

# The future of Mission Critical Communications networks

*Is there space for LMR and Critical Broadband to coexist, or does the winner take it all?*

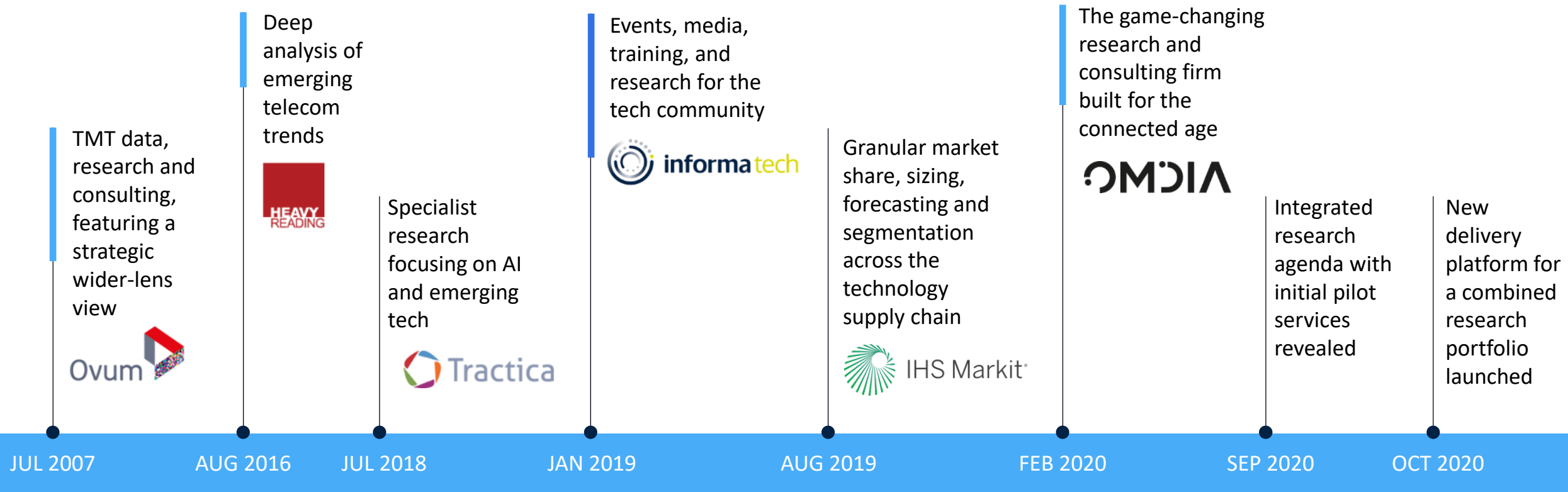
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# Who we are

**Om·di·a** | / **OM-dee-uh** / meaning “All seeing, today and tomorrow” from *omni* (all) and *dia* (day).

*A technology research and data powerhouse built from best-in-class companies*



# MCC Background Overview

Public Protection  
& Disaster Relief

41% worldwide active radios

Law Enforcement



Fire Fighters



Ambulance



Enterprise Critical  
Processes



Energy & Utilities



Transport & Logistics



Industrial Manufacturing

Sources: OMDIA Licensed Mobile Radio 2021 Database

# LMR Technology for MCC

## DIGITAL



	TETRA	P25	TETRAPOL	DMR
<b>Standard Body</b>	ETSI	APCO	Airbus DS*	ETSI
<b>Open Standard/Proprietary</b>	Open	Open	Proprietary	Open
<b>Date</b>	1995	1989	1988	2005
<b>Modulation Mechanism</b>	$\pi/4$ (DQPSK)	C4FM /CQPSK	GMSK	4FSK
<b>Access Method</b>	TDMA	FDMA	FDMA	TDMA
<b>Channel Bandwidth</b>	25 KHz	12.5 KHz	12.5 KHz	12.5KHz
<b>Time Slots (per channel)</b>	4	1	8	2
<b>Data Transmission Speeds</b>	28.8 kbps	9.6 Kbps	7.6 kbps	9.6 Kbps
<b>Coverage</b>	Shorter	Larger	Larger	Shorter
<b>Network Size</b>	Regional & Nationwide	Regional & Nationwide	Regional & Nationwide	Local & Regional
<b>Backwards Compatibility</b>	No	Yes	No	Yes
<b>Evolution</b>	TEDS	Phase II	Limited	Yes

