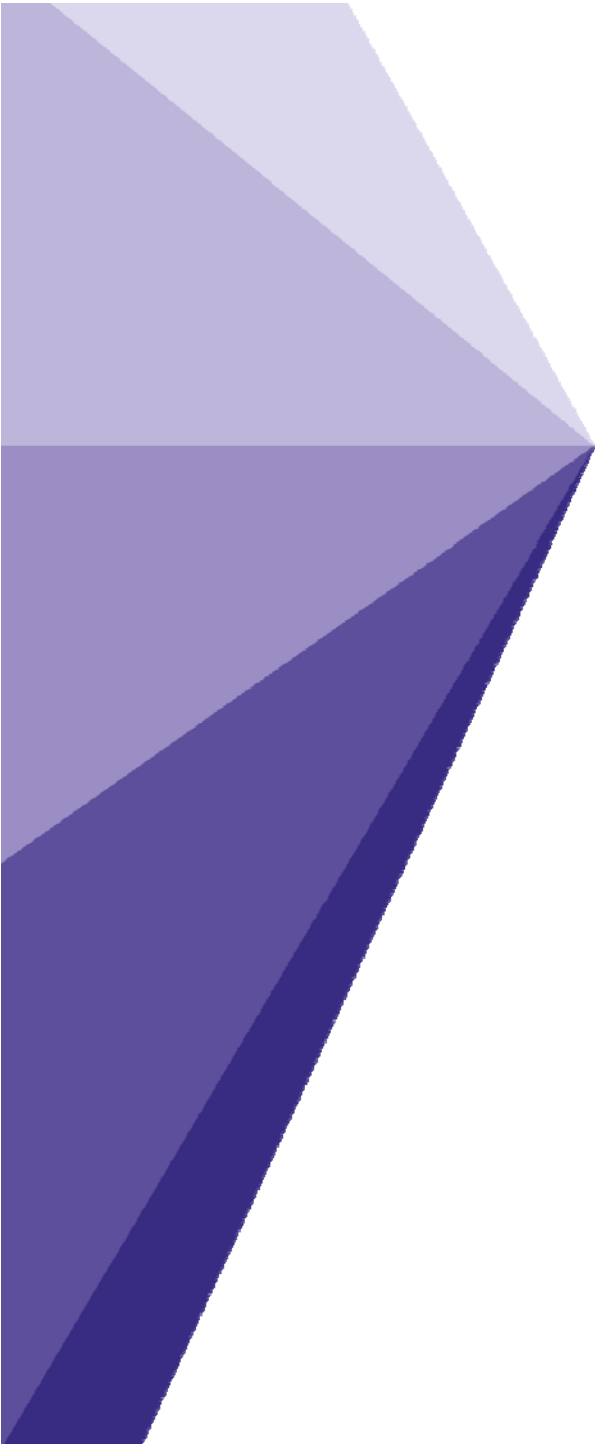


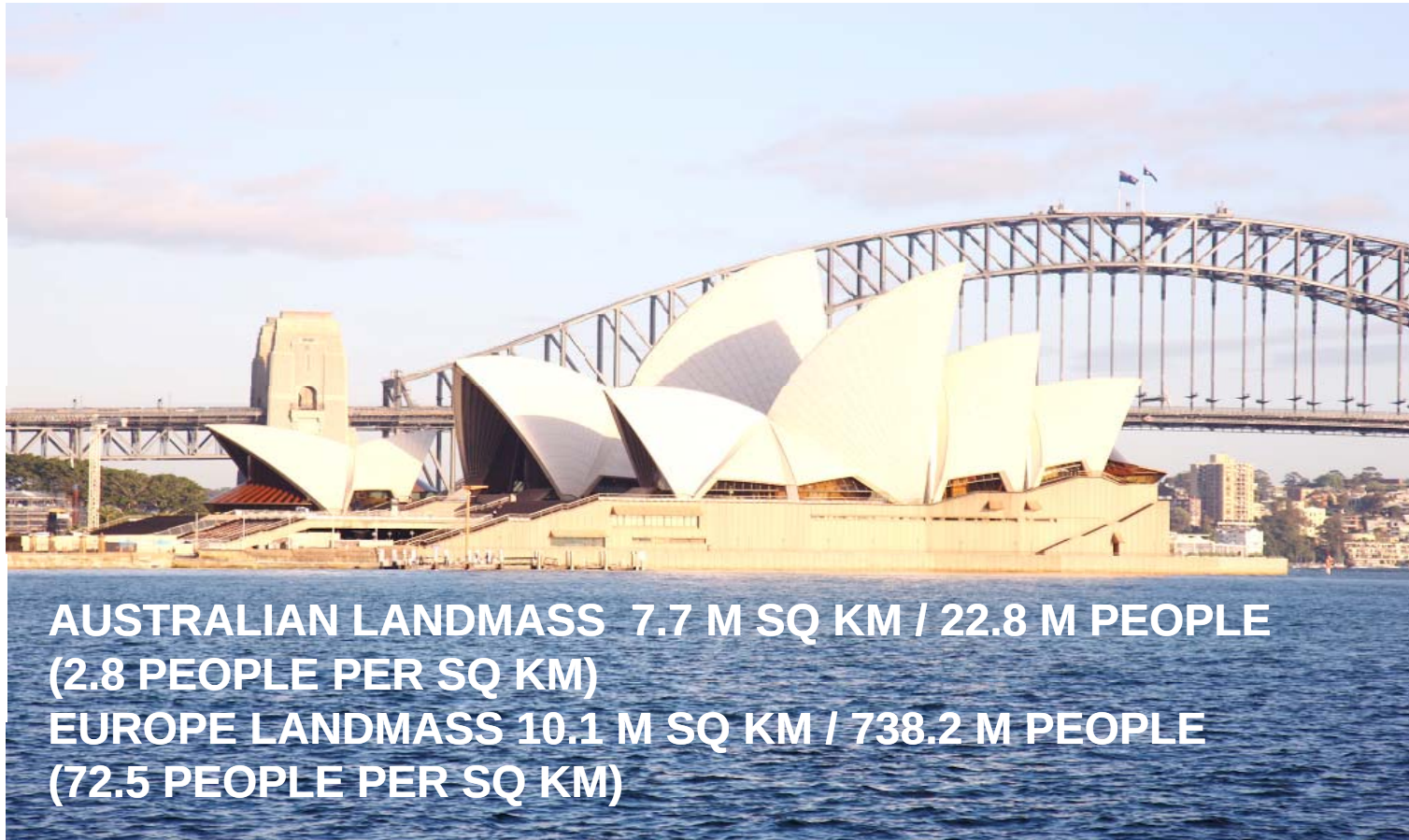


SPECTRUM: USING WHAT WE'VE GOT

MIKE WRIGHT, EXECUTIVE DIRECTOR, TELSTRA

