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Smart communications
for smart cities.

5G and Small Cells

The Public Safety Impact

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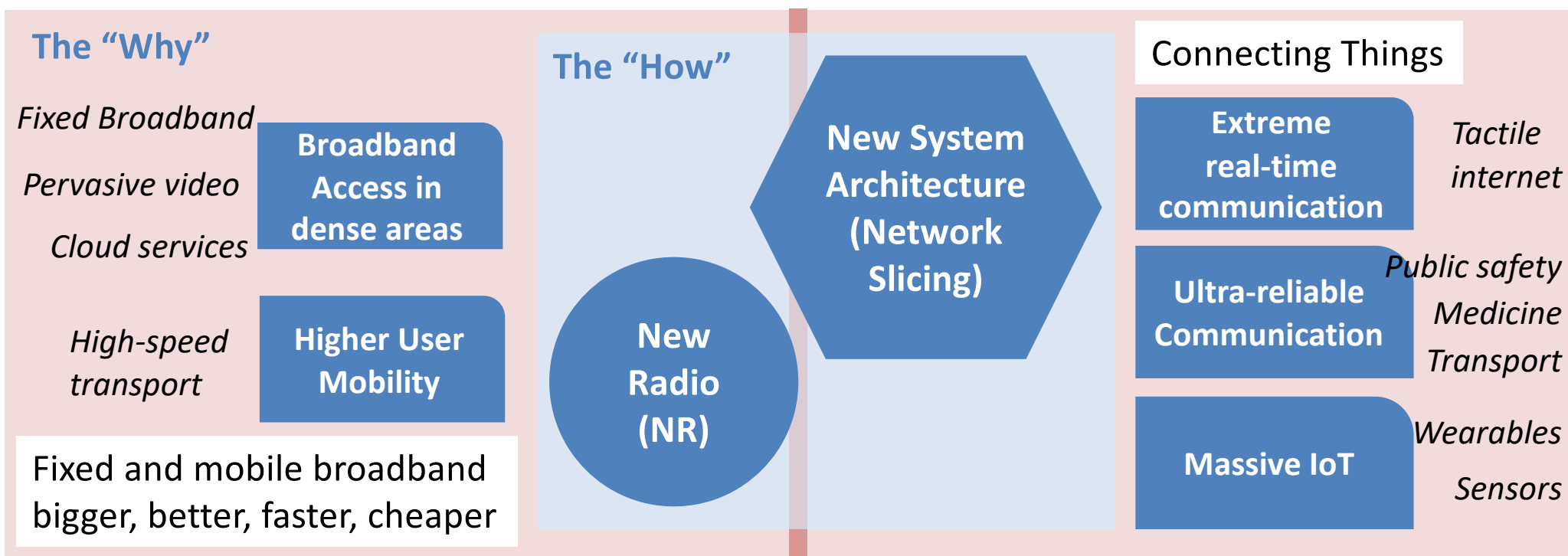
- 5G Essentials
 - Small Cells
 - Impacts to Public Safety Operations
 - New FCC Action on Small Cells and 5G Site Rules
-