OMDIA PREDICTS THAT BY 2025 THE LMR TECHNOLOGY ACTIVE RADIOS WILL BE **80% DIGITAL**

# LMR Technology Comparison

## TETRAPOL STRENGTHS

- Trunking systems support a complete range of services
- Simplex (Direct) mode supported
- Wide area coverage
- Full encryption (high security)
- Smaller & inexpensive radios similar to cellphones

## P25 STRENGTHS

- Supports conventional, trunked and simulcast options for different user requirements
- Large range/coverage
- Very secure end-to-end encryption
- Easy digital upgrade from analog

## TETRA STRENGTHS

- Higher Data Throughput than P25, TETRAPOL & DMR
- High channel efficiency for highly congested areas
- Full encryption (high security)
- High level of interoperability between vendors
- Fully featured, including limited data transmissions
- Smaller radios similar to cellphones

## DMR STRENGTHS

- Commercially attractive digital evolution from analogue.
- Cost & Size of infrastructure similar to analogue FM transmitters
- Inexpensive terminals lowering the total COTS

## TETRAPOL WEAKNESSES

- Very limited vendor support
- Poor evolution roadmap relying on IP communication
- An SCC is required to support backwards compatibility

## P25 WEAKNESSES

- Lower data throughput
- FDMA technology with poor channel efficiency
- Older technology with bulkier and more expensive terminal devices
- No data transmission supported