AUSTRALIA IN CONTEXT

IT'S HOW
WE CONNECT

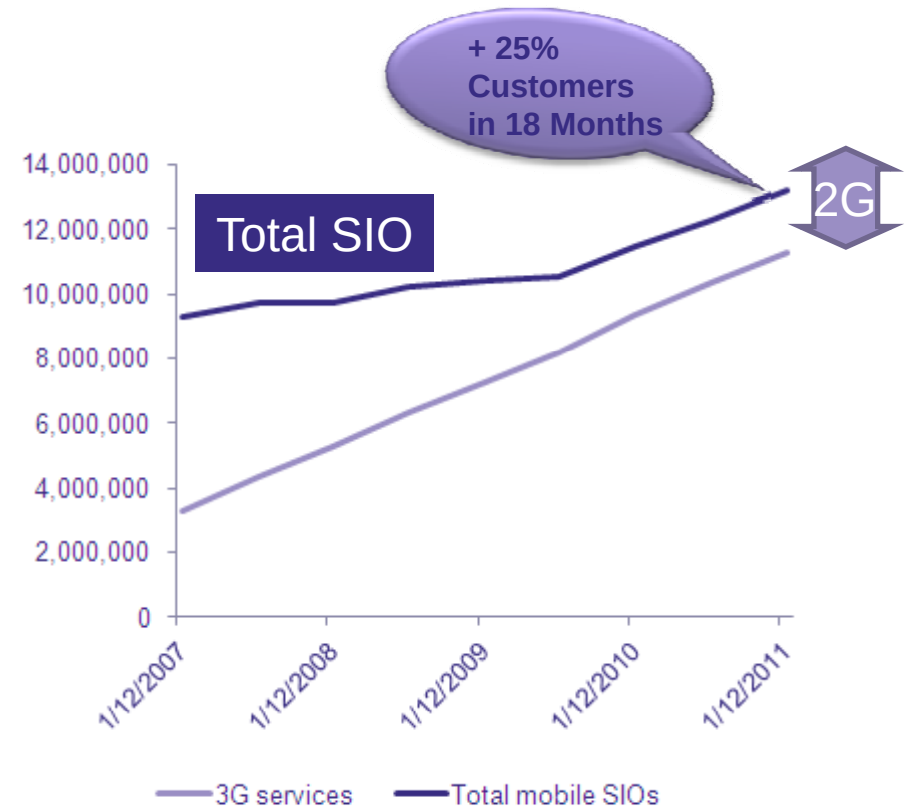
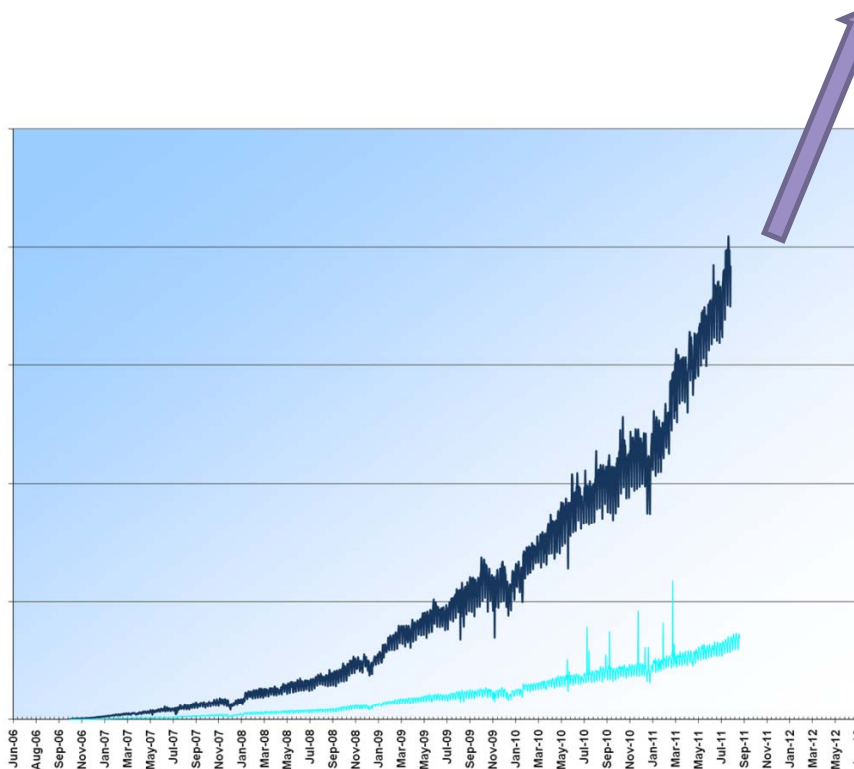


