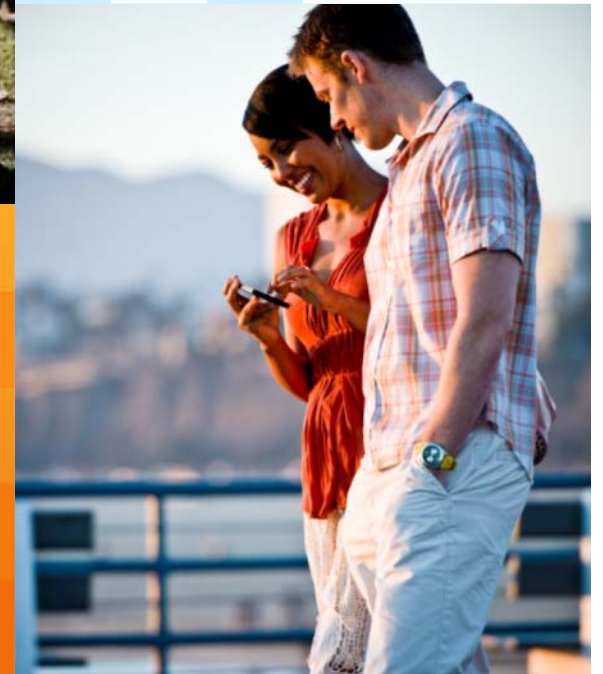




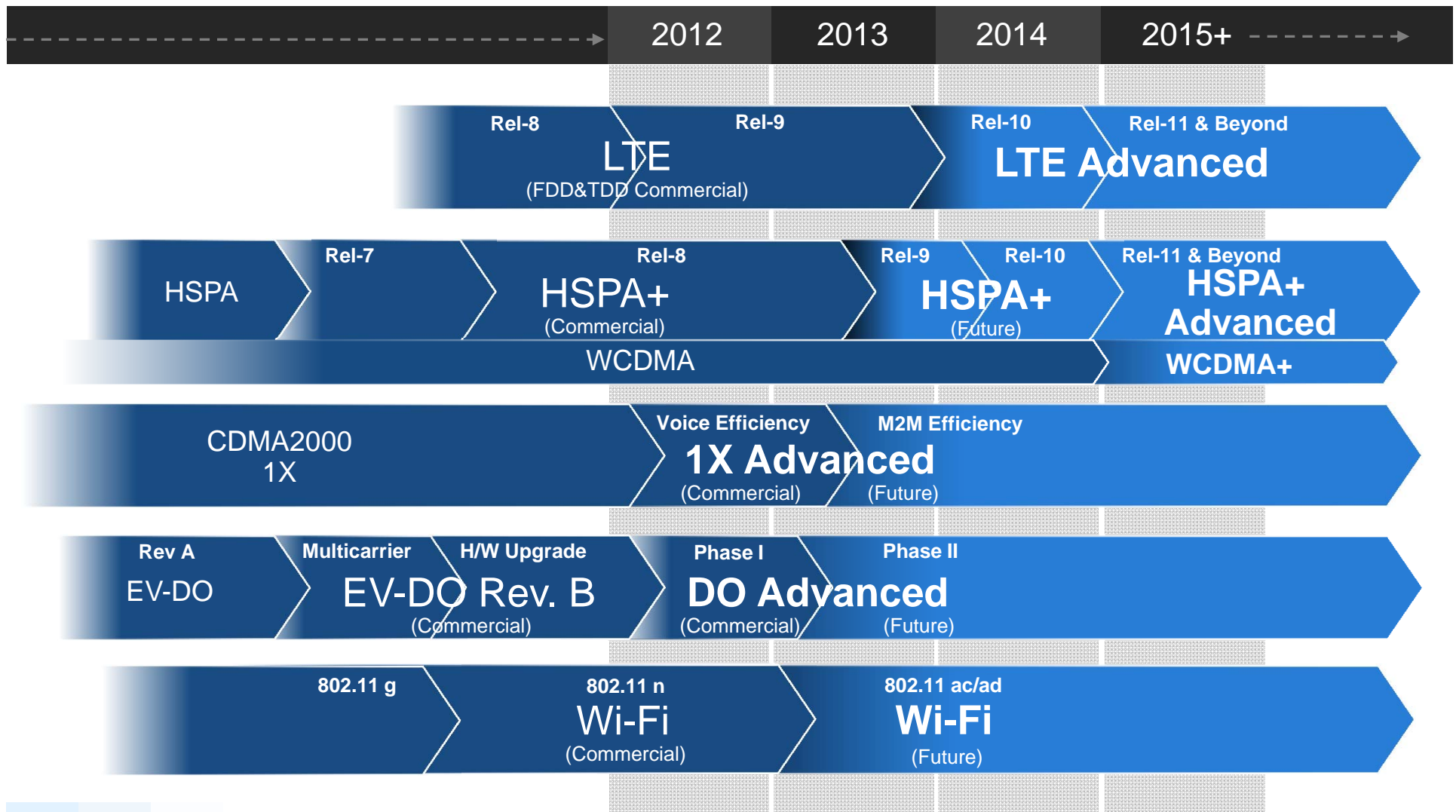
WCDMA+

Makes voice more efficient to support more data

April 2012



Qualcomm is a Leader in Wireless



■ Commercial

Note: Estimated commercial dates.

Migration to WCDMA Voice from GSM Voice

UMTS900 Well Established for HSPA+ Data and WCDMA Voice

“...UMTS900 is standard in most new devices destined for Europe, the Middle East, Africa, and Asia Pacific markets, with the 900/2100 MHz combination for WCDMA-HSPA increasingly commonplace...”