## TETRA WEAKNESSES

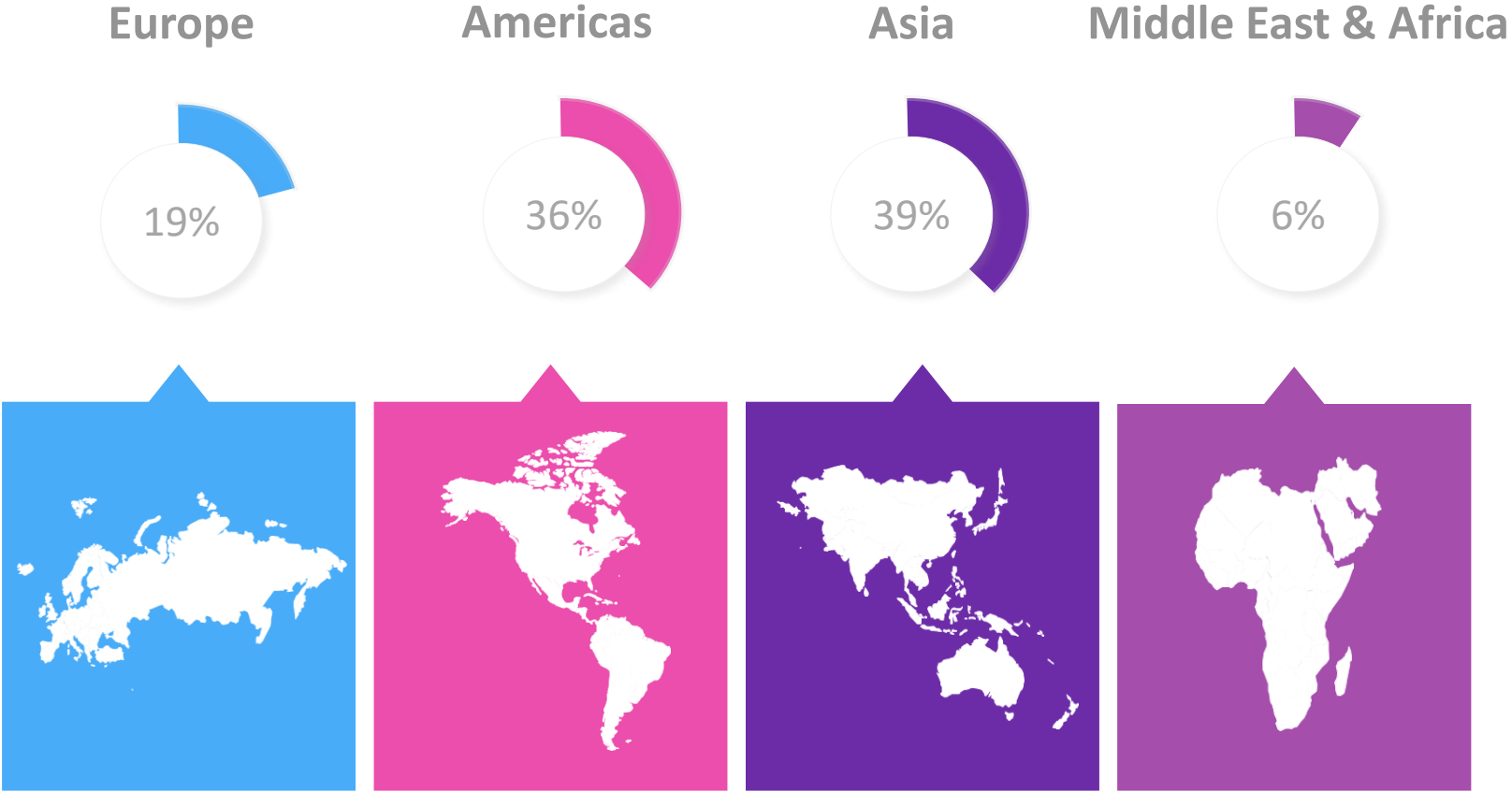
- TETRA requires larger infrastructure to support its coverage range deficiencies
- No backwards compatibility or migration support for analog networks
- TETRA systems require cellblocks of contiguous spectrum, which may not be available from relevant regulatory authorities

## DMR WEAKNESSES

- Not a high-end system
- Lower data throughput than TETRA
- Does not support Full-Duplex

# What does the global MCC market look like?

## GLOBAL ACTIVE LMR RADIOS



**THE GLOBAL LMR RADIO SHIPMENTS MARKET IS EXPECTED TO GROW TO MORE THAN \$6.3 BILLION BY 2025**

Sources: OMDIA Licensed Mobile Radio 2021 Database

# How has the Global Pandemic affected the LMR market?

The effects of the pandemic, both in human and financial costs have not been linear, with significant disparities between countries and municipalities around the world. By country, wealthier countries with better access to universal healthcare have fared better than poorer countries.



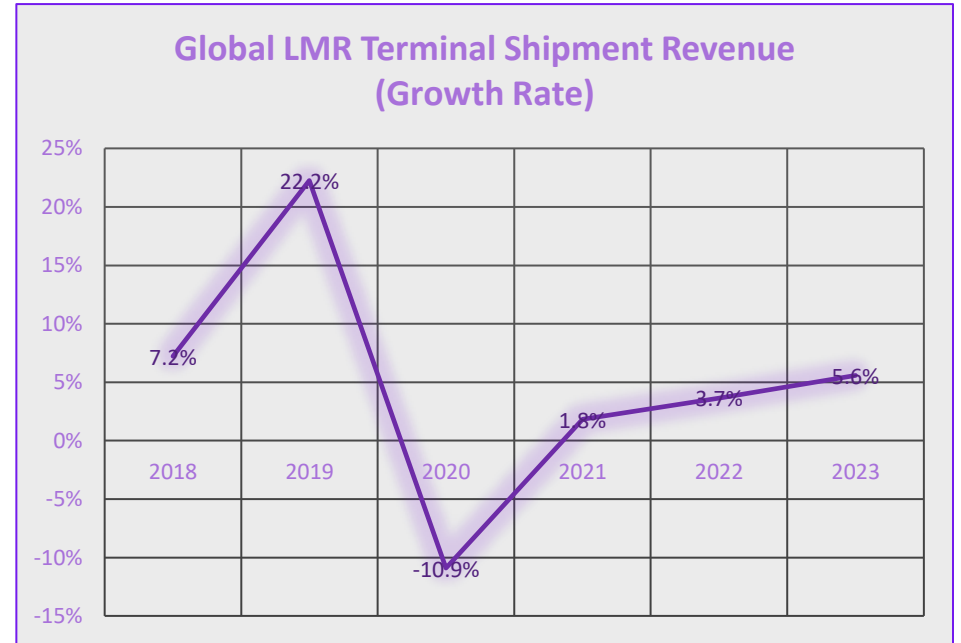
The impacts on the MCC market have not been uniform. While Public Safety & Security users have maintained a constant demand, most Enterprises have been hit harder affecting their timelines & priorities.