AGENDA

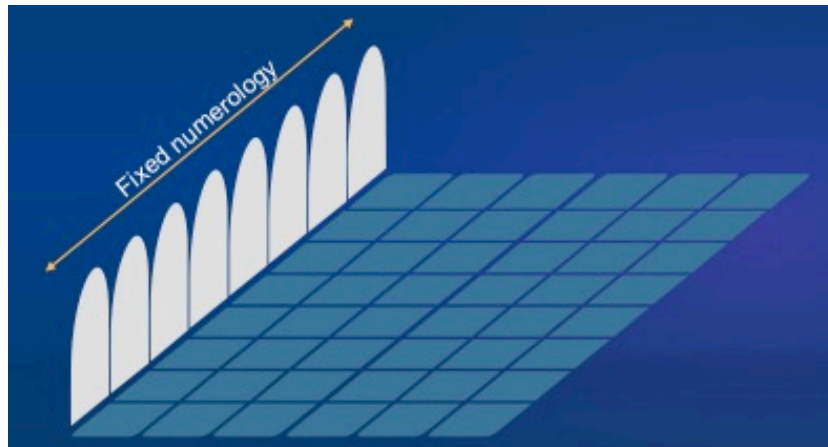
Seeking clarity in the confusion

5G ESSENTIALS

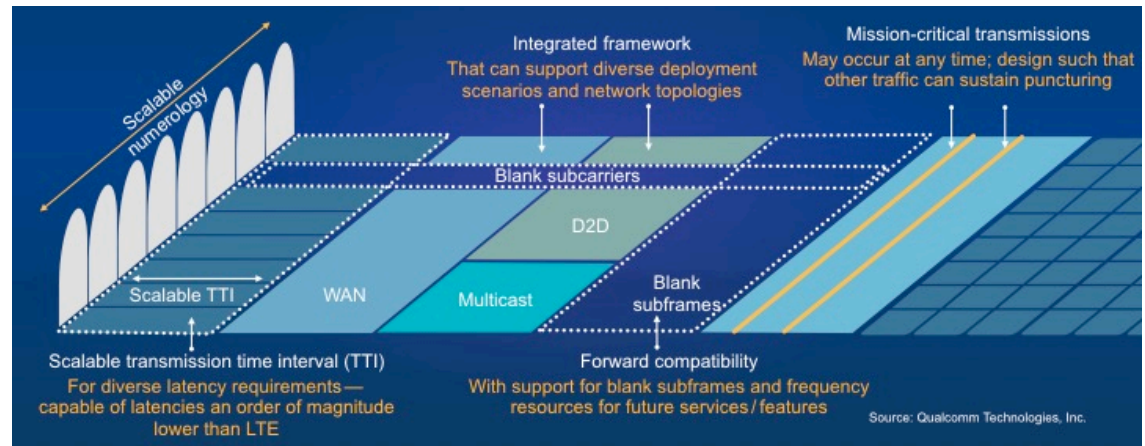
5G is a blend of concepts for many use cases



5G NR brings flexibility

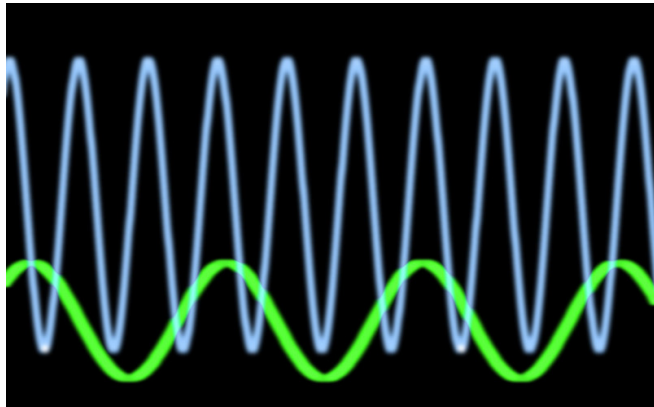


Rigid
4G LTE Frame Format



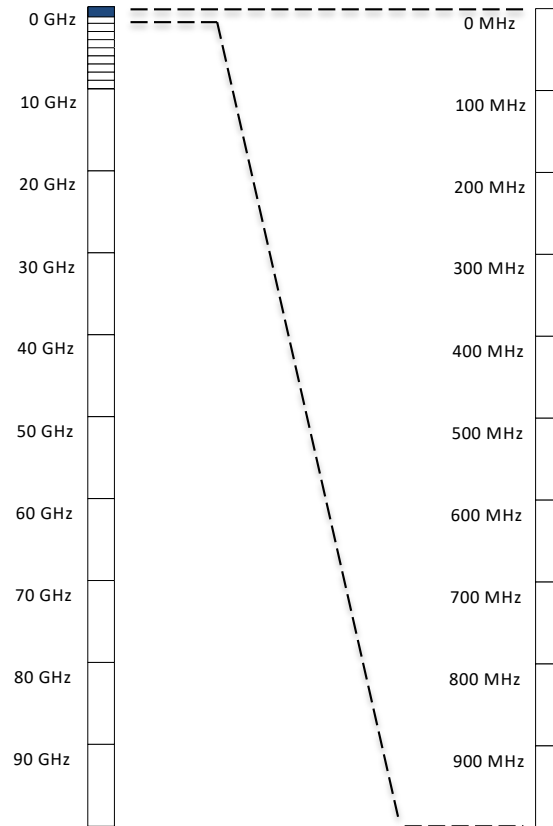
Scalable
5G Frame Format

- Scalable in time & space
- Low latency
- Turn off unused grid
- Large channels



5G helps us tap new spectrum

Low Bands Congested

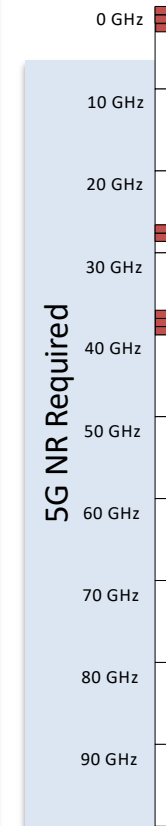


VHF

UHF

700/800

> 6 GHz Open



4G –
Small slices

5G –
Large blocks

But above 2
GHz,
propagation is
difficult

They are not just a 5G trend

SMALL CELLS

But first:
**The Macro
Site**



- **Wide area coverage**
- **Mounted high**
- **Transmit power high**
- **Tower space at premium**

Small Cell Importance

- **Reduced signal reach . . . brings expanded capacity**
- **Lower device transmit power . . . reduced noise**
- **Inserts coverage at lower cost . . . rural canyons, shoreline roads**

Critical addition to service provider arsenal

In 2007, this
was the
concept of a
small cell



Brand new: lowest price ⓘ

\$332.99

Free Shipping

Was \$369.99 Save 10% ⓘ

Get it by Friday, Jan 11 from

- New condition
- 30 day returns - Buyer pays return shipping

"For sale is a AT&T Microcell Wireless 3G Cell Signal Booster Tower Antenna."