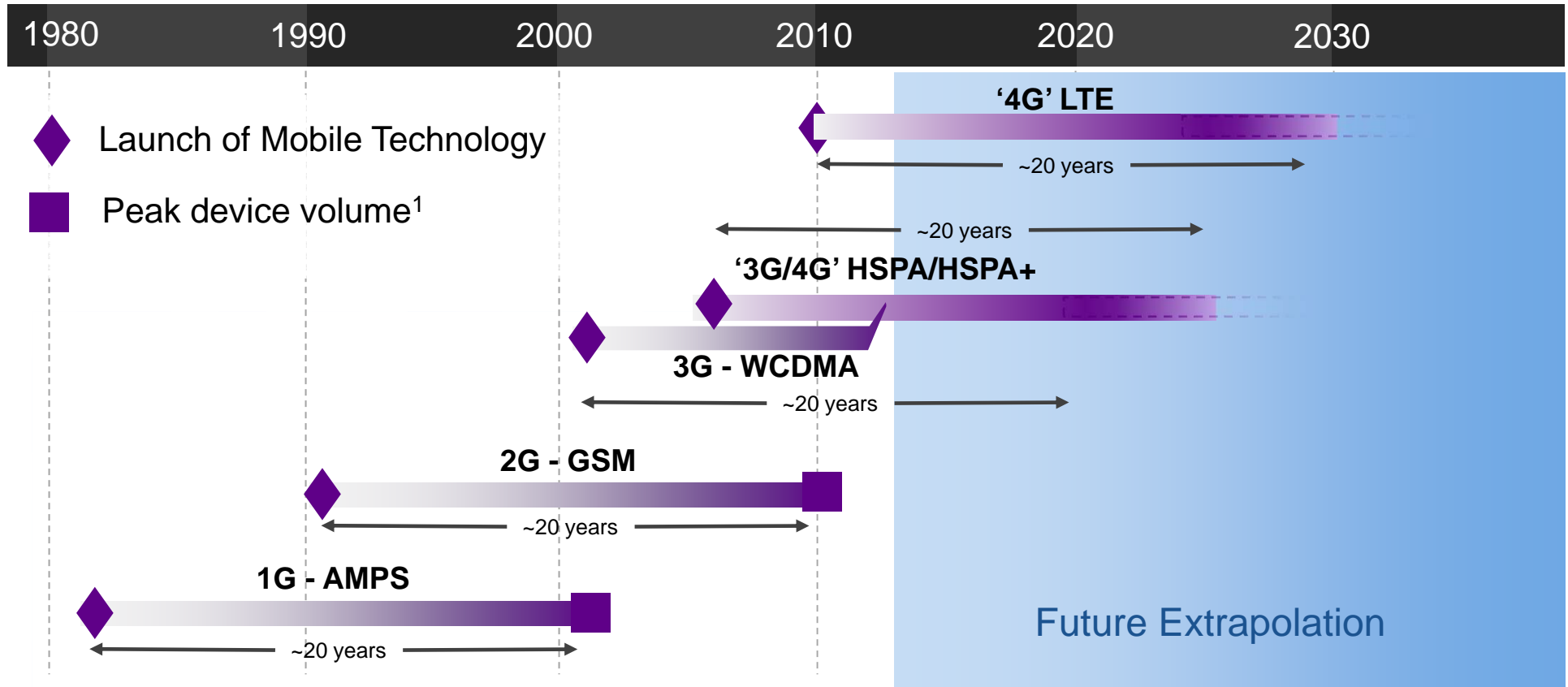
- GSA

40 Commercial Networks

719 Devices Announced

>54 Countries Allow Refarming¹

WCDMA Circuit Voice Has a Very Long Life Thanks to the Success of HSPA+

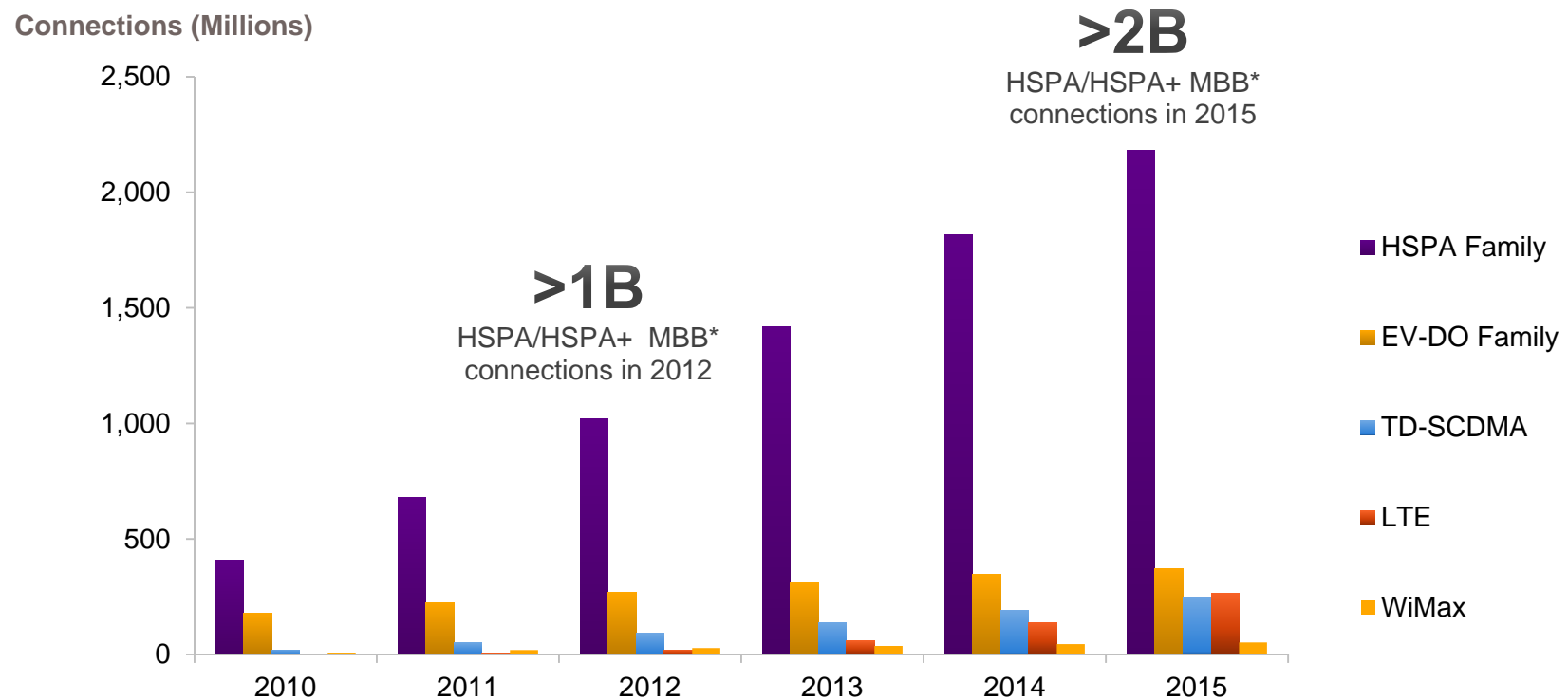


~20 years from launch of a new mobile technology generation to peak device volume

¹Sources: ABI June 2011 and Strategy Analytics Sept 2011, devices is only handset. A multimode device is counted only as the latest technology, e.g. a GSM/HSPA+/LTE device is counted as LTE.