**AUSTRALIAN LANDMASS 7.7 M SQ KM / 22.8 M PEOPLE
(2.8 PEOPLE PER SQ KM)
EUROPE LANDMASS 10.1 M SQ KM / 738.2 M PEOPLE
(72.5 PEOPLE PER SQ KM)**

**HYBRID ALL HSPA+ NETWORK WITH LTE OVERLAY IN SELECTED AREAS
2.1 M SQ KM > 99% POPULATION**

**+25% CUSTOMER GROWTH IN 18 MONTHS TO 31 DECEMBER 2011
OVER 85% OF SERVICES ARE NOW 3G
OVER 100% P.A. DATA VOLUME GROWTH PAST FIVE YEARS**

DATA DEMAND & 3G PENETRATION DRIVING PUSH FOR DEVICE & NETWORK EFFICIENCY



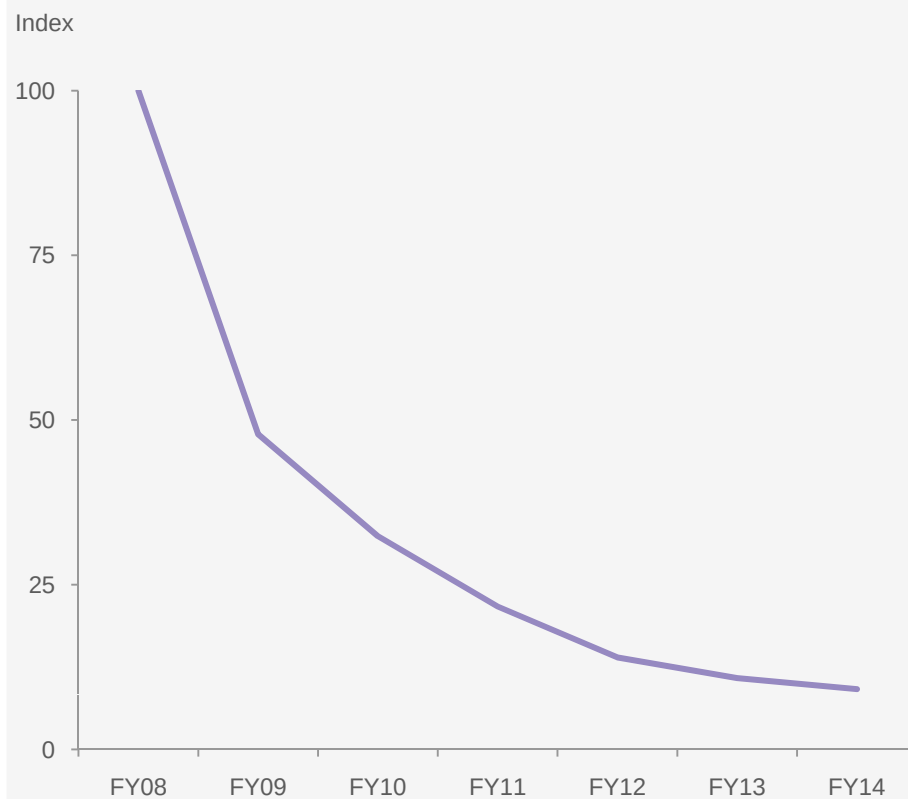
Ongoing demand growth.
Smartphone growth
Tablet growth
WBB growth
M2M growth

2G now < 15% of base
Ranging of 2G devices is rare
2G is occupying valuable spectrum
When do we 'compress' 2G?
What about planning long term closure?

