

# Introductory Comments 5G: 'Promise' and 'Peril'

[www.huawei.com](http://www.huawei.com)

**M Newbury**  
**IEEE WCNC March 2015**

**HUAWEI TECHNOLOGIES CO., LTD.**



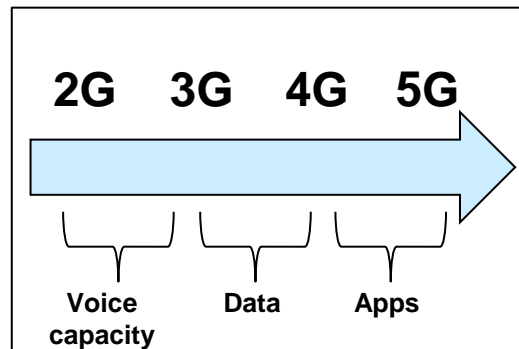
# 5G: The "Promise"

5G = loosely defined (but sharpening) collection of requirements, driven by escalating data demand and profusion of devices & apps

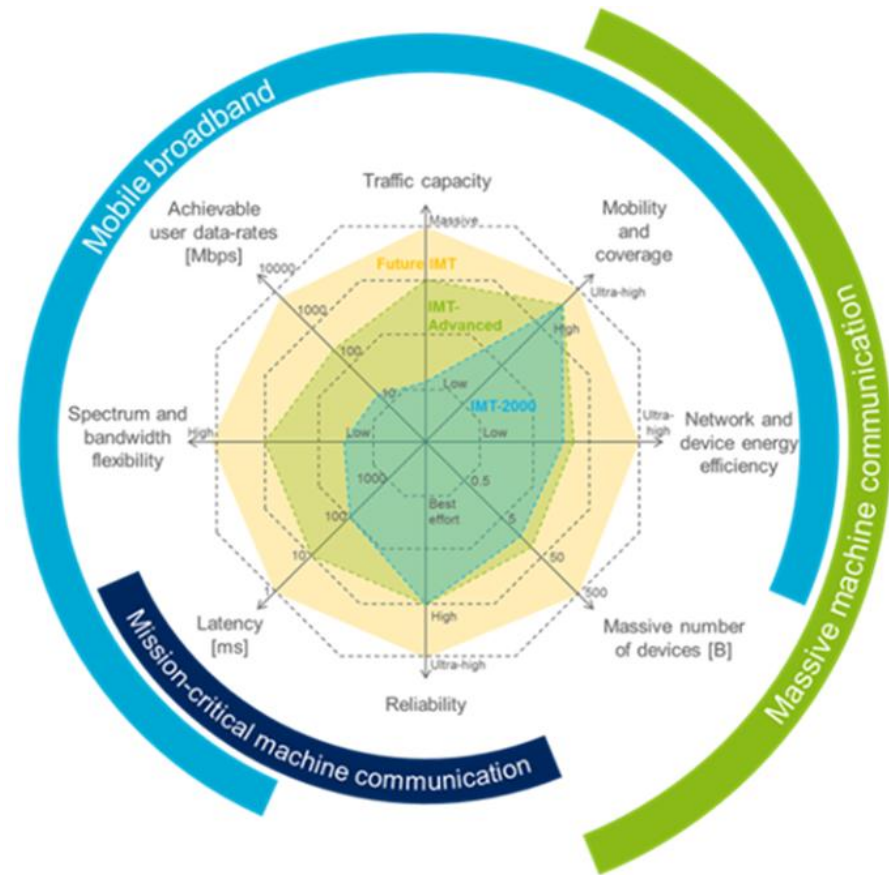
**More capacity/data rate**  
 1000 x 4G aggregate  
 100 x 4G (edge)

**More devices**  
 Internet of Things (IoT)  
 Machine to Machine (M2M)  
 Stranger than Truth (StT)

**More reactivity (lower latency)**  
 10x 4G  
 Mission critical  
 (And gaming, swordfights)



*These are 'leaps' (non-incremental) with respect to 'old G'. But what new G has been otherwise?*