2 Billion HSPA/HSPA+ Subscribers in 2015 Will Be Using WCDMA voice

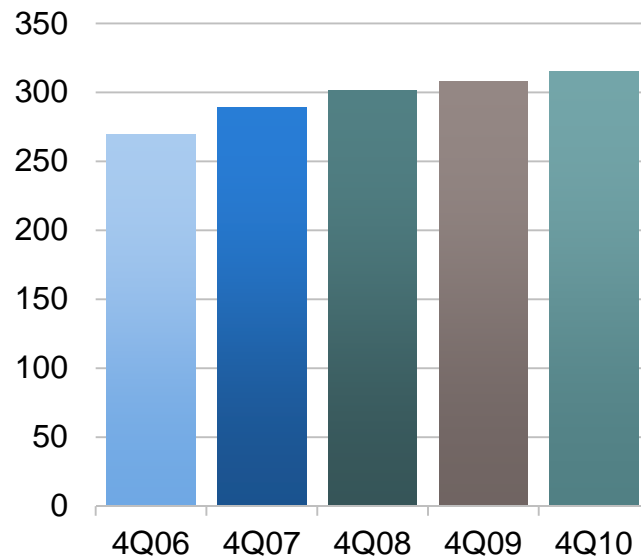
HSPA/HSPA+ relies on WCDMA for voice



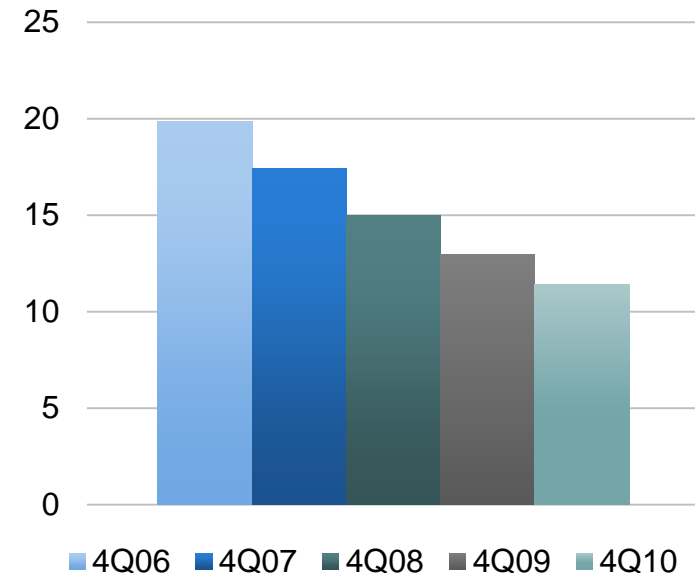
Voice Usage Stable But Revenue Declining

Growth in CALA, MEA & E. EUROPE, but flat or decline elsewhere

Stable Minutes of Use per Subscriber (Global)¹



Declining ARPU (\$ Global)¹



Voice Provides Majority of Revenue²—Data Demand Increasing
➡ Make Voice more Efficient to Support More Data While Ensuring Quality

More Efficient Voice to Support More Data

WCDMA+

Triples Voice Spectral Efficiency

- To free up resources for data

Can Free Up ~2/3 of a Carrier for HSPA+ Data

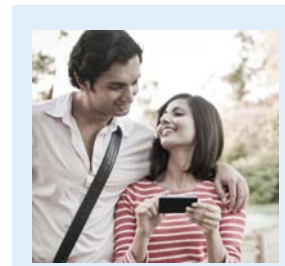
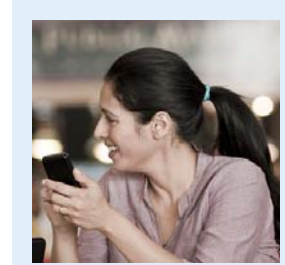
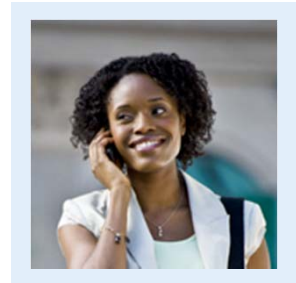
- While supporting the same voice capacity as WCDMA today