EACH GENERATION OF NETWORK HAS DELIVERED COST OF CAPACITY IMPROVEMENTS

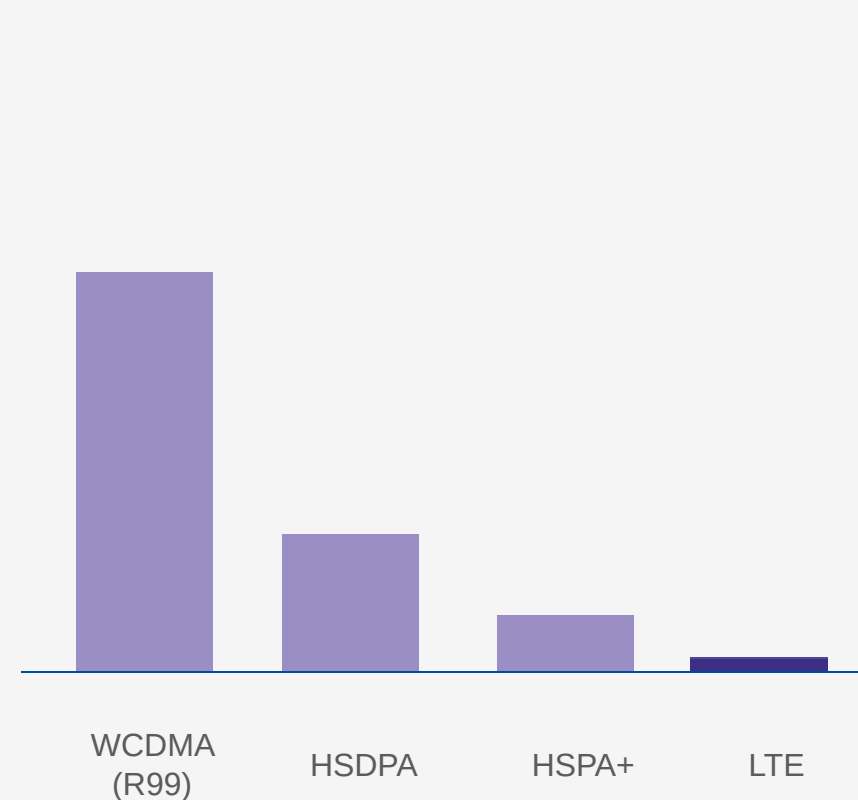


Relative Cost: Hybrid HSPA+/LTE



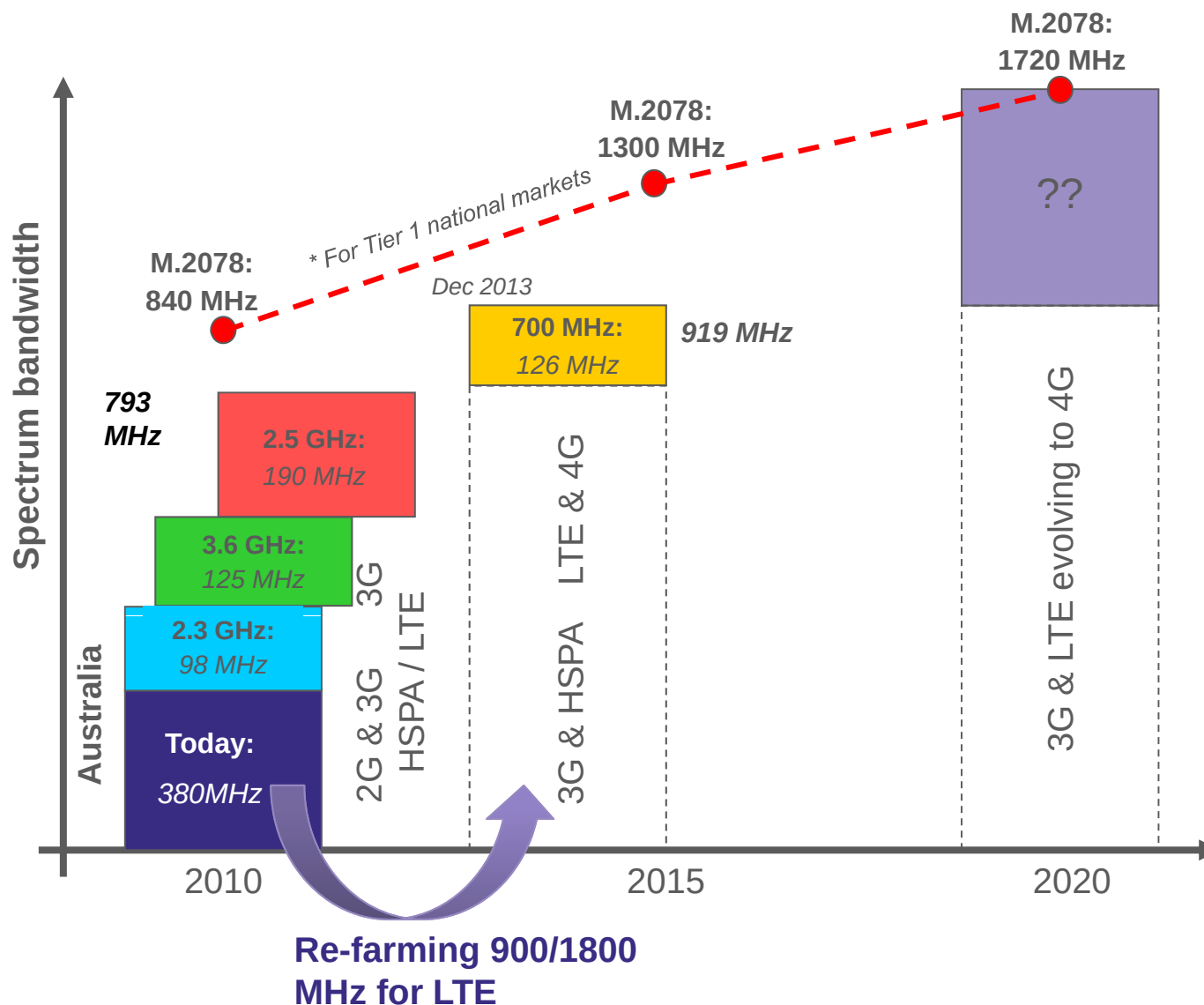
* Index based on Telstra derived network unit costs per MB (excluding OSS/BSS)

