



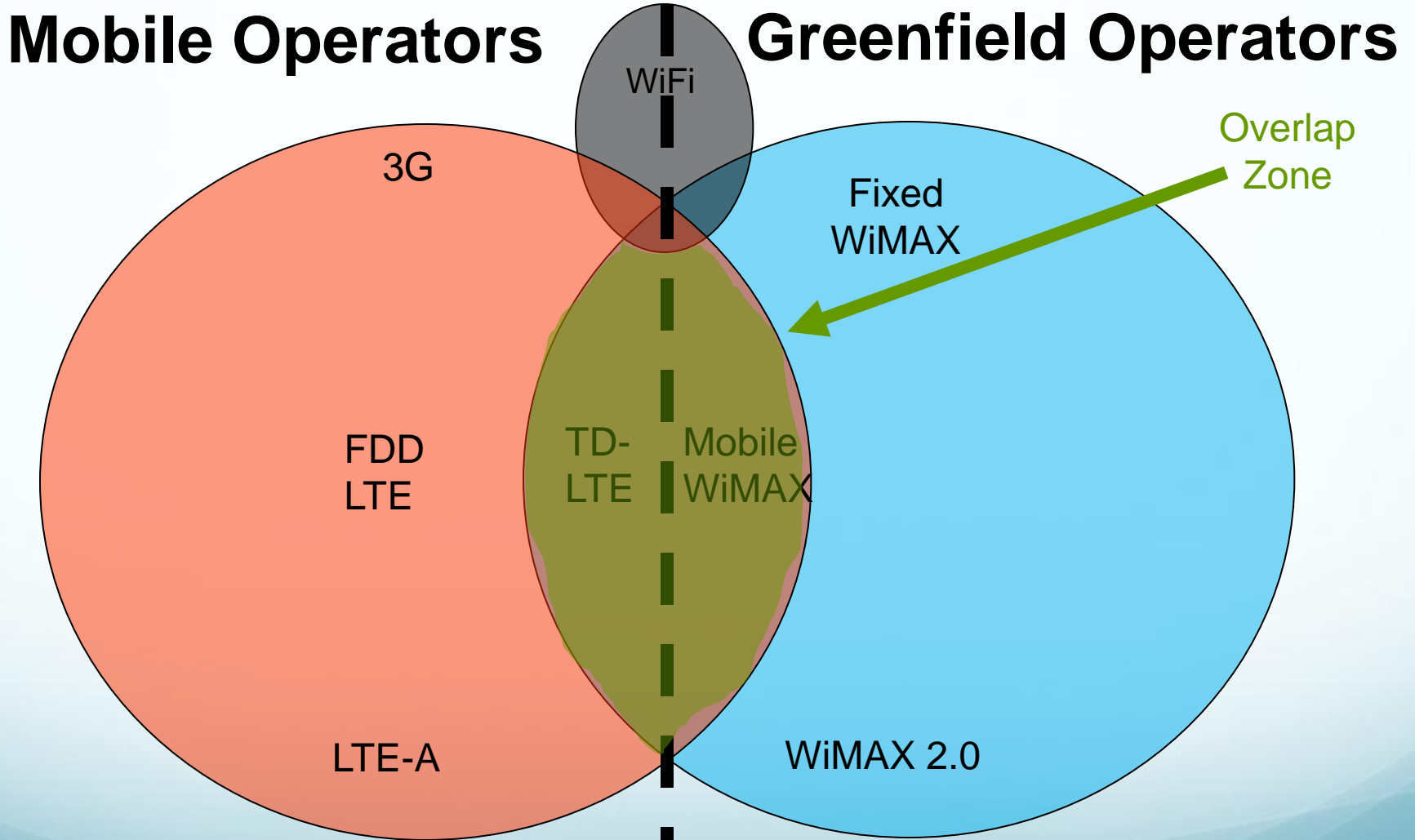
# MARAVEDIS

Wireless Market Research & Analysis

## **Panel Session: The 'How' and 'Why' of Migrating From WiMAX to LTE**

**September 22, 2010**

# 4G Technology Segmentation



Source: 4Ggear service

# About TD-LTE Availability

- Rel 8 TDD Certification (GCF)
  - 2300-2400 MHz
  - 2570-2620 MHz (2496-2690 after Clearwire's petition)
- 3.5 GHz band: WiMAX for long
- Semi-licensed: no LTE prospects
  - 3.65 GHz
  - TV Whitespaces (700 MHz)