Ensures High Quality, Reliable, Ubiquitous Voice

- WCDMA+ builds on proven WCDMA circuit switched voice

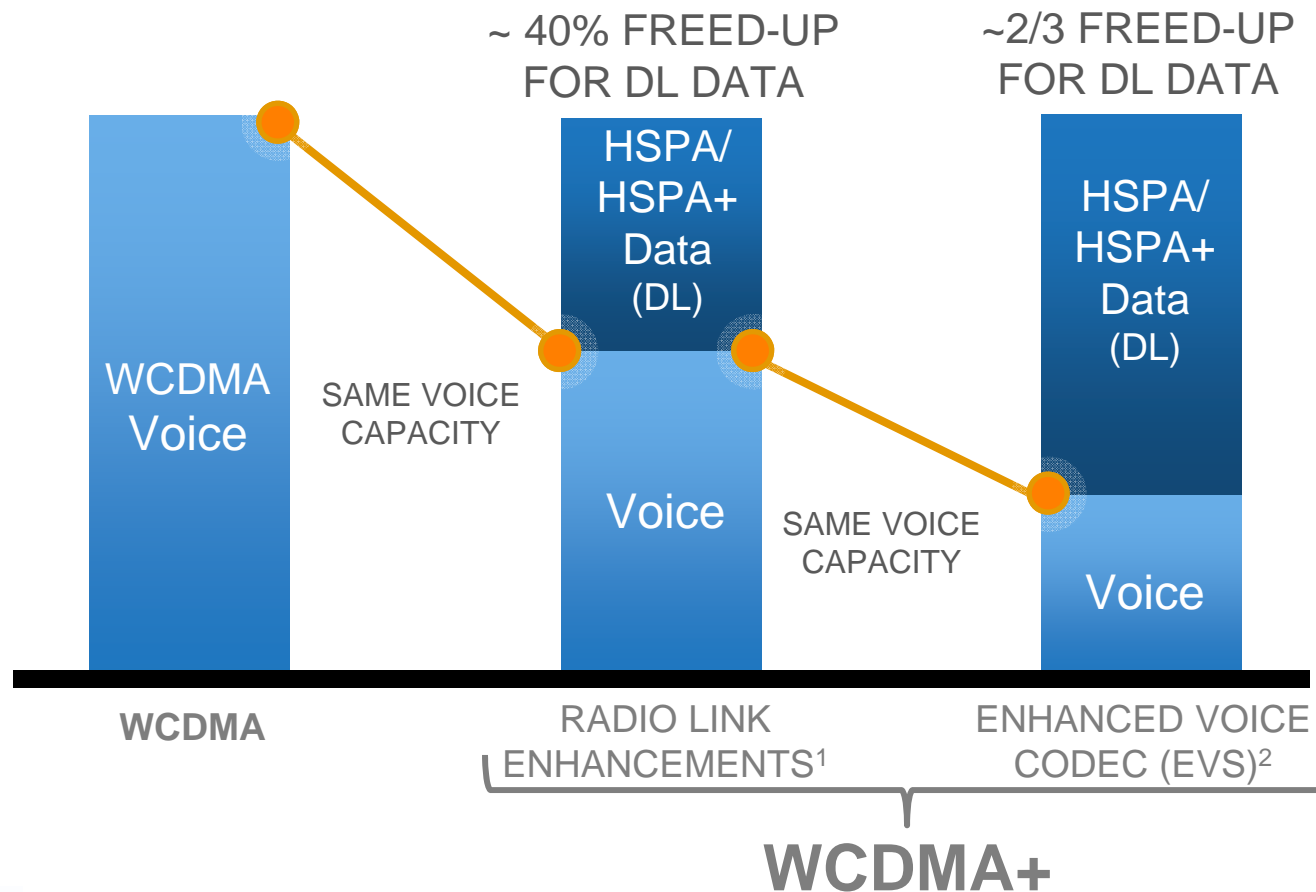
Relevant to All HSPA/HSPA+ Operators

- The long life of HSPA+ means a long life of WCDMA—Addresses all device segments