Relative Technology Cost



* Excludes trends from GPRS & EDGE as not carried on the Next G[®] network

FORECASTED NEW SPECTRUM: THERE IS A LIKELY SHORTFALL SO REFARMING MAKES SENSE



WIRELESS GROWTH HAS JUST BEGUN



From

To

And Beyond



Exploding
Data Demand
Signalling Impacts
Revenue vs Cost
Data Yield



**MULTI
DEVICE**

**CLOUD
CENTRIC**

**M2M
REACHING
PRIME
TIME**

Voice Centric
Coverage and Call drop focus
Small data consumption
'Novelty data apps'

Data Centric
High & growing consumption
My life is connected
I want 3G/4G ALWAYS

Cloud Centric
ALWAYS ON
Smart Network
Low Latency, High B/W

LTE1800 MHZ ESTABLISHED IN 12 MONTHS



1800 LTE ECOSYSTEM:

- LTE 1800 focus groups GSA & GSMA at MWC Feb 2011
- White papers from major equipment and device vendors
- GSMA facilitated meetings on 1800MHz LTE and spectrum options
- GSA dedicated LinkedIn and Website areas to LTE 1800MHz
- Telstra Launched LTE 1800 MHz September 2011

Over 1000 Members

LTE is already one of the fastest growing ecosystems ever

GSMA Seminar MWC2011 - Hall 2
Building the Mobile Broadband Ecosystem for 1800MHz band – the market opportunity for HSPA and LTE Join the GSMA, the GSA and key industry figures to hear the market size, the timing and the requirements to build a robust and viable Mobile Broadband ecosystem around the 1800MHz band.

Development of the Ecosystem for 1800MHz, Mar 2011

A number of operators are looking at deploying HSPA and LTE equipment in the 1800MHz spectrum band and would like to engage with the wider vendor ecosystem to encourage support for development of equipment, modules and devices. To facilitate this push, the GSMA, along with GSA, hosted a seminar to further the development of this topic on Friday 25th of March 2011. Please follow the links for PDF versions of the speaker presentations.

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GSA **LTE 1800**
 a subgroup of Global mobile Suppliers Association (GSA)

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LTE HSPA 1800 MHz: presentations from the March 25, 2011 workshop - London

The Development of the Mobile Broadband Ecosystem for the 1800 MHz Band

A number of operators are considering deploying HSPA and LTE equipment in the 1800 MHz spectrum band and would like to engage with the wider vendor ecosystem to encourage support for development of equipment, modules and devices. The GSMA, together with GSA, hosted this seminar to further the development of this topic on March 25, 2011 in London. The presentations are available below. A full audio recording of the workshop will be available for download shortly for which more details will be provided on this page.

Topic	Speaker	Date
Update on spectrum assignment of 1800 MHz worldwide	Sandra Gilligan, GSN Association (341.5 KB)	March 25, 2011
LTE take the up and interest in 1800 MHz (LTE1800) around the world	Alan Hadden, President, GSA (192.4 KB)	March 25, 2011
Deutsche Telekom come on 1800 MHz spectrum for Mobile Broadband	Peter Steves and Walter Grethe (16.1 KB)	March 25, 2011
Wong King, China The Case for LTE 2.6 / 1.8 GHz and DC-HSPA	Paul Wang, CCL	March 25, 2011
LTE 1800 - Network vendor View	Martin Ljungberg, Ericsson (71.7 KB)	March 25, 2011
Building the MBB Ecosystem for the 1800MHz band: a chipset perspective	Ben	March 25, 2011

50 Devices

LTE FDD	
700 MHz	142 devices
800 MHz	52 devices
1800 MHz	50 devices
2600 MHz	65 devices
800/1800/2600 MHz	43 devices
AWS	51 devices

REPORT: Status of the LTE Ecosystem January 20, 2012

This updated report, which was researched and published by GSA (Global Mobile Suppliers Association), lists 269 LTE devices launched in the market by 57 suppliers, and confirms how a robust user device ecosystem has been established in support of LTE as the fastest developing mobile communications system technology ever.

GSA (Global Mobile Suppliers Association)
www.gsacom.com

Join the discussions in our LinkedIn groups

GSA: www.linkedin.com/groups?gid=2313721

LTE1800: www.linkedin.com/groups?gid=3129390

LTE TDD: www.linkedin.com/groups?gid=3978061

LTE User Devices: www.linkedin.com/groups?gid=4146472

LTE TDD	
2300 MHz Band 40	36 devices
2600 MHz Band 38	36 devices
2600 MHz Band 41	5 devices

4G/LTE ALREADY A REALITY



TELSTRA 4G USB MODEM
AVAILABLE TODAY



HTC VELOCITY (4G)
AVAILABLE TODAY



GSA REPORTS:

- 49 LTE deployments across the world
- Forecasts approx 120 launches by the end of 2012
- 14 LTE1800 networks now commercially launched
- 50 LTE1800 devices available globally

