5G Way Through Unlicensed Spectrum

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By **prasanna (http://5gblogs.com/author/prasanna/)** in **(http://5gblogs.com/5g-way-through-unlicensed-spectrum/) 5G System (http://5gblogs.com/category/**

Utilizing unlicensed Spectrum

Unlicensed spectrum band is used by low-power devices such as WiFi or Bluetooth devices to commu wireless signals over short range. For this spectrum band, there is no regulatory to provide license or band as far as the transmission power is low. Some common devices in this category are home securi WiFi remote camera, cordless phones and Bluetooth speakers/headsets.

For unlicensed transmission, in order to avoid larger interference, different devices operate in differer frequency range like WiFi is regulated to use 2.4 GHz or 5 GHz band.

Good examples of Unlicensed spectrum utilization in communication.

- **WiFi offload:** Offloading cellular traffic over WiFi Access points.
- **LTE-U :** Transmitting LTE signal over unlicensed spectrum with low power for Home base station tc small buildings.
- **LAA :** License Assisted Access is a LTE aggregation technology(R-13) to aggregate Licensed LTE ban Band) with unlicensed bands.
- **Higher order MIMO in WiFi**: This is multiple antenna WiFi technology(802.11ac) gives higher orde transmit Gigabits/s of traffic over WiFi access points.

5G System Objectives

5G is more than just another version of mobile network. It has to deal with most diversified communi infrastructures which has very diversified aspects described as below.

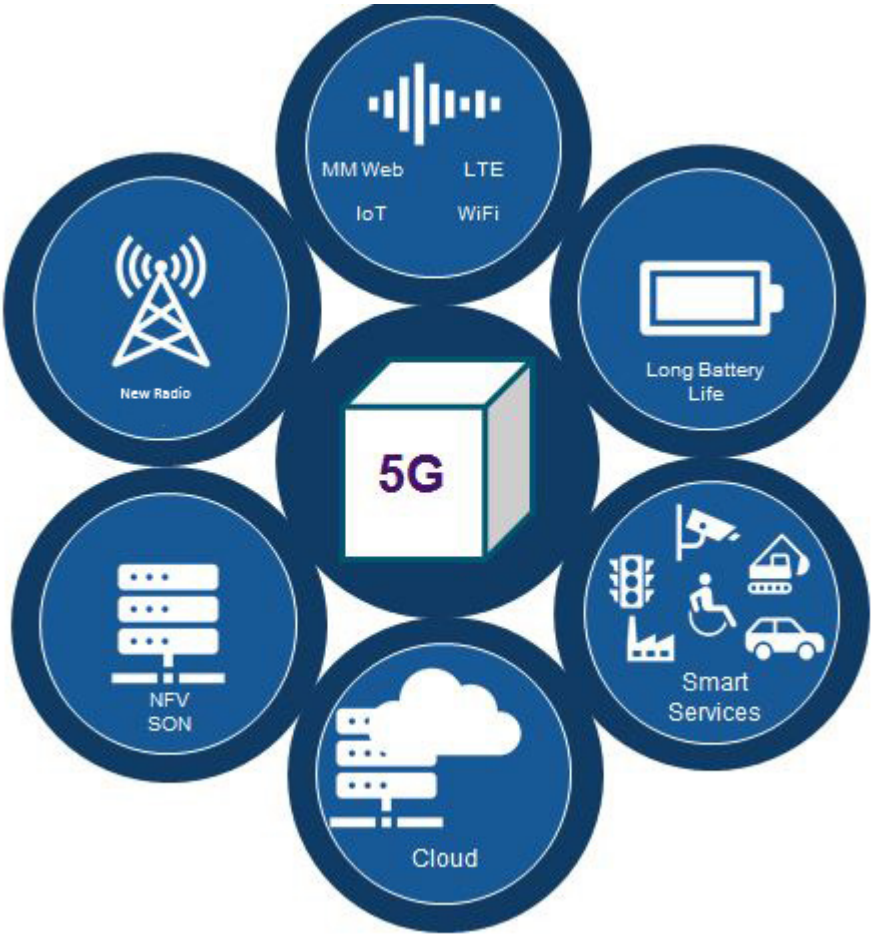
High speed radio access: 5G will provide download speeds of up to 20 Gbps. Why would anyone eve much speed?, Because of the evaluation of cloud based technology, online gaming and mobile edge c all the devices need a high speed and low latency connectivity to other edge nodes. And these are ma force behind high data rate requirement. And in future this requirement is going to go up. It's also imp

remember that bandwidth is shared by all the users on a cell tower.

Ultra-low latency: 5G networks will be used to control autonomous cars, Health care communicatior remote operation theatre and high precision mission-critical system. High reliability and availability at base target for 5G systems.

Massive Connectivity: In this increasing smart world, 5G has to deal with millions of IoT devices and order density. By 2020 there will be approximately 21 billions of connected devices, excluding smartpl Most of the IoT devices are remotely located and operated by batteries and constrained to transmit sı amount of data like Smart electricity or water meters and parking sensors. And 5G has to deal with d transmission power management and scale of the devices.

5G Driving Forces



Speed and scale: Up to 20Gbps wireless connectivity, with help of Carrier aggregation, Massive MIMC order QAM

Unlicensed Spectrum: Mobile Operators, now a days prefer to unlicensed spectrum technologies suc LTE-U, LAA or Multifire to cover coverage holes where regular radio network can't penetrate. And this the preference due to low infrastructure cost, free spectrum availability. 5G defined specs deals with i working of 5G system with these unlicensed access technologies.

IoT : In cellular technologies, IoT is not new, as it is part of LTE/4G in different transmission technologi NB-IoT(Narrow band IoT), CAT-M1. and also non-LTE technologies such as LoRA and Sigfox. 5G is also have inbuilt IoT technologies which is going to support massive scale of IoT devices.

Virtualization: NFV enables massive scaling of network functions, easy and quick deployment(elastic and early to market are integral feature of 5G system. 5G specs have defined fully virtualised networ and service based interfaces for cloud based deployment of network elements.

New Radio (NR): 5G NR is a new air interface being developed for 5G which uses millimetre wave ran frequency band from 2.5 Ghz to 40 GHz. Although 5G NR uses same OFDM modulation as LTE, it is op have better performance.

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I am Prasanna Sahu. I live in Dublin Ireland. I work in 3gpp wireless technology UMTS and LTE and 5G. I love Photography, painting. Know more about me: http://in.linkedin.com/pub/prasanna-sahu/29/257/91a See my photographs: http://www.flickr.com/photos/24986299@N05/

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