

# Introduction and Global Update

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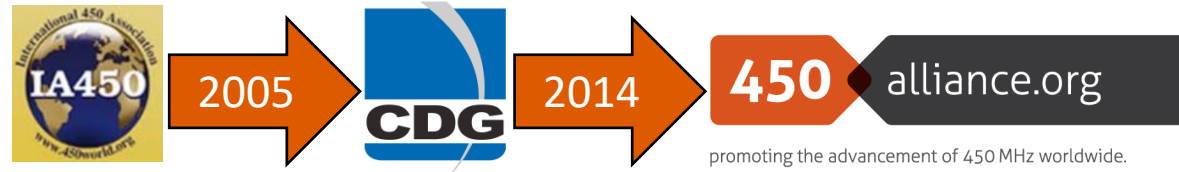


promoting the advancement of 450 MHz worldwide.

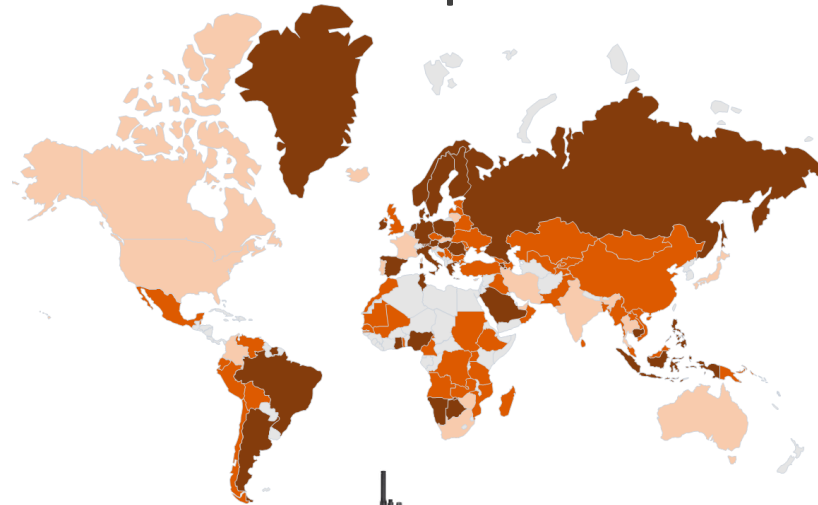
# Numbers



promoting the advancement of 450 MHz worldwide.



## Global Spectrum



100+ Licences

10 Million Connections

4 Work groups

2 Reports annually

2 Events annually

60+ Member



200+ devices

20+ radios

200+ antenna

# 450A

## » Mission

- » Promoting the advancement and facilitating usage of sub 500 MHz-bands worldwide.

## » Vision

- » Flourishing dedicated networks in the sub 500 MHz spectrum bands worldwide, supported by a prospering and competitive ecosystem.

## » Strategy

- » Presenting the potential business models, use cases and diversity of customers of sub 500 MHz dedicated networks.
- » Cooperating to support in a non compete approach the development of a competitive market for all equipment and systems (from an E2E system perspective) by promoting standardization and spectrum harmonization.
- » Enabling a collaborative industrial society for networking and knowledge sharing.

# Our work

- » Be a resource of information for:
  - » Spectrum
  - » Equipment ecosystem
- » Encourage cooperation
  - » Introduction between parties in the ecosystem
  - » Organizing and participate at events
  - » Work and support partner organisations
- » Drive evolution
  - » In work groups and ITU
  - » Responding to consultations



# Why 400 MHz bands

- » Coverage
  - » Affordable for robustness, lower number of sites
  - » Support for broadband and IoT
- » Controlled spectrum
  - » Licensed
  - » Only industrial devices, robust at major incidents
- » Good ecosystem
- » Global technology standard
- » Anchor spectrum with limited bandwidth

# Spectrum allocations

- » LTE bands b31 and b72 in 450 MHz
- » LTE bands b87 and b88 in 410 MHz
  
- » 5G band n31 and n72 in 450 MHz
- » 5G band n87 and n88 in 410 MHz in progress
  