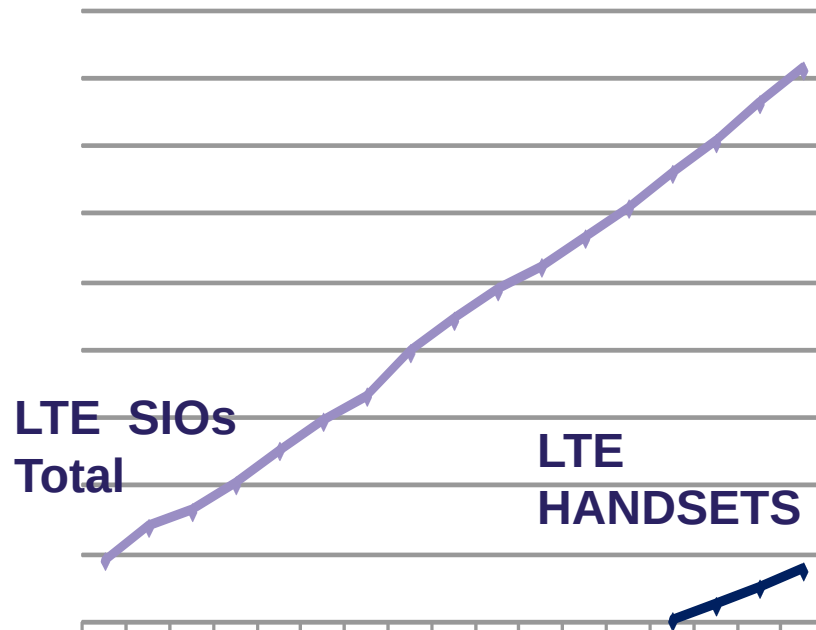


4G DEVICES PROVING EXTREMELY POPULAR

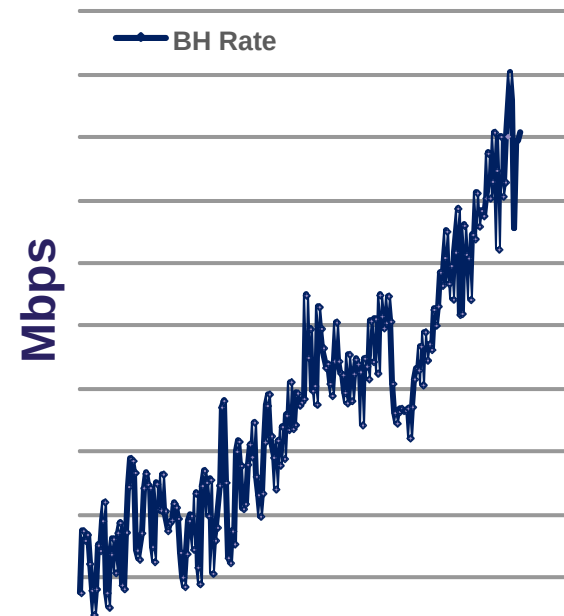
IT'S HOW
WE CONNECT



LTE Handset and Data Device SIOs



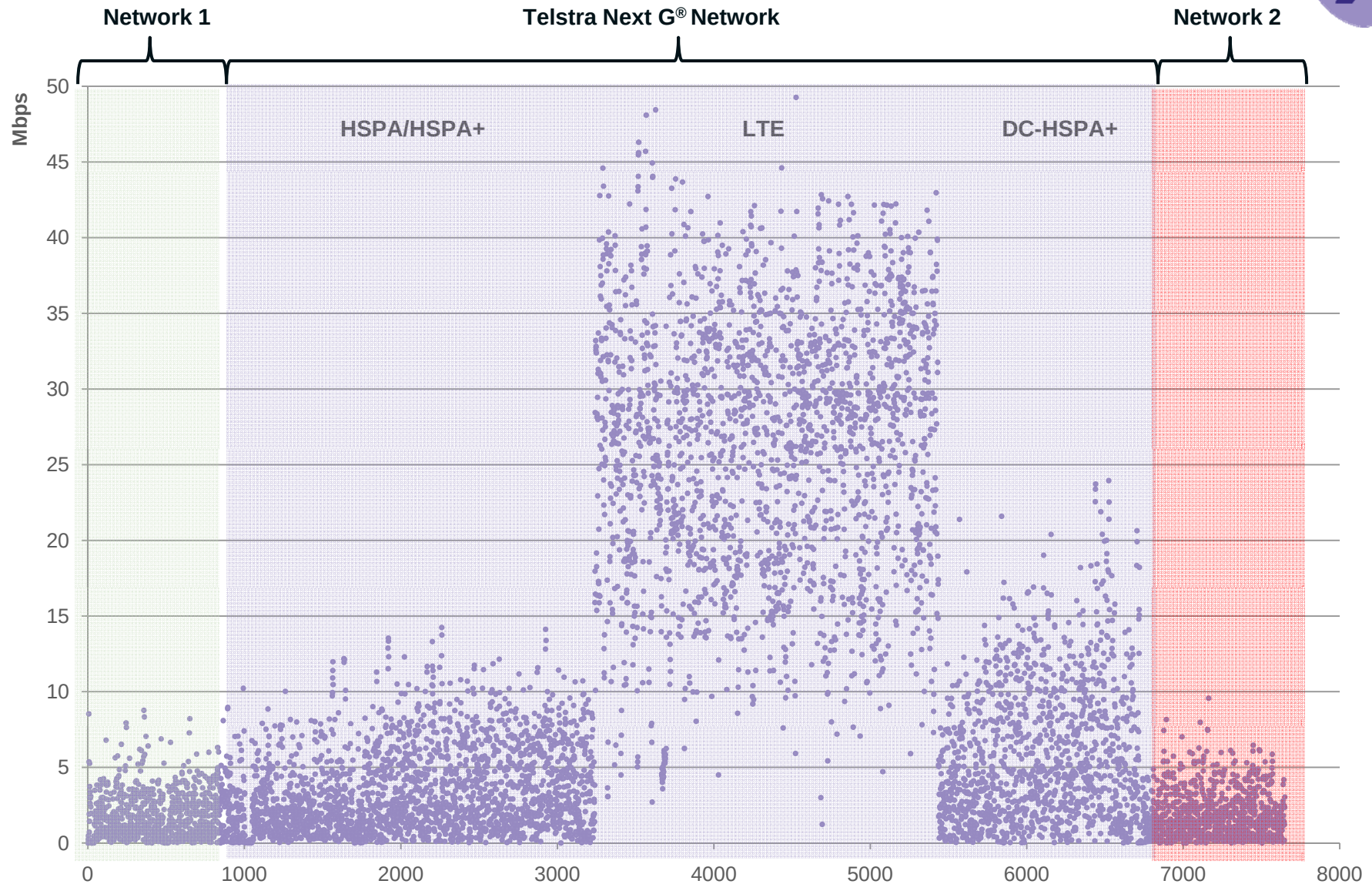
Daily LTE N/W DL Throughput



OVER 100,000 CUSTOMERS IN FIRST THREE MONTHS.
IN FIRST MONTH OF SELLING 4G HANDSET IT BECAME
THIRD MOST POPULAR PHONE WE SELL

SPEEDTEST.NET - ANDROID DOWNLOAD SAMPLE