Supply-side global shock - Mission Critical Markets are now affected by shortage of critical components, major increase in delivery and service times and a consequent increase of prices.



Governments have been forced to adopt extremely cost-sensitive criteria in their technology selection process. The technology market shows preferences towards OPEX models instead of traditional CAPEX offerings.



**The market recovery will be slow. The global market will not reach pre-pandemic revenue levels until 2023 onwards.**

# General Market Trends

**-5% CAGR (20-25)**

**Analogue Terminal Shipments Globally**

## Cost Optimized Digital Technologies

Cost Optimized Digital technologies, for example DMR and PDT, have been positioned as ideal replacements for analogue radios in systems that can be satisfied by lower-end digital solutions

## Broadband & LTE

LTE, used in conjunction with tried and tested LMR networks will provide the high-speed data solutions in addition to the critical voice communications

## Migration to Digital

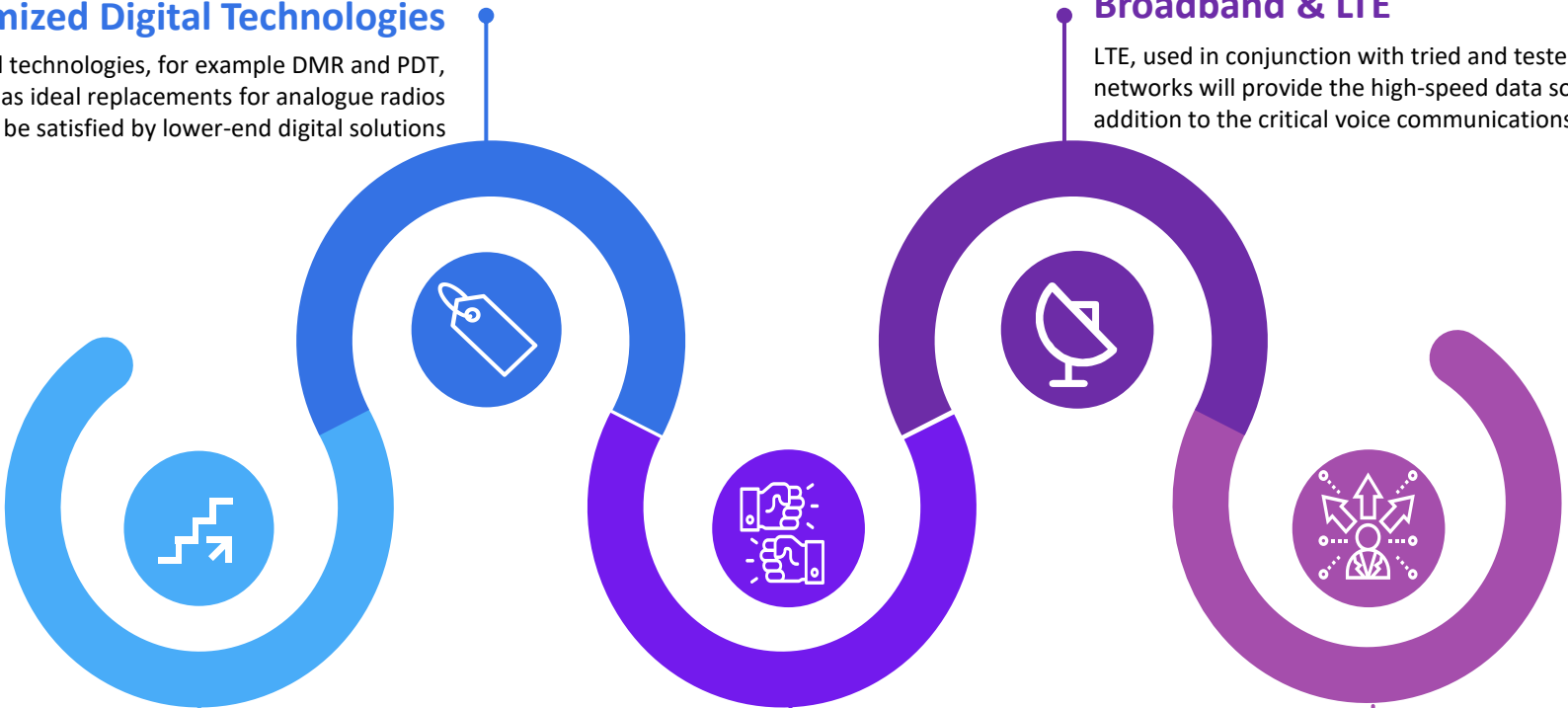
Digital radio services not only provide better battery life, sound quality and inherent signal security than analogue, but also provide spectrum efficiencies and a strong flexible platform