- » Band 380 MHz work in progress
  
- » Monitoring for 470 MHz and above

380	382.5	385	387.5	390	392.5	395	397.5
Band TBD		↑			Band TBD		↓

410	412.5	415	417.5	420	422.5	425	427.5
Band 87		↑		Band 88		↓	
		↑				↓	

450	452.5	455	457.5	460	462.5	465	467.5
Band 72		↑		Band 31		↓	
		↑				↓	

# Private network spectrum

Spectrum Region	410 MHz 450 MHz	700 MHz	800 MHz 850 MHz 900 MHz	1600 MHz 1800 MHz	2100 MHz 2300 MHz	2500 MHz 2600 MHz	3500 MHz 3700 MHz	4900 MHz	2 <sup>nd</sup> lease
Africa	B31/72/87	B28/68							Yes
Asia	B31/72/87		B26/27			B41		n79	Yes
Europe	B31/72/87	B28/68		B3	B40 n40	B38 n38/n90	B42/43 n77/78		Yes
Middle East	B31/72/87				B1 n65		B43 n77/78		
North America	B31/72/87	B14	B8/106	B54			B48		Yes
Oceania Pacific	B31/72/87		B26/27					n79	Yes
South America	B31/72/87		B26/27		B40 n40	B38 n38	B42/43 n77/78		Yes