E-UTRA Operating Band	Uplink (UL) operating band BS receive UE transmit		Downlink (DL) operating band BS transmit UE receive		Duplex Mode
	F <sub>UL_low</sub>	F <sub>UL_high</sub>	F <sub>DL_low</sub>	F <sub>DL_high</sub>	
1	1920 MHz	1980 MHz	2110 MHz	2170 MHz	FDD
2	1850 MHz	1910 MHz	1930 MHz	1990 MHz	FDD
3	1710 MHz	1785 MHz	1805 MHz	1880 MHz	FDD
4	1710 MHz	1755 MHz	2110 MHz	2155 MHz	FDD
5	824 MHz	849 MHz	869 MHz	894 MHz	FDD
6 <sup>1</sup>	830 MHz	840 MHz	875 MHz	885 MHz	FDD
7	2500 MHz	2570 MHz	2620 MHz	2690 MHz	FDD
8	880 MHz	915 MHz	925 MHz	960 MHz	FDD
9	1749.9 MHz	1784.9 MHz	1844.9 MHz	1879.9 MHz	FDD
10	1710 MHz	1770 MHz	2110 MHz	2170 MHz	FDD
11	1427.9 MHz	1447.9 MHz	1475.9 MHz	1495.9 MHz	FDD
12	698 MHz	716 MHz	728 MHz	746 MHz	FDD
13	777 MHz	787 MHz	746 MHz	756 MHz	FDD
14	788 MHz	798 MHz	758 MHz	768 MHz	FDD
15	Reserved		Reserved		FDD
16	Reserved		Reserved		FDD
17	704 MHz	716 MHz	734 MHz	746 MHz	FDD
18	815 MHz	830 MHz	860 MHz	875 MHz	FDD
19	830 MHz	845 MHz	875 MHz	890 MHz	FDD
20	832 MHz	862 MHz	791 MHz	821 MHz	FDD
21	1447.9 MHz	1462.9 MHz	1495.9 MHz	1510.9 MHz	FDD
...					
33	1900 MHz	1920 MHz	1900 MHz	1920 MHz	TDD
34	2010 MHz	2025 MHz	2010 MHz	2025 MHz	TDD
35	1850 MHz	1910 MHz	1850 MHz	1910 MHz	TDD
36	1930 MHz	1990 MHz	1930 MHz	1990 MHz	TDD
37	1910 MHz	1930 MHz	1910 MHz	1930 MHz	TDD
38	2570 MHz	2620 MHz	2570 MHz	2620 MHz	TDD
39	1880 MHz	1920 MHz	1880 MHz	1920 MHz	TDD
40	2300 MHz	2400 MHz	2300 MHz	2400 MHz	TDD