## Interoperability

Interoperability is a hot topic in the LMR industry, especially in the public safety area where there is more need than ever for agencies to be able to work together during times of emergency..

## Channel Efficiency

OMDIA forecasts the move to digital and trunked systems, in particular, can offset increased loading as can the move to spectral-efficient systems including DMR and TETRA.

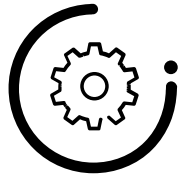




# The Connectivity Revolution



Connectivity has become a worldwide revolution that has started to shape our modern society. The breadth and scale of this **hyper-connectivity revolution** and the extent to which it has ingrained our lives have been possible thanks to the radical technology developments that increased the available speeds offered by service providers but also in the large number of groundbreaking platforms, brought to the market by Internet and Social Media titans or disruptive startups and unicorns with the aim to transform the way individuals, groups and business interact.



**Industry 4.0** – This whole paradigm shift leverages the automation and digitization of production processes already achieved during the Third Industrial Revolution. But, this time, Industry 4.0 aims to converge the Operational Technology (OT) and Information & Communication Technology (ICT).



In a similar way, with mission critical applications like those used by first responders in the line of duty, effective communication and the ability of acquiring and analyzing data are critical components of successful outcomes. Due to the increasing complexity of the world today, mission critical communication technology is forced to go beyond traditional voice and rely on new sources of information and **multimedia** communication.

# Mission Critical LTE: Drivers



**Business Processes Grow Reliant On Data in the Field**

**Growing data dependence exposes mobile data's flaw**



**LMR Data Limitations**

**LMR End-Of-Life Worries**

**Wi-fi's Critical Communication shortcoming emerge**



**Maturing Mobile Broadband Networks generate user confidence**

**Growing Hybrid Device options**

**Expanding field of MC-PTT infrastructure and control room options**

**Dreams of Cost Reduction**

# Mission Critical LTE: Nation-wide Security Agencies



### United States of America – First Net

FirstNet was assigned the 3GPP Band 14 spectrum. The FirstNet service, that AT&T provides, is delivered over a dedicated public land mobile network (PLMN) identifier that associates FirstNet UE with a dedicated core network supporting FirstNet traffic.