# Coverage



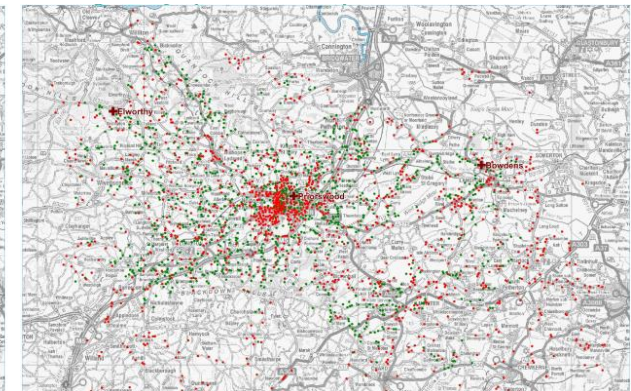
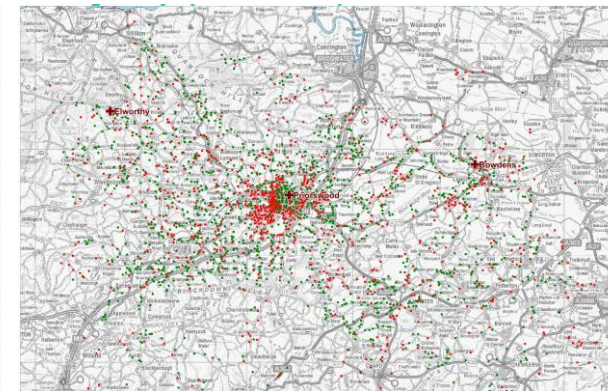
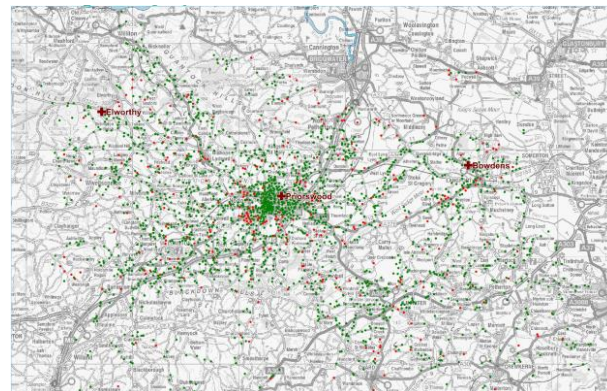
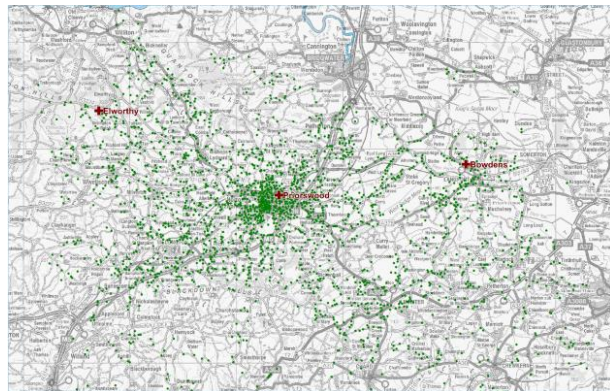
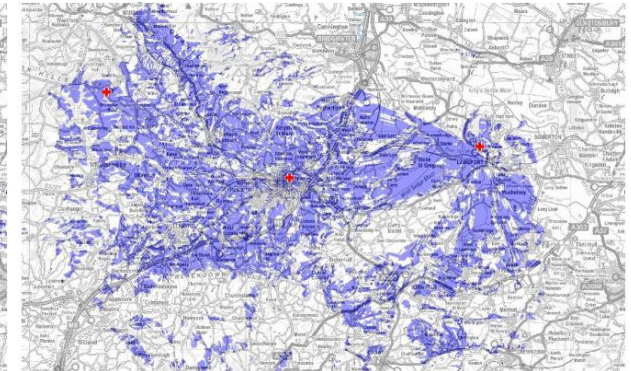
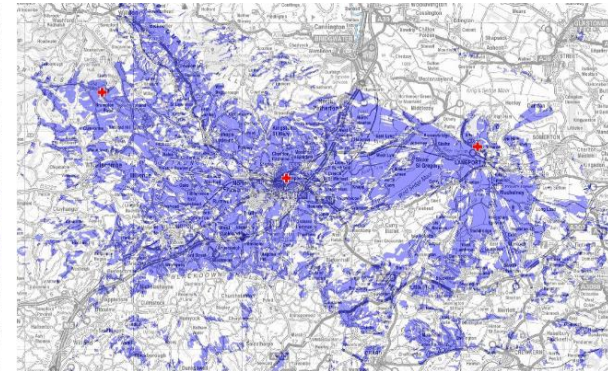
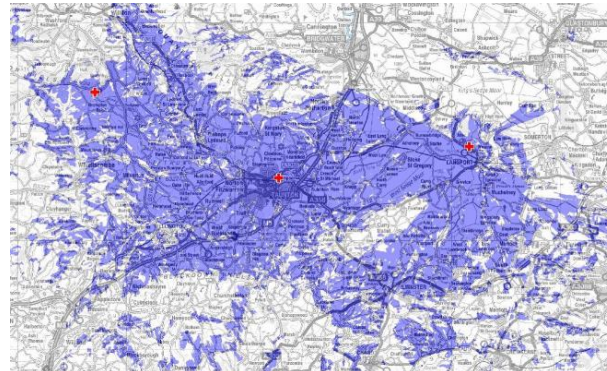
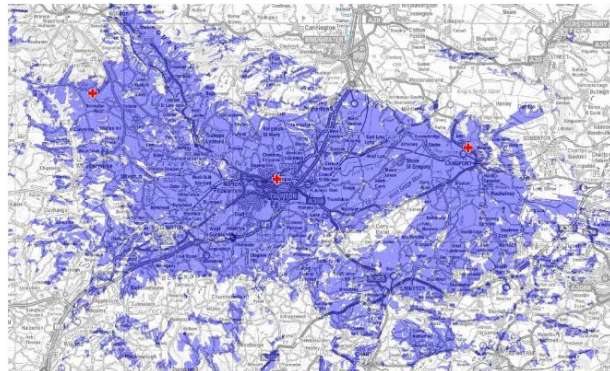
promoting the advancement of 450 MHz worldwide.

