



Manufactured Capital

At Airtel, everything we do centres around **delivering an unparalleled experience to our customers**. For our new generation of customers, connectivity and the internet are redefining how they live, work and play. We are mindful that ability of our customers to realise new possibilities depends on our capability to **provide a strong network and world-class services**. Therefore, we are constantly investing in a smart way and expanding our infrastructure and growing our spectrum portfolio to be more **future-ready than ever before**.

This section includes

- Network quality, expansion and transformation
- Spectrum enhancement and re-farming
- Network reliability
- Strategic partnerships to enhance network security

SDGs impacted



India is home to the second-highest number of internet users globally. The Government of India's vision for a 'Digital India', coupled with technological advances, growing demand for digital services and customer demand for a seamless experience, has prompted us to make substantial investments in our network infrastructure.

We now connect 7,907 census towns and 792,827 census and non-census towns and villages through our mobile telephonic services, covering 95.5% of India's population with our network. We also remain focused on expanding our reach further into rural areas.

216,901

Mobile Network Towers

606,783

Total Mobile Broadband Base Stations

3,603 Bn

Minutes on Network (Mobile)

32,541 Bn MBs

Data Traffic (Mobile)

324,825 RKms

Optical Fiber Network

Network quality, expansion and transformation

The growth in data traffic has spurred us to strengthen our footprint across different bandwidth spectrums. Led by our commitment to deliver outstanding customer experience, we are expanding our network to cover new locations, strengthen the network in existing ones,

and add more sites and small cells in hotspot areas.

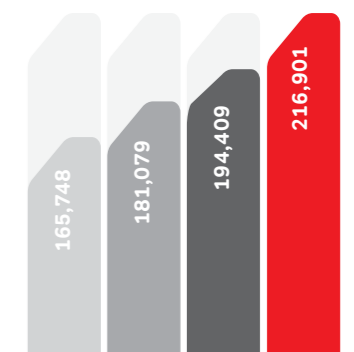
A total of 22,492 mobile network towers were installed in FY 2020-21 across all 22 telecom circles, an increase of 11.56% compared to FY 2019-20.

Mobile Broadband Base Stations (in No.)



■ FY 2017-18 ■ FY 2018-19

Mobile Network Towers (in No.)

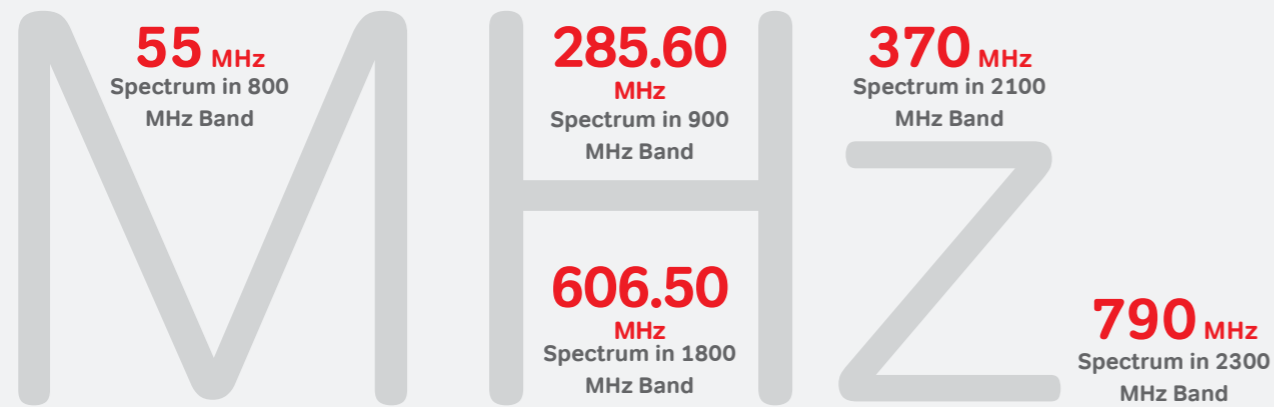


■ FY 2019-20 ■ FY 2020-21

Spectrum enhancement and re-farming

Airtel has built the most formidable spectrum holdings in the country. In the latest spectrum auction conducted by the Government of India, we acquired 355.45 MHz spectrum across Sub GHz, mid-band and 2300 MHz bands for a total consideration of ₹187,034 million.