### South Korea – Safe-Net

The two largest South Korean MNOs, KT and SK Telecom, are deploying the Safe-Net base stations that transmit over a dedicated 700MHz band 28 allocation, which means that no commercial operator traffic is permitted.



### United Kingdom – Emergency Network System (ESN)

The UK government developed a plan to substitute commercial LTE service for the specialty Airwave TETRA technology. The project is scheduled to shut down Airwave completely by 2026.



### Finland – Virve 2.0

The Erillisverkot Group is Finland's corporate entity responsible for delivering critical communications services for public safety, transport, and other critical operations. Erillisverkot expects an introduction of mission-critical services after 2024 as part of its Phase 2 deployment.

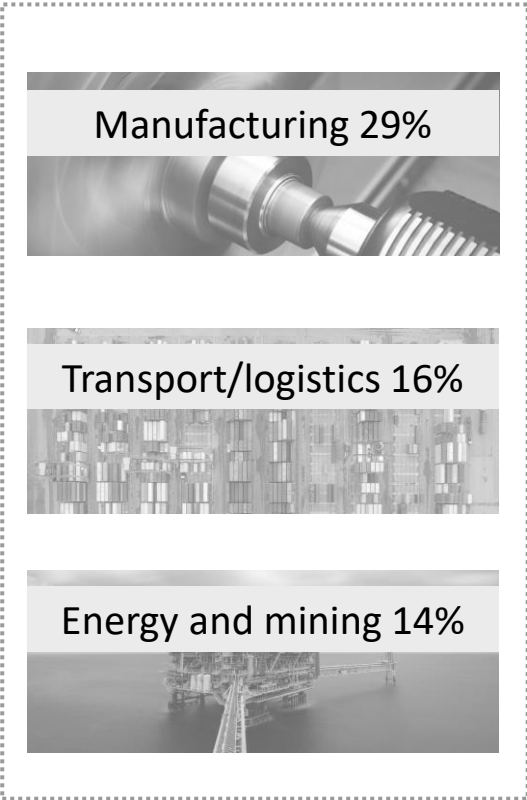


### Worldwide Efforts

Nordic Countries (Denmark, Sweden – RAKEL G2), France (Réseau Radio du Futur program (RRF)), Germany, The Netherlands, Belgium (ASTRID), Switzerland (MSK), New Zealand, Mexico (Red Compartida), etc.