410 MHz

740 MHz

2350 MHz

3850 MHz



100% connected

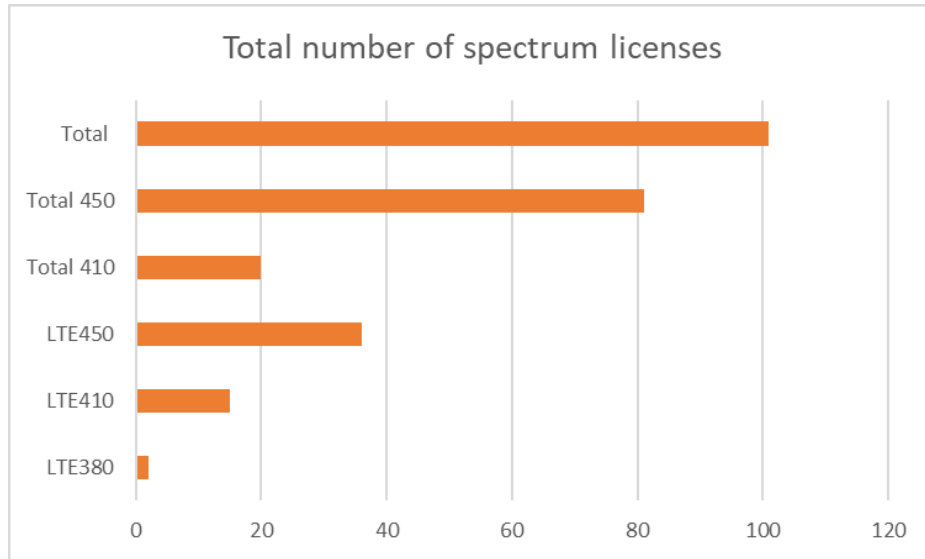
91,3% connected  
2.5-3 x eNB

58,7% connected  
12-15 x eNB

45,6% connected  
20-25 x eNB



# Global deployments



	Total Deployments (CDMA/LTE)	LTE Deployments	Consultation	Not in use
Africa	22	6	3	2
Americas	9	5	7	2
Asia and Oceania	18	5	7	5
Europe	25	16	6	15
<b>Total</b>	<b>74</b>	<b>32</b>	<b>23</b>	<b>24</b>

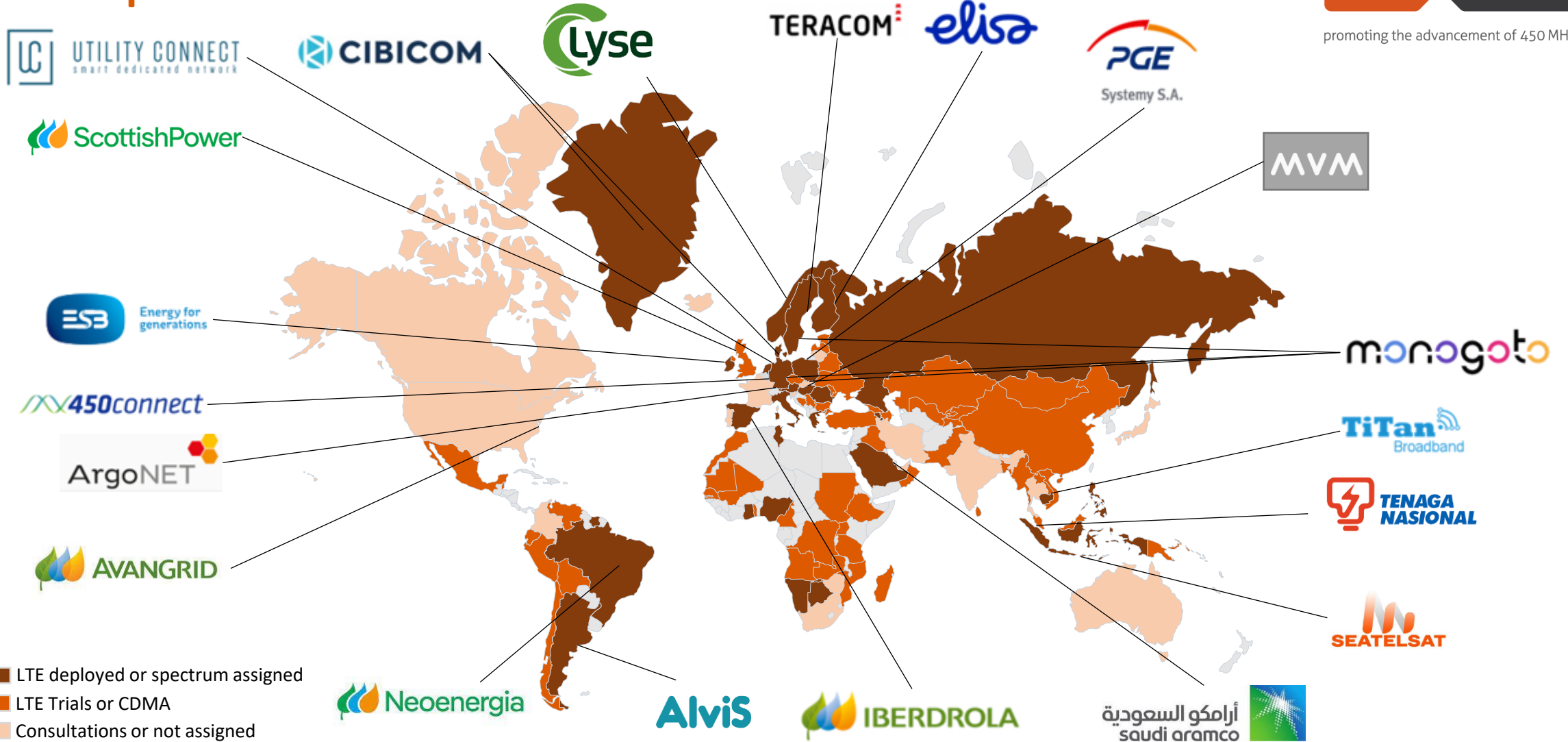
Countries where spectrum allocated or in consultation represents more than 6.7 billion people or 86 percent of the world population.