[See details](#)

**Femtocell – Solving consumer 3G
voice coverage problems**

Small cells move to the outdoor environment



Nokia
Flexi Zone Mini Macro BTS

Nokia
Flexi Zone Micro BTS

“Small Cell” meaning expanded to ease site permission



Small cells and 5G will make a difference,
but when?

IMPACTS TO PUBLIC SAFETY OPS

Public Safety 5G Impact 2019 - 2020

Impact: ZERO

2019 2020 2021 2022 2023 2024 2025

Impediments

- Insufficient devices
- Very limited network footprint
- LTE is adequate for 99.9% of what public safety agencies require ... including demanding Drone Beyond Visual Line of Sight (BVLOS) flight

Accelerants

- Service providers gain experience with 5G fixed wireless in bands > 6 GHz
- Initial devices appear in 2020
- Early 5G device support available for vehicle routers (Cradlepoint, Goodmill, Sierra Wireless)

Public Safety 5G Impact 2021 - 2022

Impact: Minimal

2019 2020 **2021** **2022** 2023 2024 2025

Impediments

- LTE continues to improve with faster speeds, lower latency
- LTE device pricing lower, keeping budget conscious public safety agencies on LTE
- AT&T may not be able to justify broad outdoor coverage > 6 GHz, thus limiting FirstNet coverage in that band
- Ultra-reliable, low latency connection (URLLC) features missing until end of 2022

Public Safety 5G Impact 2021 - 2022

Impact: xxx

2019 2020 **2021** **2022** 2023 2024 2025

Accelerants

- 5G moves into more devices as large venues (e.g. sports, concert) take advantage of 5G edge computing and higher capacity with spectrum > 6 GHz
- 5G capacity may relieve constraints on public safety video transmission

- FirstNet deployables or locally managed 5G may be useful for hyper-local public safety operations
- Spectrum sharing between 5G and LTE becomes real, and brings 5G into old 3G and 4G spectrum bands, but without capacity additions

Public Safety 5G Impact 2023 - 2025

Impact: Modest

2019 2020 2021 2022 2023 2024 2025

Impediments

- AT&T capex constraints limit FirstNet 5G footprint

Accelerants

- Adoption in the factory expands devices on market, drives cost down
- All top tier handsets will have 5G > 6 GHz
- Outdoor footprint begins to match today's suburban footprint
- Service providers move to support 5G NR on all bands

How does this new Report & Order change things?

NEW FCC ACTION ON SITE RULES

Third Report & Order

Short shot clocks for permit decisions

- Colocation on existing site, 60 days
- Review for new structure, 90 days
- Batched permits get no extension

Reduces local regulatory barriers for 4G and 5G site deployments

Federal Communications Commission	FCC 18-133
Before the Federal Communications Commission Washington, D.C. 20554	
In the Matter of)
Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment) WT Docket No. 17-79
Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment) WC Docket No. 17-84
DECLARATORY RULING AND THIRD REPORT AND ORDER	
Adopted: September 26, 2018	Released: September 27, 2018
By the Commission: Chairman Pai and Commissioners O'Rielly and Carr issuing separate statements; Commissioner Rosenworcel approving in part, dissenting in part and issuing a statement.	
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Third Report & Order

Defines small cell

- 50 feet or less
- Each antenna is ≤ 3 cubic feet
- Total all equipment ≤ 28 cubic feet



Third Report & Order

Allows Aesthetics Requirements

- Must be “reasonable”
- No more burdensome than requirements for other tech gear on street
- Objective and published in advance

Third Report & Order

Constrains Fees for Permitting Process

- *Example:* \$500 for non-recurring fees, including a single up-front application that includes up to five Small Wireless Facilities
- *Example:* \$270 per Small Wireless Facility per year for all recurring fees

Third Report & Order

Impact on Public Safety

- Speeds injection of LTE capacity into urban and suburban areas
- Expands 5G coverage area for bands above 6 GHz, adding significant video capacity
- ***Does not solve*** difficult in-building signal source problem for FirstNet . . . outdoors only

Smart communications for smart cities.

THANK YOU