IT'S HOW
WE CONNECT



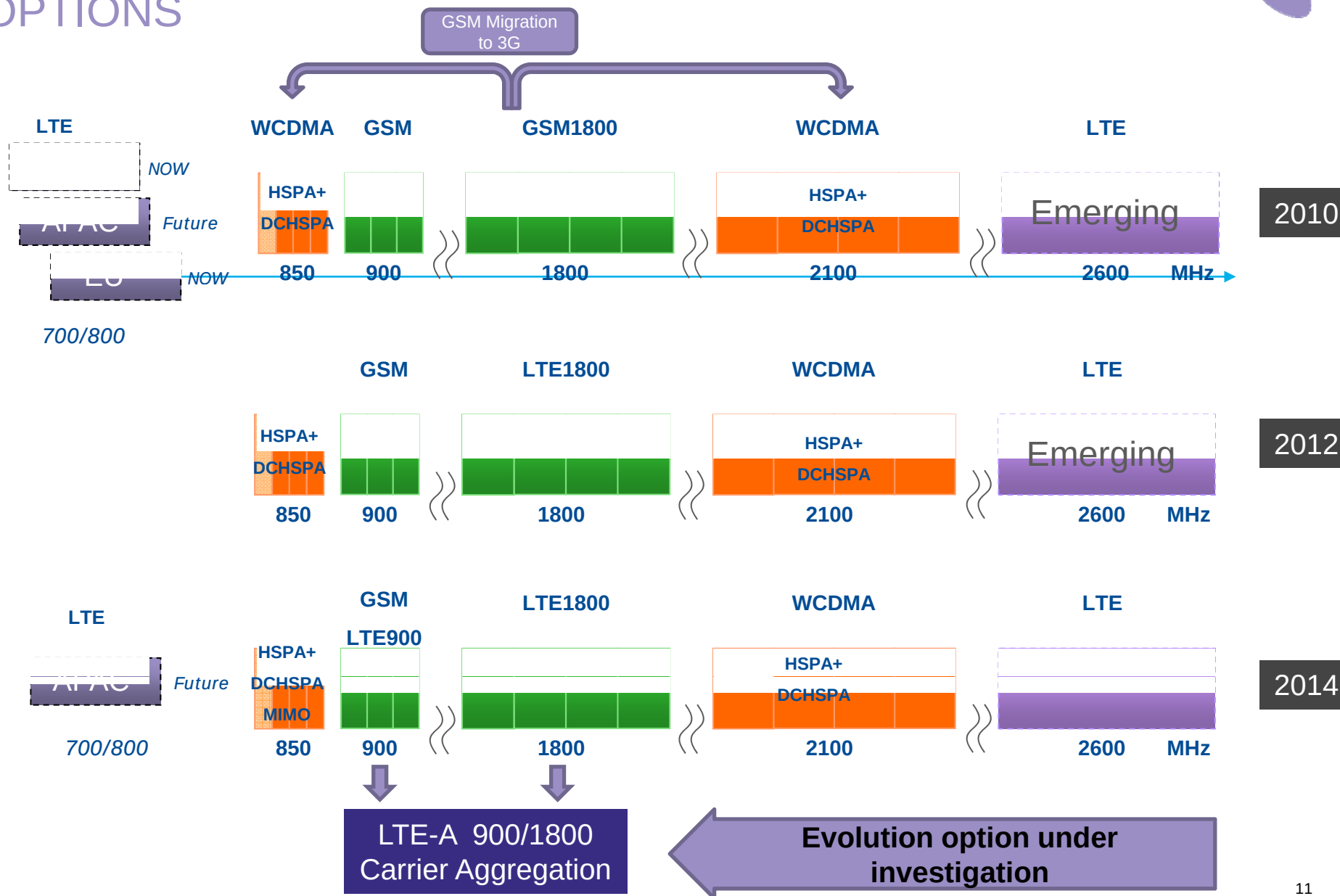
of tests

SAMPLE NETWORK SPEED TESTS FOR ANDROID SMARTPHONES

Based on tests at locations across the networks via the Telstra Melbourne Speed test Server from 9/1/2012 – 1/2/2012 While online speed test sites are not always robust, these sample results for Android handsets do show what our 4G LTE on Telstra's Next G® mobile network is capable