Countries where networks are being or are already deployed represents more than 4.0 billion people or 50 percent of the world population.

# Operator Members

**450** alliance.org

promoting the advancement of 450 MHz worldwide.



- LTE deployed or spectrum assigned
- LTE Trials or CDMA
- Consultations or not assigned

The above map is subject to change

# 450 MHz and 410 MHz main projects 2025-2026



**Ireland**  
LTE410: 2025  
Company: ESB

**Netherlands**  
LTE450: 2025  
Company: Utility Connect

**Germany**  
LTE450: 2023  
Company: 450connect

**Denmark**  
LTE450: 2015  
Company: Cibicom

**Norway**  
LTE450: 2015  
Company: Lyse

**Finland**  
LTE450: 2014  
Company: Elisa

**Estonia**  
LTE450: 2025  
Company: Utility

**Italy**  
LTE450: 2025  
Company: Mol

**Austria**  
LTE450: 2018  
Company: ArgoNET

**Sweden**  
LTE450: 2015  
Company: Teracom

**Latvia**  
LTE450: 2025  
Company: Triatel

**Poland** promoting the advancement of 450 MHz worldwide.  
LTE410: 2024  
Company: Polkomtel

**France**  
LTE450: 2025  
Company: EDF

**Poland**  
LTE450: 2023  
Company: PGE

**Hungary**  
LTE450: 2016  
Company: MVM Net

**Canada**  
LTE450: 2025  
Company: Hydro Quebec

**Russia**  
LTE450: 2015  
Company: Rostelekom

**USA**  
LTE380: 2025  
Company: SRP

**Mongolia**  
LTE450: 2025  
Company: G-Mobile

**Mexico**  
LTE450: 2025  
Company: Telmex

**Spain**  
LTE450: 2025  
Company: Mol

**China**  
LTE450: 2026  
Company: China Unicom

**Bolivia**  
LTE450: 2025  
Company: Ende

**Philippines**  
LTE450: 2025  
Company: BE

**Brazil**  
LTE450: 2024  
Company: Neoenergia

**Brazil**  
LTE410: 2025  
Company: CEMIG

**Malaysia**  
LTE450: 2024  
Company: TNB

- LTE deployed or spectrum assigned
- LTE Trials or CDMA
- Consultations or not assigned

