

# **WIRELESS MEDIUM ACCESS CONTROL AND CDMA, 3G, WIMAX, 4G AND 5G NETWORKS**

## **Lesson 17**

### **Upcoming 5G Network**

# 5G

- Next-generation mobile communication and networks.
- 5G converge multiple technologies massive MIMO, advanced antenna systems, software-defined networking (SDN), network functions virtualization (NFV), Internet of Things (IoT), wireless sensors,

# 5G

- Satisfy ITU IMT-2020 requirements and 3GPP Release 15
- High throughput, low latency, high mobility and high connection density
- Additional spectrum in the existing LTE frequency range (600 MHz to 6 GHz) and millimeter wave bands (24-86 GHz)

# 5G

- Support data rates of up to 20 gigabits per second (Gbps)
- Massive MIMO (Multiple Input Multiple Output) Infrastructure for significant increase in network capacity<sup>1</sup>

# 5 G – EMBB NETWORK SERVICES

## ITU three categories of Network Services

1. Enhanced Mobile Broadband (eMBB)  
handsets. Initial 5G deployments will focus on eMBB.

# 5 G— URLLC AND MMTC NETWORK SERVICES

## 2. Ultra-Reliable Low-Latency

Communications (URLLC), which includes industrial applications and autonomous vehicles, and

## 3. Massive Machine Type Communications (MMTC) from sensors.

# 5 G USE CASES (PROJECTED)

- 10- to 100-fold increase in the number of 5G-connected devices over the number of 4G devices
- The Internet of Things (IoT) —5G's virtualized, radio technology-agnostic core, published predictions estimate as many as 20 billion IoT connections by 2020

# 5 G USE CASES (PROJECTED)

- Drive smart buildings and smart cities
- 1,000 times the bandwidth of 4G
- Up to five times the density
- 5G speeds driverless cars to coordinate over the network, enable augmented reality and virtual reality, and expand the horizons of remote surgery

# 5G

- Ultra fast file transfers
- Streaming ultra high resolution pictures
- Streaming high definition TV
- Streaming videos
- Need 100 Mbps at the mobile systems

# SUMMARY

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- 1. Enhanced Mobile Broadband (eMBB) handsets. Initial 5G deployments will focus on eMBB

# ...SUMMARY

2. Ultra-Reliable Low-Latency Communications (URLLC), which includes industrial applications and autonomous vehicles, and
3. Massive Machine Type Communications (MMTC) from sensors

# ...SUMMARY

- The Internet of Things (IoT) —5G's virtualized, radio technology-agnostic core, published predictions estimate as many as 20 billion IoT connections by 2020

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**End of Lesson 17**  
**Upcoming 5G Networks**