AUSTRALIAN SPECTRUM & TECHNOLOGY EVOLUTION OPTIONS

IT'S HOW
WE CONNECT

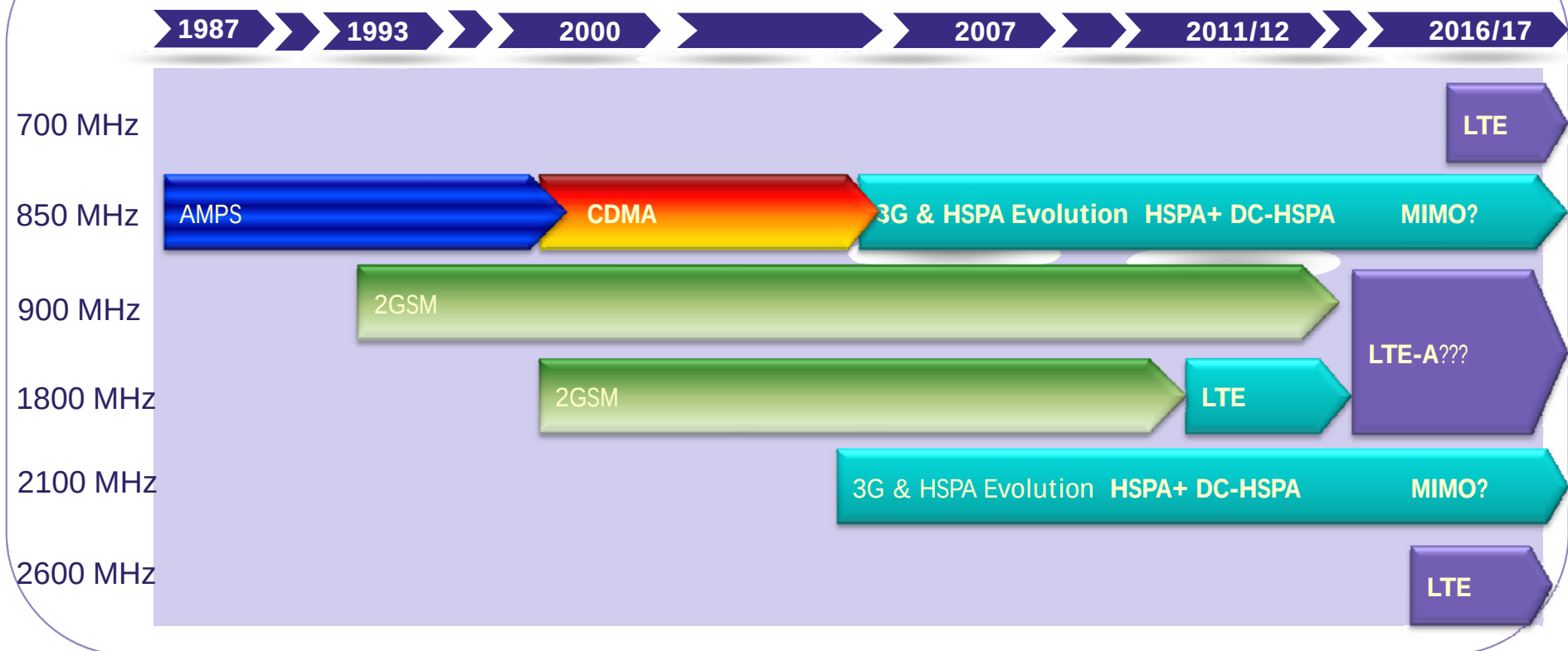


Speed references are peak network speeds for which the technology is rated. Actual speeds are lower.

TELSTRA HAS A LONG HISTORY OF REFARMING SPECTRUM



3GPP Evolution Path for Telstra



- Telstra has re-farmed spectrum and even closed networks to do so in the past
- Evolution to a integrated HSPA+/LTE network is a logical extension of this strategy

STEPS TOWARDS COMPRESSION AND REFORMING OF 2G SPECTRUM



DEVICE PENETRATION & MIGRATION

- Multi-technology & Multiband devices are emerging at lower cost
- Penetrate the base to allow quick take up when new bands activated
- Increase move of traffic to 3G/4G with smartphones/lower cost devices

TRAFFIC MIGRATION

- Improve 3G/4G coverage depth to shift traffic off 2G layer
 - o Low frequency 3G/4G technologies
 - o Site densification, tower mounted radio units, multi sector
- Focus on Handset Antenna Performance in 3G/4G bands to move traffic



TRAFFIC COMPRESSION/REDUCTION

- Half-rate on 2G
- Software based network tuning & spectrum compression (Telstra Optimi experience)