**Argentina**  
LTE450 and 410: 2023  
Company: Allvis

**Nigeria**  
LTE450: 2025  
Company: MPS

**South Africa**  
LTE450: 2025  
Consultation: Railways

**Saudi Arabia**  
LTE450: 2025  
Company: Aramco Digital

**Bahrain**  
LTE410: 2024  
Company: EWA

**Indonesia**  
LTE450: 2025  
Company: Mol

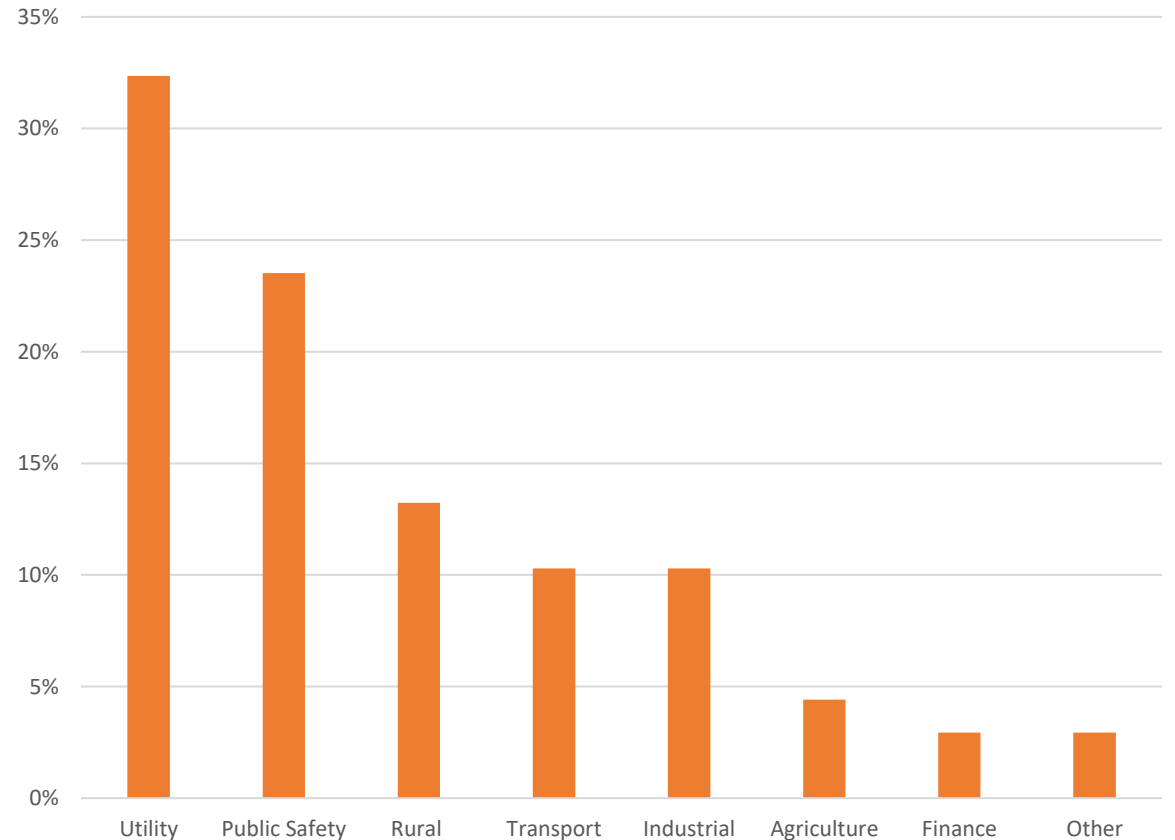
**Singapore**  
LTE450: 2018  
Company: DSTA