Airtel's Spectrum snapshot* (Unpaired)



*Note:

- 1) Includes all spectrum acquired in 2021 auction and excludes spectrum due for expiry in September, 2021.
- 2) In April 2021, Airtel announced an agreement with another Telecom Service Provider to transfer the 'Right to Use' of its 800 MHz spectrum in Andhra Pradesh (7.50 MHz), Delhi (2.50 MHz) and Mumbai (5.00 MHz) on unpaired terms which is subject to statutory approvals as on the date of this report.

We have re-farmed our spectrum from legacy technologies like 2G and 3G to 4G to enhance coverage and capacity. Refarming of 3G spectrum led to additional spectrum usage for L900 and L2100 which boosted the network's 4G capacity and complimented the services we offer in the 2300 MHz and 1800 MHz bands. In the last two years, a total of 100,000 sites for 120 MHz have been re-farmed to a 4G spectrum from 3G.

We deployed 280 Massive Multiple-Input Multiple-Output (MIMO) in FY 2020-21 to scale capacity and meet throughput requirements. MIMO has been deployed to support traffic surges during cricket matches in the Arun Jaitley Stadium, New Delhi or in cities like Bengaluru to manage the high customer and payloads.

Airtel is the first operator in India to deploy 4G in licenced and unlicensed bands using Licensed Assisted Access

(LAA) technology to tap into the unlicensed band spectrum and expand capacity.

We ran a special programme with our partners to improve spectral efficiency, which offered new features and fine-tuned parameters to increase spectral efficiency by up to 5% in all circles. As on March 31, 2021, our customer churn decreased to 2% for the fiscal year on a customer base of 321.4 million.

Network reliability

Providing customers with consistent network coverage is an essential service, and its continuity needs to be ensured even during catastrophes. We have supported the 'Digital India Mission' by taking up several initiatives to improve network reliability.

A comprehensive Business Continuity Plan (BCP) ensures that our network is live even during adverse conditions. We have taken many measures and introduced various new initiatives to ensure uninterrupted connectivity during the nation-wide lockdown due to COVID-19 outbreak. An ecosystem was created wherein remote access was set up for the entire field staff including our partners. Automation and digitisation of our processes enables us to monitor our network remotely and resolve issues with minimal field visits. New tools like Groundhog have removed dependency on manual drive test of sites. We have introduced new automated tools for Root Cause Analysis and appointed resources from Microsoft for faster and accurate cause analysis and complaint resolution. We proactively inform our customers whenever a new site goes live or in case of mass outages in the



Radio Access Network (RAN). As a result of such initiatives, our customer complaints have decreased drastically.

Further, as the traffic shifted from urban to rural areas, we diverted incremental capacities to rural areas. We rolled out aggressive capacity plans across circles to maintain customer experience standards despite the sudden change in traffic patterns. Moreover, we ensured adequate spares availability for corrective maintenance.

To strengthen the Airtel network across urban and rural areas, for better speed and voice quality, we rolled out the following initiatives during FY 2020-21:

- » Deployed over 22,000 coverage sites across multiple geographies
- » Total 43 PB capacity added in the network

- » Spectrum maximisation on 4G carried out for 23,800 sites
- » 3G services were shut down in a phased manner for 24,000 sites across eight circles and converted to 4G
- » Maximisation of 4G spectrum through the deployment of L900 technology solutions
- » Standardised cloud hardware to bring more efficiency across domains (VOLTE/PACO/VAS/IN/VRAN)
- » Software Defined Networking automation to simplify multivendor applications

These measures reduced upgrade time, made operations more efficient, improved network resilience and reduced network interruption, with 0.005269 Average Network Interruption Frequency and 0.000014 Average Network Interruption Duration.

Ready for a 5G future

We are partnering with leading technology providers in our journey to roll out world-class 5G in India and are the first in India to test live 5G services over existing network. Our 5G network will be capable of delivering ultra-fast speeds with low latency and high concurrency compared to existing technologies. For customers, this will unlock a digital world of limitless possibilities.

