

# LTE-Advanced Pro

## The last 4G technology jump before 5G

### FACTS about the world's first LTE-A Pro modules

**10x** faster downlink speeds<sup>1</sup>

**3x** faster uplink speeds<sup>1</sup>

**4x** QAM speed boost<sup>1</sup>

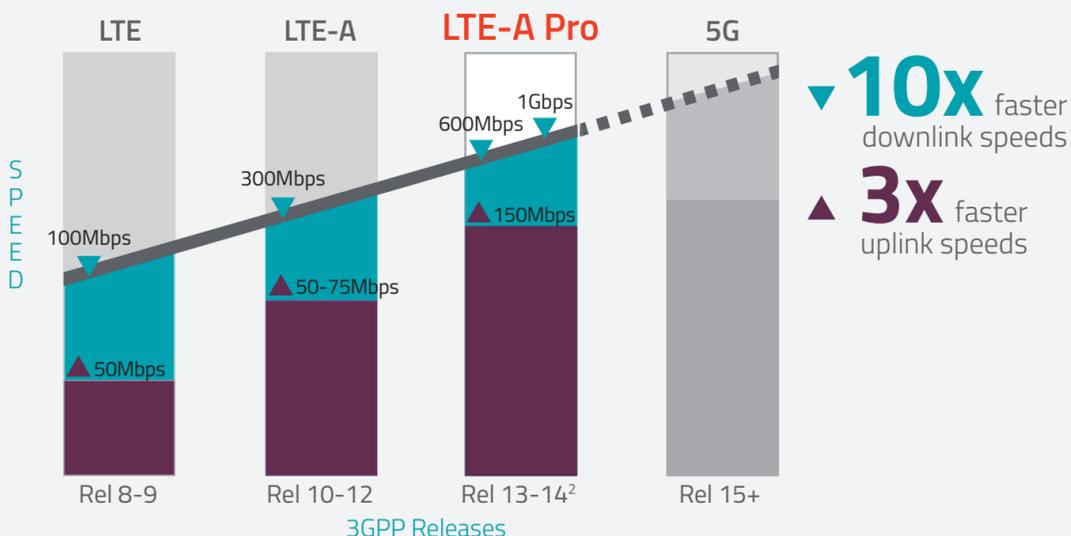
**5 GHz** Additional speed boost on **unlicensed bands**

**3.5 GHz** Ability to set up **local private networks**

Enables **public safety networks** (i.e. FirstNet™, ESN, PC STORM, ASTRID)

<sup>1</sup>Comparing to LTE Cat-3 technology

### The Evolution of LTE to 5G



### Comparing the Speeds and Features

Speed	Cat-3	Cat-6	Cat-9	Cat-11	LTE-A Pro modules	
					Cat-12	Cat-16
Downlink	100Mbps	300Mbps	450Mbps	600Mbps	600Mbps	1Gbps
Uplink <sup>3</sup>	50Mbps	50Mbps	50Mbps	75Mbps	150Mbps	150Mbps
QAM	64	64	64	64	256	256
Features	Cat-3	Cat-6	Cat-9	Cat-11	Cat-12	Cat-16
5 GHz LTE-LAA <sup>4</sup>	-	-	-	-	✓	✓
3.5 GHz CBRS <sup>4</sup>	-	-	-	-	✓	✓
Public Safety	-	-	Band 14 for FirstNet™, Bands 20 & 28 for Europe			

<sup>3</sup>Uplink speed based on configuration of modules in the market  
<sup>4</sup>Features available with select modules only  
Information collected from the 3GPP website.

### How does LTE achieve 1Gbps speed?

The technology enabling the data super highway (where passenger = data)



For this example, think of baseline LTE technology as a single highway with standard size cars traveling on it.

#### Highway expansion

Carrier Aggregation is like adding a highway



Unlicensed Band is like moving some traffic to parallel service roads



4x4 MIMO is like adding a highway on top of a highway



#### Additional passengers per vehicle

256 QAM is like adding more people per vehicle



**Gigabit LTE speed is achieved by combining all these technologies.**

### The use-cases for LTE-Advanced Pro

Retail applications



Private networks



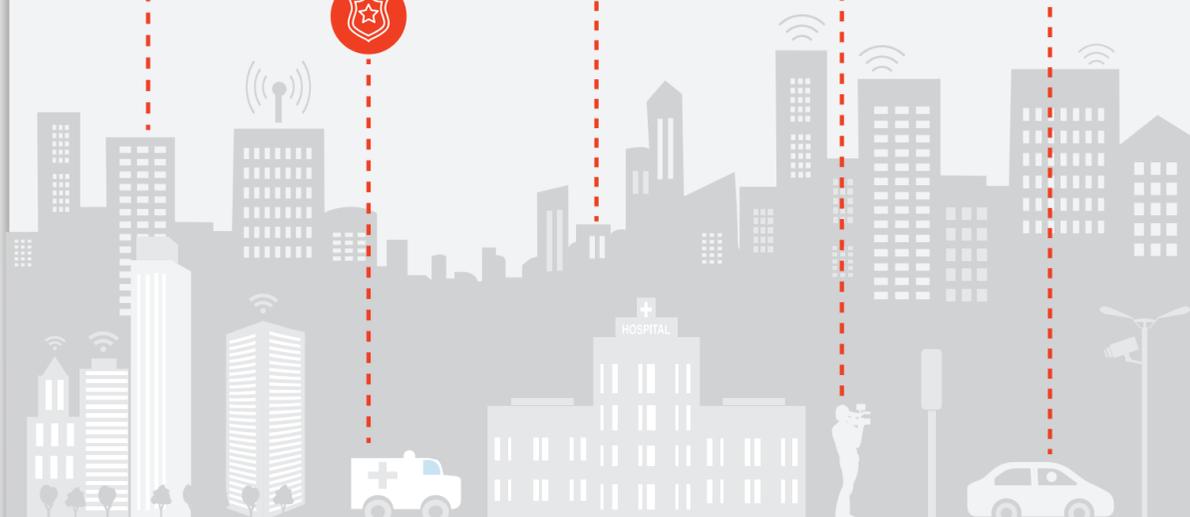
Road warrior connectivity



Public safety networks



Live HD video broadcasting



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