The above map is subject to change

# Vertical distribution

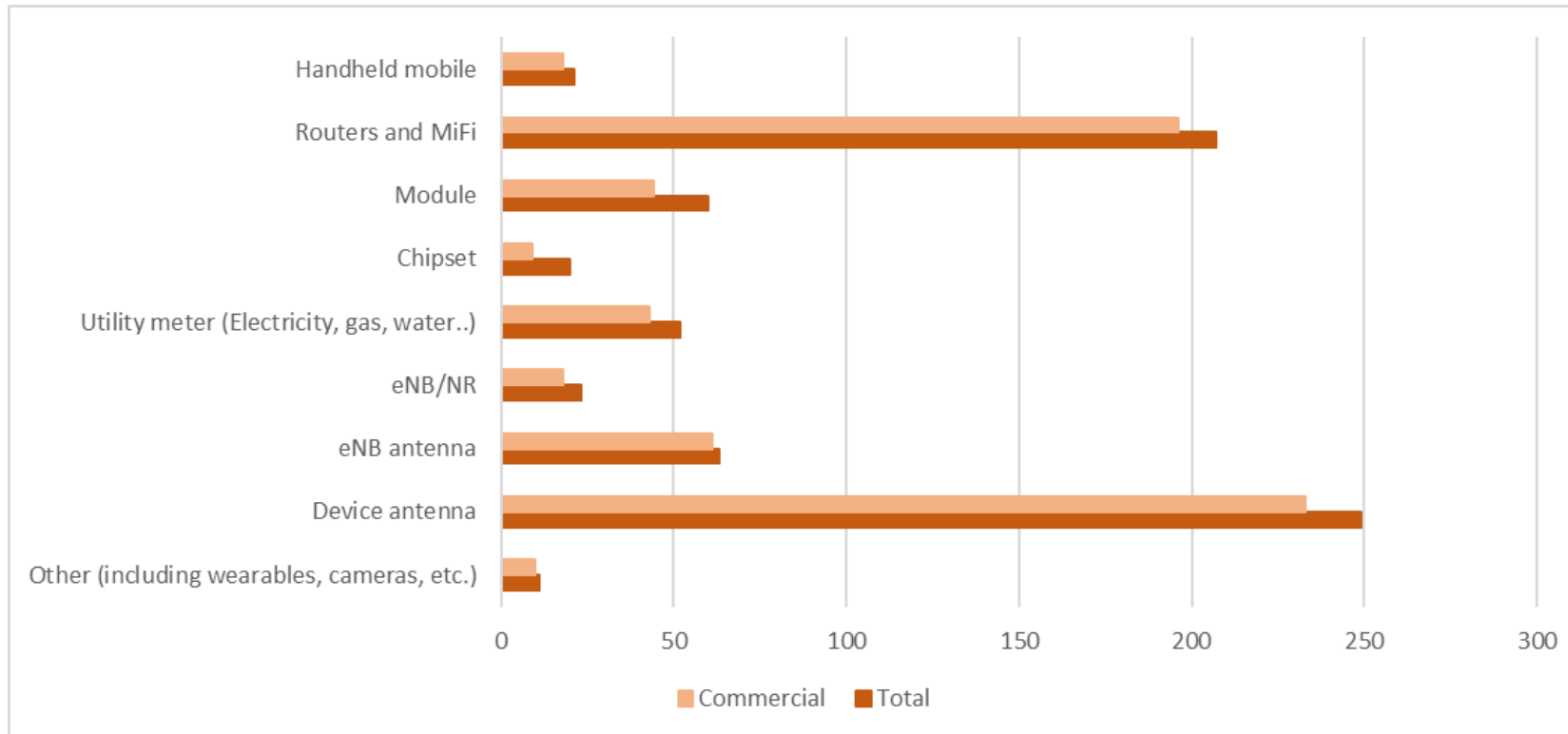
- » Utility →
- » Public safety →
- » Rural connectivity including Health care and Schools →
- » Transport →
- » Industrial →
- » Agriculture →
- » Bank and finance →

Applications 2023



# Ecosystem update 2024

» Device total 267 where of 237 commercially available



- » The listed devices are verified with the suppliers
- » Most devices multiband and multi technology

# LTE450 Ecosystem

■ Networks



■ UE Chipsets



■ M2M Modules



- LTE450 ecosystem is maturing & further growing taking advantage of global LTE developments (e.g. LTE-M, NB-IoT, MC-PTT)
- Market is further growing due to spectrum refarming activities
- 450MHz ideally suited for M2M / IoT and critical voice applications
- There are a mature range of equipment for the networks
- Chipsets and Modules support for eMTC & NB-IoT with multiband capabilities from 410-2600MHz are commercially available