Note 1: Band 6 is not applicable

Source: 3GPP TS 36.101 version 9.3.0 Release 9, April 2010

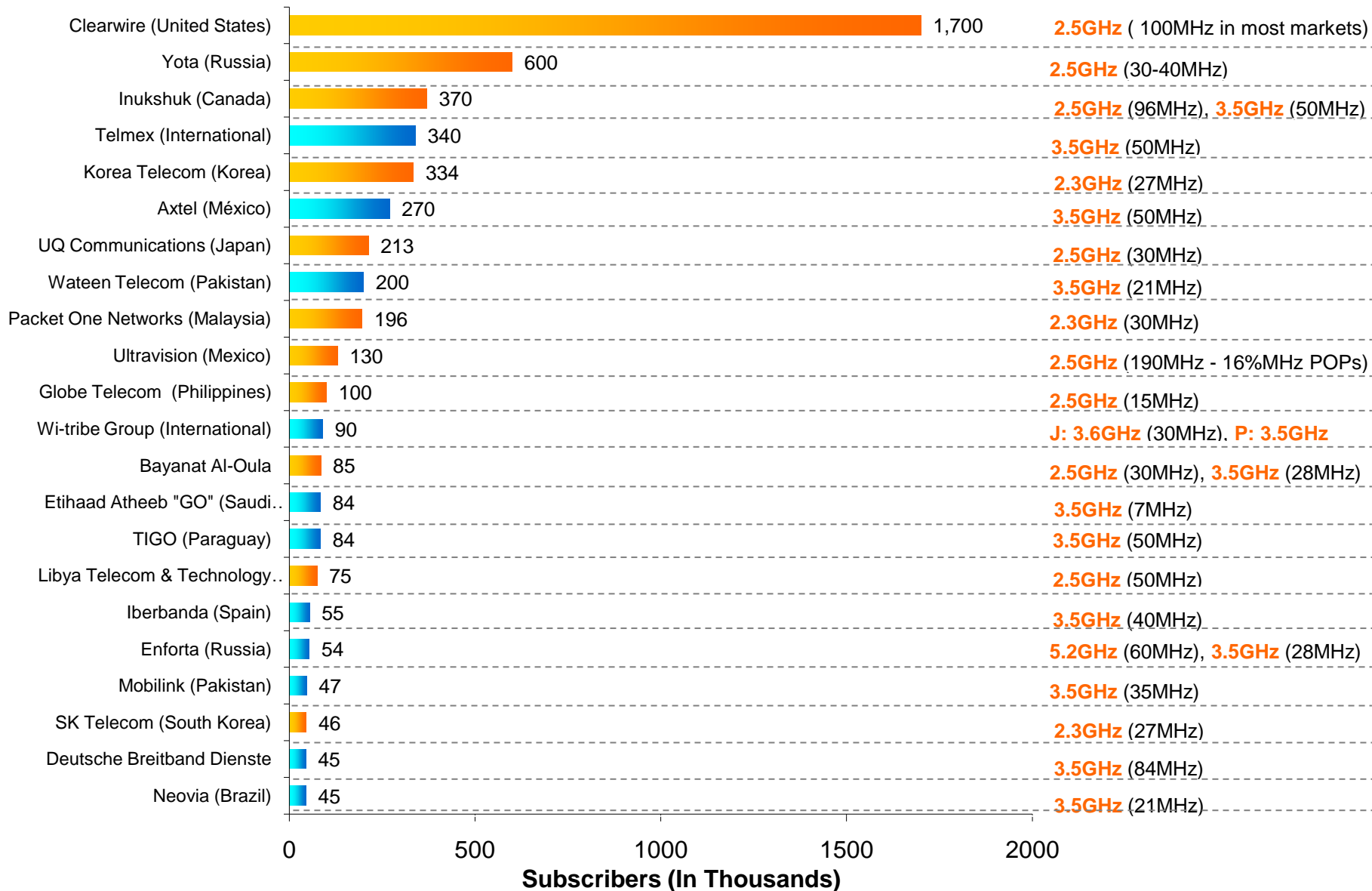
# Hard Realities of WiMAX-to-LTE Conversion

- **Current subscriber base**
  - Cost to convert a subscriber is high
  - Declaration of intent to convert may imply to customers that the current network is obsolete
- **Equipment**
  - Will current RAN vendor's solution support dual operation? (No = expensive...)
  - How long will it take to fully convert subscriber base to new devices? (Quick = expensive...)
  - The core architecture of each standard is significantly different, requiring the concurrent operation of two core networks until subscribers are completely migrated
- **Spectrum**
  - Concurrent networks require double the spectrum, albeit mitigated somewhat by variable channel sizes and novel spectrum reuse techniques available in both standards
  - TDD and FDD are not compatible in adjacent spectrum, so most WiMAX carriers will be forced to deploy TD-LTE.

**RESULT: WiMAX-to-LTE migration is expensive and complicated and will not make sense for many WiMAX networks.**

# Top WiMAX Operators- Source: 4GCounts.com

## Spectrum by Operator



# WiMAX Prospects

- **Near term continued WiMAX growth**

- Fixed/Portable Deployments
- Vertical Markets

- **WiMAX and/or LTE**

- Pure-play WiMAX vendors may have difficulty to support additional R&D for LTE product lines
- Tier-1 vendors risk losing interest in relatively smaller WiMAX market (vs. LTE)

- **Few commitments yet to WiMAX 2 upgrades**



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