexible hardware to interwork with legacy technologies such as 4G. The ever-increasing technical requirements of 5G and system complexity make it necessary to rely on future-proof test equipment, with dedicated application-optimized test solutions for the whole life cycle.

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

NETWORK DENSIFICATION

Network densification enables to cope with the challenging capacity requirements by complementing macro cells. Solutions range from repeaters and low power small cells, operating in FR1, to distributed antenna systems (DAS) and mmWave solutions. Being 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 enabling access and backhaul via the same 5G air interface technology.

EVOLVING MOBILE NETWORK TECHNOLOGY

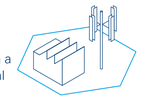


The importance of 5G mobile network infrastructure rises with the need to assure network performance in various use cases ranging from sporadic data burst transmission to reliable and fast speed with low latency requirements. Trends like cloudification, disaggregation and multi-access edge computing (MEC) target at smart, agile and flexible networks. The challenge is to bridge the right gap between centralization, for less energy consumption and lower complexity on one side and hierarchical disaggregated network deployment fostering low latency, intelligent RAN control and QoS optimized scheduling aspects on the other side.
Ubiquitous connection is a target to bring connectivity to rural areas and IoT networks in remote locations via non-terrestrial networks (NTN) delivering 5G services via satellite and other aerial communication systems. Unmanned aerial vehicles mounted base stations (UAV-BSs) are expected to become one of the most relevant components of the Next Generation Wireless Networks (NGWNs).

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 a virtualization of functions making deployment of new network functions much faster, flexible and easier. The functions itself are decoupled from a direct hardware binding leading to a 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 in terms of interoperability between the network equipment of different vendors.

PRIVATE/ LOCAL NETWORKS



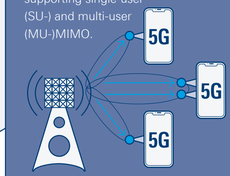
Industries, such as production facilities, use the 5G technology to create a local or private network within a dedicated area. Based on network slicing or individual industry-owned networks, private networks feature unified connectivity, use-case optimized services and a secure environment. Governments 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.

Network energy saving (NES)

Base station equipment and its components have significant potential for energy saving. Advanced power analysis, real-time power statistics over time and debugging device activity versus power consumption are important tasks during R&D. Utilization of dedicated T&M equipment such as power supplies, power analyzers or high-performance oscilloscopes support in reaching energy efficiency and sustainability goals.

What is massive MIMO?

MIMO stands for multiple-input multiple-output. While it involves multiple technologies, MIMO mainly describes spatial multiplexing: a wireless network that allows the transmitting and receiving of more than one data signal layer simultaneously 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.



What is beamforming?

Beamforming is an antenna technology that ensures 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.

RF design, verification and conformance testing	Production testing	Rollout verification and acceptance
 R&S®SMW200A/ SMBV100B vector signal generator	 R&S®PVT360A performance vector tester	 QualiPoc Android
 R&S®FSW/FSV(A)3000 signal and spectrum analyzer	 R&S CMP200 radio communication tester	 SmartAnalytics
		 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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