# LTE450 Ecosystem

## Handhelds



## Routers



- The device range is growing in line with global operations
- Handhelds are mainly supporting an industrial and rugged design
- Availability of routers are good and are growing with the implementation of modules within new router and gateway families
- eMTC and NB-IoT have extended the range of products to include meters for electricity, gas and water and other sensor and gateways with requirements for low power consumption

The above table is subject to change

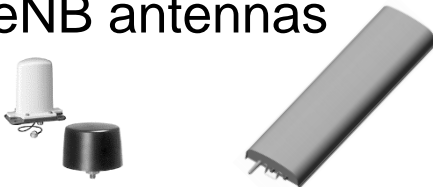
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# LTE450 Ecosystem

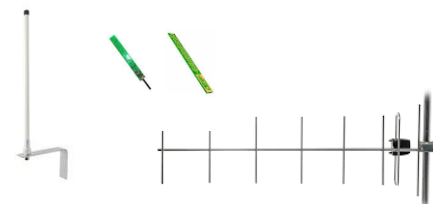
## Meter and Other



## eNB antennas



## Device antennas



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# 450A members providing solutions and their position in the ecosystem



promoting the advancement of 450 MHz worldwide.

**COMARCH**  
**BSS**  
**NOKIA** **ERICSSON** **monogoto**

**RAN**  
**AIRBUS**  
DEFENCE & SPACE

**Site management**  
**STUV**

**monogoto** **NTN** **Telit Cinterion**

**VAS**  
**CYBERTEL** bridge  
**NOKIA**  
**AIRBUS**  
DEFENCE & SPACE  
**Hytera**  
**ERICSSON** **ZTE**  
**KatelaNetworks** **HUAWEI**  
**ALAIT**

**Traffic handling**  
**ONELAYER**  
**elisa**  
**ERICSSON** **ZTE**  
**ERICSSON** **HUAWEI**  
**NOKIA**

**Core**  
**NOKIA** **ZTE**  
**ERICSSON** **HUAWEI**  
**KatelaNetworks**  
**ANKTION TECH**  
**etelm..**  
**Druid**  
**ALAIT**

**Airspan** **ZTE**  
**NOKIA** **ERICSSON**  
**KatelaNetworks** **HUAWEI**  
**Hytera**  
**ANKTION TECH**  
**UBIHK**  
**etelm..**  
**ALAIT**

**Antennas**  
**ALPHA**  
WIRELESS  
**HUBER+SUHNER**  
**AMPHENOL PROCOM**  
connect with confidence  
**QUECTEL**  
**ANTENNA COMPANY**  
**PCTEL**  
**A-ANTENNAS**  
**HUAWEI**  
**PANORAMA ANTENNAS**

**Consumer devices**  
**HUAWEI**  
**UNITAC**  
**ZTE**

**Sensors and IoT**  
**meazon**

**Industrial devices**  
**UNITAC** **NOKIA**  
**INSYS** **icom** **intelliport solutions**  
**ANDRA**  
**GE** **GE VERNOVA**  
**Hitachi Energy**  
**WESTERMO**  
**CISCO** **robustel**  
**BAERIS**  
ENERGIEESSTECHNIK  
**ADVANTECH**  
**GARDEROS** **WM SYSTEMS**

**Handheld Devices**  
**CYRUS**  
RUGGED MOBILITY  
**RugGear**  
**NOKIA**  
**UNITAC**  
**ZTE** **HUAWEI**  
**Hytera**  
**CYBERTEL** bridge  
**ALAIT**

**Chipset**  
**GCT**  
**Qualcomm**

**Modules**  
**Telit Cinterion** **SIMCom**  
a SIMBA M2M company  
**SEMTECH**  
**CAVLI**  
Wireless  
**UNITAC** **QUECTEL**

**ERICSSON** **NOKIA** **COMARCH** **OSS** **HUAWEI** **ZTE** **elisa**

**VSD Automation** **Integrator**

**monogoto** **Telit Cinterion** **SIM platform** **SEMTECH** **QUECTEL**

## Disclaimer note



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