# Mission Critical LTE: Private Networks

## TOP 3 verticals

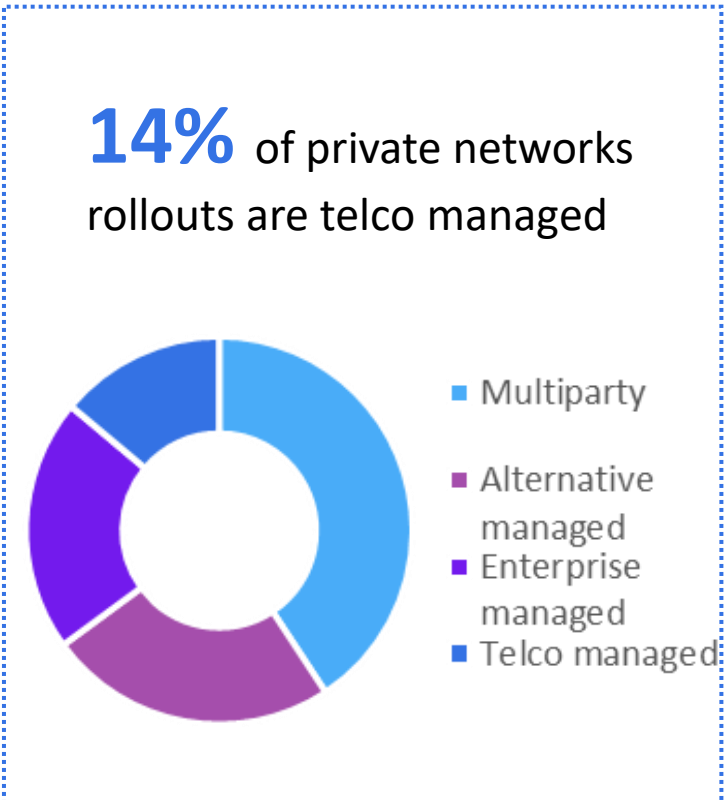


## Private Networks are Ready Now

**64%** of publicly announced private network rollouts are on LTE

**Trial and tests contributed to...**  
**32%** of all announcements in 2020  
**20%** of all announcements in H1 2021

**98%** of enterprises would buy a complementary technology alongside their private network, with **SD-WAN leading the way**



Sources: Private LTE and 5G Networks Tracker 2Q21, Private LTE and 5G Enterprise Survey Insight Report 2020

# The Promise of 5G NR



### Enhanced Mobile Broadband

Throughputs that approach 10Gbps, a sharp contrast to lower-band LTE performance that hits limits of 1Gbps.

### Future-Proof

LTE air interface lacks a means for old devices to ignore new types of incompatible digital traffic. With 5G NR, legacy devices have a method to ignore portions of the space and time grid that support new functionality the legacy devices cannot handle.

### URLLC

5G NR drives down the latency of transmissions across the air interface by enhancing the acknowledgement mechanisms. 5G NR also provides mechanisms that support ultra-reliable transmissions that go beyond LTE's levels of reliability.

### Energy Efficiency

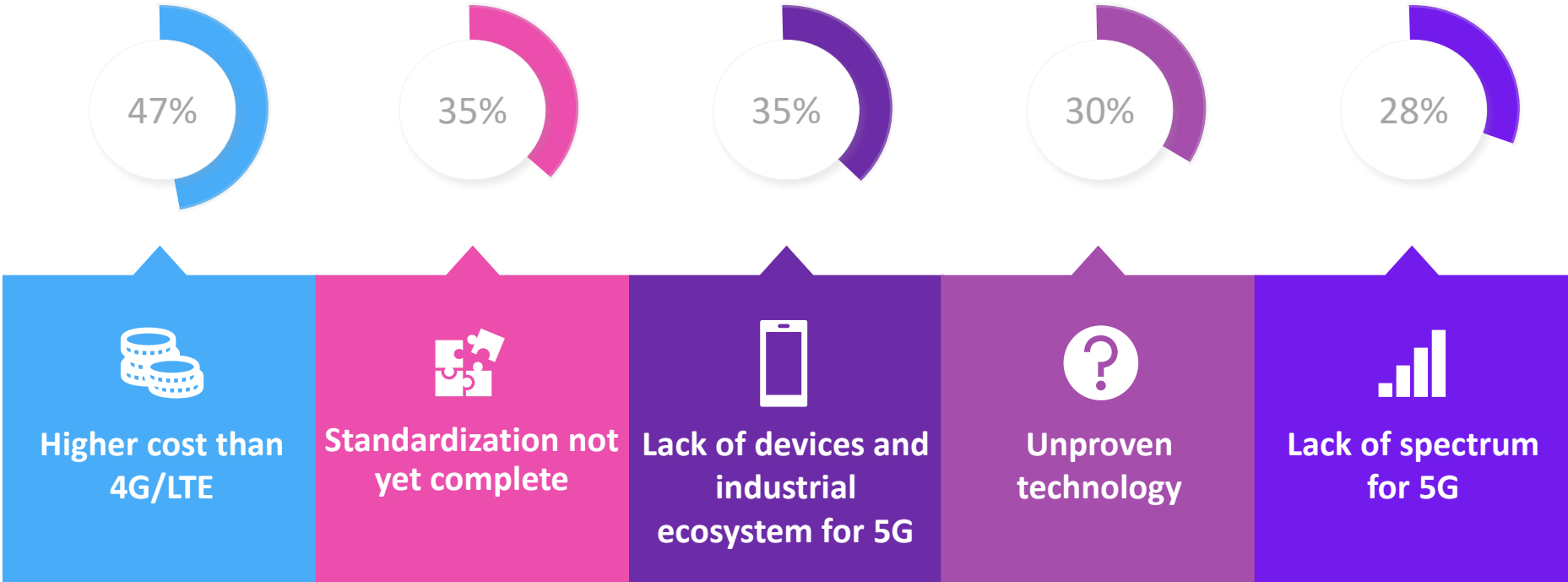
5G NR air interface is designed to enable reduced power in portions of the grid where transmissions are not in progress.