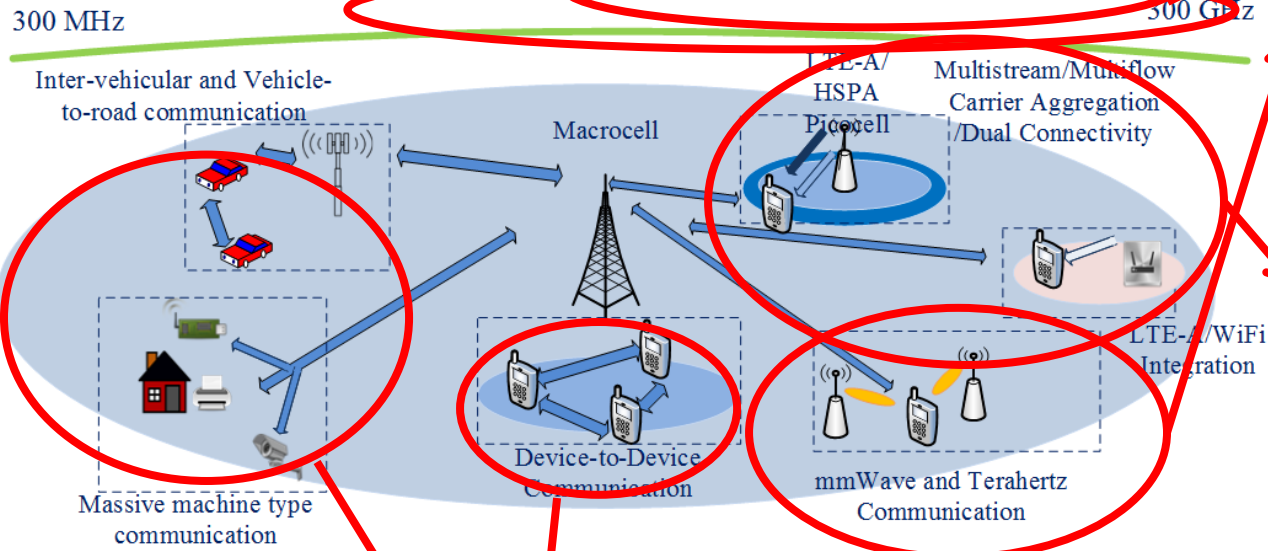
**Enablers (conventional wisdom) for above also associated with 5G; these include**

<i>Extreme densification (incl offload and WiFi integration)</i>	<i>Significantly reduced energy and cost</i>
<i>Flexible, intelligent, integrative, virtualized network/core</i>	<i>Wider bandwidths, higher freq(mm wave)</i>
<i>Massive amounts of antennas (enhanced spectral efficiency through MIMO)</i>	

*These 'promise' 5G. What is the peril?*

# 5G: The "Peril"

**Can new spectrum costs be contained?  
Can spectrum be shared or even quickly traded?**



**How to address mm wave?  
(How to address narrowband, bimodal communication?)**

**High loss/low diffraction/high blockage: hero or villain?  
Small cell 'densification' gains?  
Mobility, frequency dependent functionality ('phantom')?**

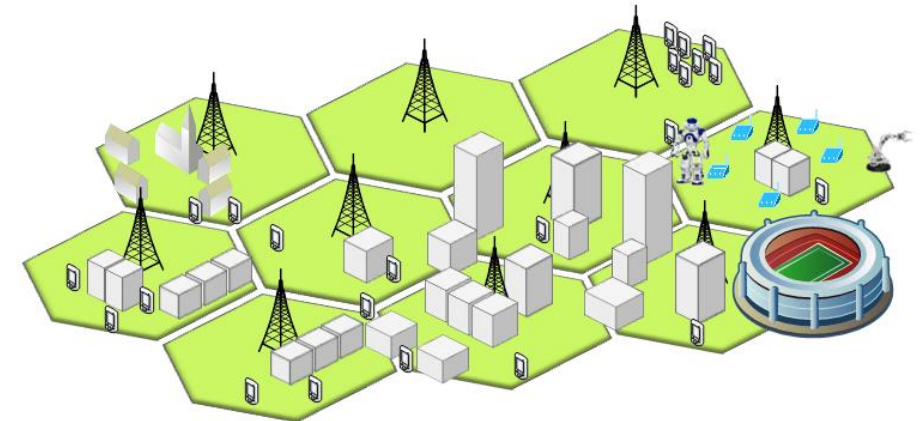
**How to:**

**Align UL/DL beams? Manage mobility? Access cells? Steer arrays? Model 3D channels?**

**How to choose your RAT (game theory?)  
How to manage diverse network (analytics?)  
How to backhaul many small cells?  
Will capacity gains scale favorably with density?  
Can small cell hardware & deploy costs be contained?**


**How to manage and sort thousands (if not more) of D2D and M2M?**

**How to assign and enforce 'mission' parameters?  
How to model 'planar' radio channels?**



**These are (some of) the research areas actively being pursued, required to make 5G a reality.**



 HUAWEI

**Thank you!**  
[www.huawei.com](http://www.huawei.com)

♿  
HSA  
ENT