Homes services

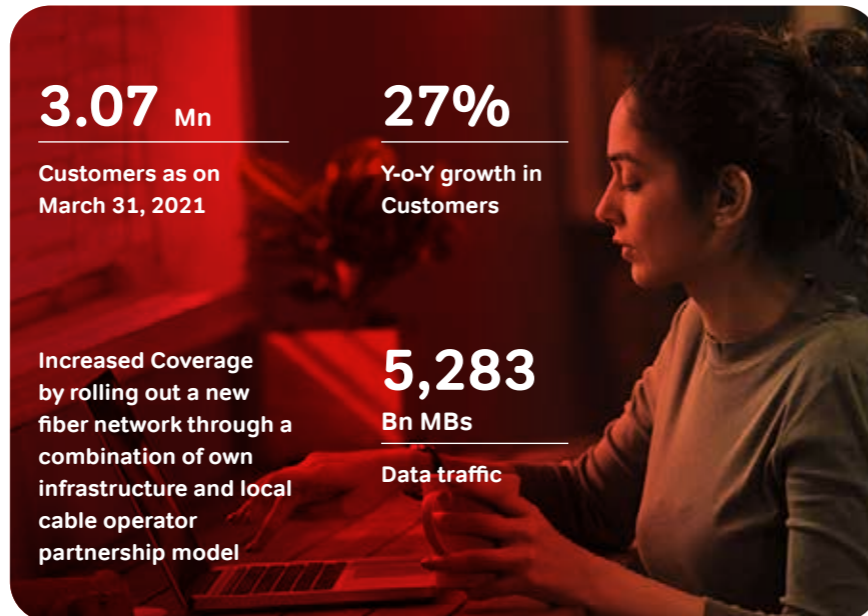
Airtel now provides fixed-line telephone and broadband services for homes in 291 cities across India as compared to 111 cities at the end of the previous year.

There has been an unprecedented surge in demand for home broadband due to the ongoing pandemic. Homes broadband has become necessary to enable work-from-home, e-learning, online entertainment, digital payments and various other online services. A robust and reliable fiber network is key to addressing the growth in demand for home broadband.

During the year, we rolled out a new fiber network across major cities in India. Overhauling our network from Copper to FTTH continued to ensure that our customers enjoy higher speed and seamless connectivity. Additionally, local cable operator partnerships, an innovative and entirely digital-led model developed internally, has enabled Airtel to work with them in providing

convenient last mile, accessing more cities and expanding the scale of its business. At the same time, we are unleashing entrepreneurial energy of these cable operators, in managing the

last mile for us while providing them the backing of the Airtel brand – its customer support, billing systems, technology and its backhaul fiber connectivity.



Digital TV services

Airtel Digital TV is one of the leading DTH service providers in the country. It offers the largest number of entertainment channels, including premium ones, to our subscribers. Our Direct-To-Home (DTH) platform offers standard and high definition (HD) digital TV services with Dolby surround sound.

Airtel Digital TV has witnessed a step up in customer additions on the back of its premium HD content. Airtel DTH keeps launching innovative products for its customers and provides them with best-in-class customer service. It is one of

the fastest-growing DTH operators, with operations in 639 districts.

To deliver modern-day entertainment services to its customers, Airtel Digital TV launched the Airtel Xstream 4K Android Box (Connected Box) in September 2019, which saw a strong rise in demand for this first-in-kind Android Box and currently has 700,000 active users. We also launched the 'Airtel Xstream Bundle', which provides access to Linear Pay TV and OTT streaming apps such as Disney+ Hotstar, Amazon Prime Video and ZEE5.



17.72 Mn
6.6% Y-o-Y growth

Customers as on March 31, 2021

99.8%

Coverage

639

Districts covered

Airtel Business

Airtel is the most trusted provider of ICT services to individuals and enterprises in India. Our strategically located submarine cables and satellite networks connect customers across the world in the remotest of areas.

We offer a diverse portfolio of services to enterprises, governments, carriers and small and medium businesses, including:

- » Fixed-line voice and data
- » MPLS (Multiprotocol Label Switching), VoIP (Voice over Internet Protocol), SIP (Session Initiation Protocol) trunking to small and medium enterprises
- » VAS services like International Toll-Free Services and SMS hubbing



Data centres in Maharashtra by Nxtra Data Limited

Nxtra Data Limited, a subsidiary of the Company, offers secure data centre services to leading Indian and global enterprises, hyperscalers, start-ups, SMEs and governments through its nationwide portfolio of 10 large data centres and more than 120 edge data centres. During the year, we signed a Memorandum of Understanding (MoU) with the Maharashtra Industrial Development Corporation for setting up two new data centre campuses in the state.

Enhancing digitisation for growing network capacity and improving customer experience

- » We introduced network digitisation with auto-ticketing with solutions from Netcool and Remedy to reduce the time taken to isolate faults and rectify them.
- » A Homes Network View (HNV) web portal and mobile app were created for Airtel's Call Centre and Field operations. This predictive Decision Tree tool tracks the real-time network quality of a customer's home connection to enable faster fault identification and resolution.
- » We set up a dedicated Customer Experience Analytics portal to analyse quota and speed of usage across rental plans. This initiative upgraded speed plans for 3,500,000 customers.
- » We introduced the Multi Router Traffic Grapher (MRTG) portal to generate broadband utilisation reports and develop productivity-enhancing tools.