### Massive Machine Communications

Looking beyond radio basics, more radical change is coming in the system architecture that governs how the 5G air interface is used.

Based on OMDIA research, Private 5G networks in the industrial environment will take on a larger role than 5G networks in the public safety communications ecosystem for the time being.

# Private Networks: LTE or 5G?



Source: *Omdia Private LTE and 5G Networks Insight Survey Report 2020*. N:507.

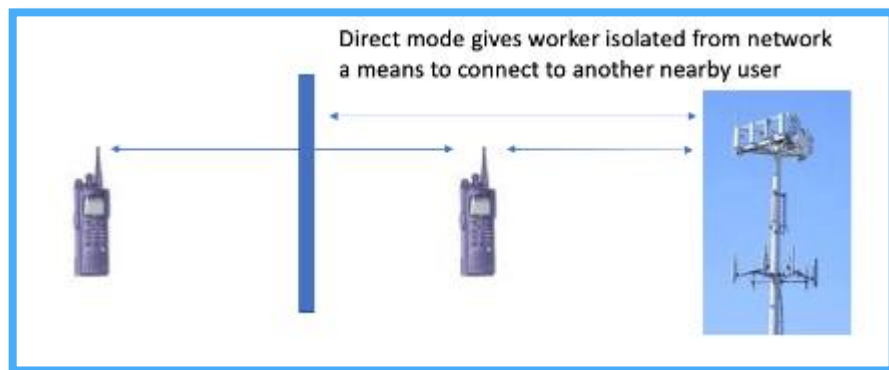
# Mission Critical LTE: Barriers

The question is: **Can MC-LTE replace LMR systems?**

**Spectrum Availability :** High quality mobile broadband services, PS-LTE networks require affordable and predictable access to sufficient radio spectrum

**Coverage Limitations:** Ubiquitous and uninterrupted network coverage is a key element of mission critical networks.

## Direct Mode Back-to-Back



**Broadcast is expensive:** MC-PTT operation may not be realistic because citywide talk groups can scale up to hundreds of users

**Interworking with legacy radio systems:** Technology-specific interoperability standardization efforts, such as those needed for TETRA, remain a work-in-progress.

# The MCC Ecosystem Forecast

NEXT GENERATION CONTROL ROOMS

HYBRID DEVICES

MISSION CRITICAL

BROADBAND NETWORKS

NEW APPLICATIONS & SERVICES

FUTURE MISSION CRITICAL  
COMMUNICATION  
ECOSYSTEM

LMR TECHNOLOGY

NEW PLAYERS & BUSINES MODELS

**HYBRID**



# Takeaways



Public Safety & Security a **resilient** market highly dependent on Mission Critical Communication technology - the COVID-19 pandemic and worldwide supply-chain challenges have not affected their technology demand. Enterprise sectors will start recovering from 2022 onwards.



The MCC market is very dynamic: **Digital Transformation** – OMDIA predicts that 80% of worldwide MCC active radios will be digital by 2025.



**Beginning of a New Hybrid Era** - In response to the market demands for data-rich feature & services OMDIA argues that there are good reasons for a hybrid approach: keeping trusted LMR technology, such as TETRA, DMR and PDT, for the indispensable voice communication in extreme situations and empower the additional services and features with integrated LTE broadband solutions.

# Thank You

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