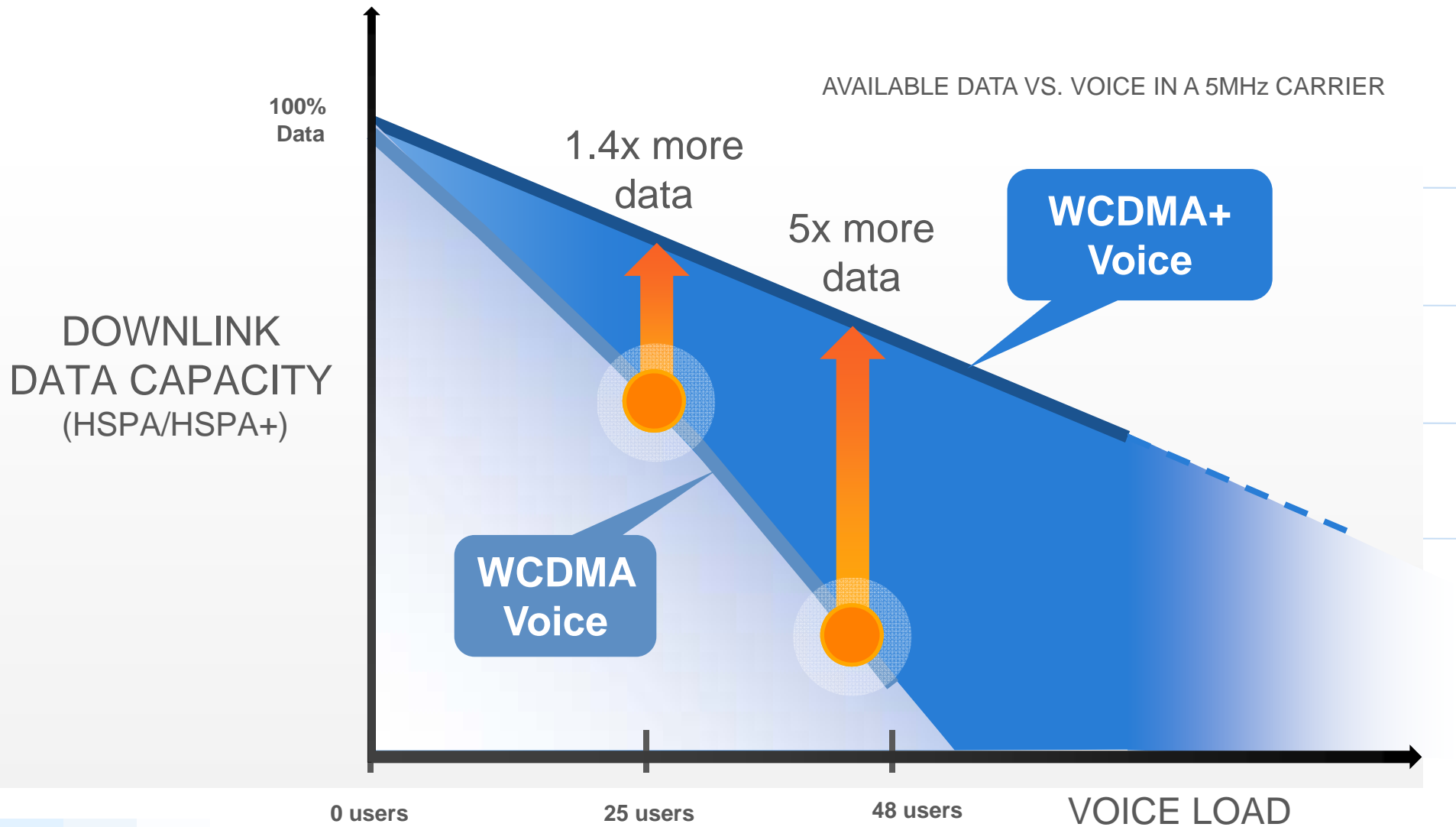
WCDMA+ Triples Voice Spectral Efficiency

~2/3 of a Carrier Freed up for Data by Enhancing Circuit Switched Voice



Assumptions: single receive antenna and rake receiver assumed for voice, dual receive diversity assumed for data. ¹WCDMA+ enhancements targeted for 3GPP R12
¹AMR 12.2k vocoder. ²EVS 5.9kbps VBR Wideband mode.