- » An application for capturing customer complaints was included in the Airtel Thanks App eliminating the need for customers to visit our premises, especially during the pandemic.
- » We launched High-Speed V Fiber technology across India to deliver superfast broadband to digital homes covering 19 telecom circles and 3.06 million customers.

Strategic partnerships to enhance network security

Qualcomm

Airtel and Qualcomm announced their partnership for 5G in India. Airtel will use the Qualcomm® 5G RAN Platforms to roll out virtualised and Open RAN-based 5G networks as well as collaborate on a wide array of use cases, including 5G Fixed Wireless Access (FWA) designed to deliver broadband connectivity at Gigabit speeds to homes and businesses.



Airtel renewed its agreement with Ericsson to provide managed network operations across India. Ericsson will deploy the latest automation, machine learning and artificial intelligence (AI) technologies to enhance Airtel's mobile network performance and customer experience. Ericsson will also manage Airtel's network operations centres and field maintenance activities across India.



Airtel hosted India's First O-RAN ALLIANCE Plugfest, offering a great opportunity to Indian organisations with innovative hardware, software and services capabilities to build a 'Make in India - O-RAN solution' - for Indian and global markets.



Airtel selected Ceragon's products and services to expand its 4G network to meet the growing demand for broadband amid a sharp rise in data consumption across India. Airtel is looking to increase its 4G network capacity in urban areas and expand its coverage in rural regions and prepare for its future evolution to 5G.

NOKIA

Extending its long-standing relationship with Nokia, Airtel announced a strategic partnership with Nokia's CloudBand-based software products to power Airtel's VoLTE network in India to support over 110 million customers, making it the largest cloud-based VoLTE network in India and also the largest Nokia-run VoLTE in the world. The deployment will allow Airtel to provide its mobile customers with faster, more reliable, cost-efficient call connectivity.



Airtel selected IBM and Red Hat to build Open Hybrid Cloud Network. Through this collaboration, Airtel will build a modern, innovative and more responsive network infused with automation and AI, that will provide the consistency and agility needed for today's rapidly changing marketplace.



Improving coverage in difficult terrains/ remote and rural areas

Nubra is a subdivision and a tehsil in the Indian union territory of Ladakh situated 10,135 ft above sea level. Called 'The valley of flowers', Nubra is a popular tourist destination. Given its location and remoteness, Nubra faces a challenge of connectivity and communication with only one VSAT-based service provider. Airtel has now laid an OFC passing through the Khardungla pass near the valley. While laying the cable at such a high altitude and punishing temperatures was challenging; however, our teams worked hard to beat the weather and delivered fiber connectivity to Nubra. We are the first and only operator to provide a high-speed quality network in Nubra with seven towers in the valley. Our 4G services have empowered the locals to improve tourism and access digital channels to grow business.



First and only operator of high-speed quality network in Nubra

365 new sites added in FY 2020-21

10 new sites in the Ladakh region



Broaden our reach in rural India in the North-East

The Government of India has approved a proposal to implement a comprehensive telecom development plan for the North-Eastern states. This project will provide mobile coverage to a set of under-served villages across Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland, and Tripura. As part of this initiative, Airtel has installed 1,350 mobile towers along national highways to bring 4G services to these villages. We appreciate the contributions of our network teams, who

have overcome the challenges of harsh weather and rugged terrain to bring these services to the people.

These 4G services enable local communities, the army and tourists visiting the region to avail of digital services like HD quality videos, superfast downloads and high-speed internet browsing.



1,350
New Towers Installed

8.5 Lakhs
New customers



Airtel operates 5G and 4G on the same spectrum block

Airtel became India's first telco to demonstrate and orchestrate LIVE 5G service over a commercial network in Hyderabad over its existing liberalised spectrum in the 1800 MHz band through the NSA (Non-Stand Alone) network technology.

Airtel seamlessly operated 5G and 4G concurrently within the same spectrum block using a first-of-its-kind dynamic spectrum sharing. This demonstration has further validated the 5G readiness of Airtel's network across all domains - Radio, Core and Transport.



India's first telco to demonstrate and orchestrate LIVE 5G-service over a commercial network