More Data Capacity at All Voice Loads

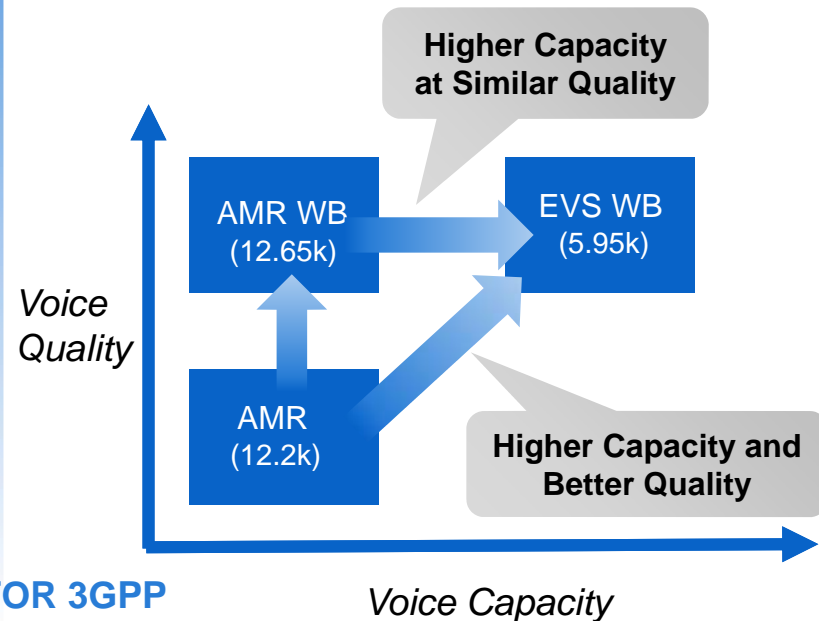


WCDMA+: The Secret Sauce

RADIO LINK ENHANCEMENTS¹

- 1) Reduces overhead—more power left to support more users
Such as slower power control (750 MHz) and removal of dedicated downlink pilot
- 2) Less energy to transmit a voice frame—less interference and higher capacity
Such as early voice frame termination²

ENHANCED CODEC—EVS WB²



TARGETED FOR 3GPP
RELEASE 12



A GLOBAL INITIATIVE

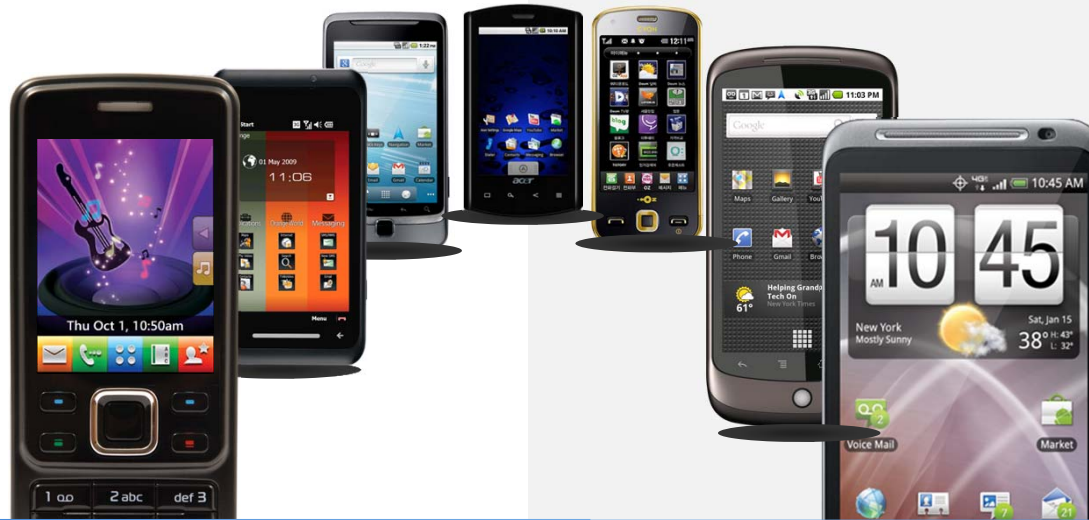
¹Applies both to downlink and uplink, uplink improvements also needed to enhance uplink data capacity. ²The 20 ms voice-frame transmission can be terminated as soon as it is successfully decoded, compared continued to repeating all packets the full 20ms frame. ³EVS = Enhanced Voice Services, with a source controlled variable bit-rate mode.

WCDMA+ Ensures High Quality, Reliable and Ubiquitous Voice



¹High quality tanks to soft handover, proven interoperability and 10+ years of WCDMA circuit switched voice optimizations. ²Current consumption reduced by ~10% with WCDMA+

WDCMA+ Addresses all Device Segments



Cost-Effective Penetration Across *All* Device Segments

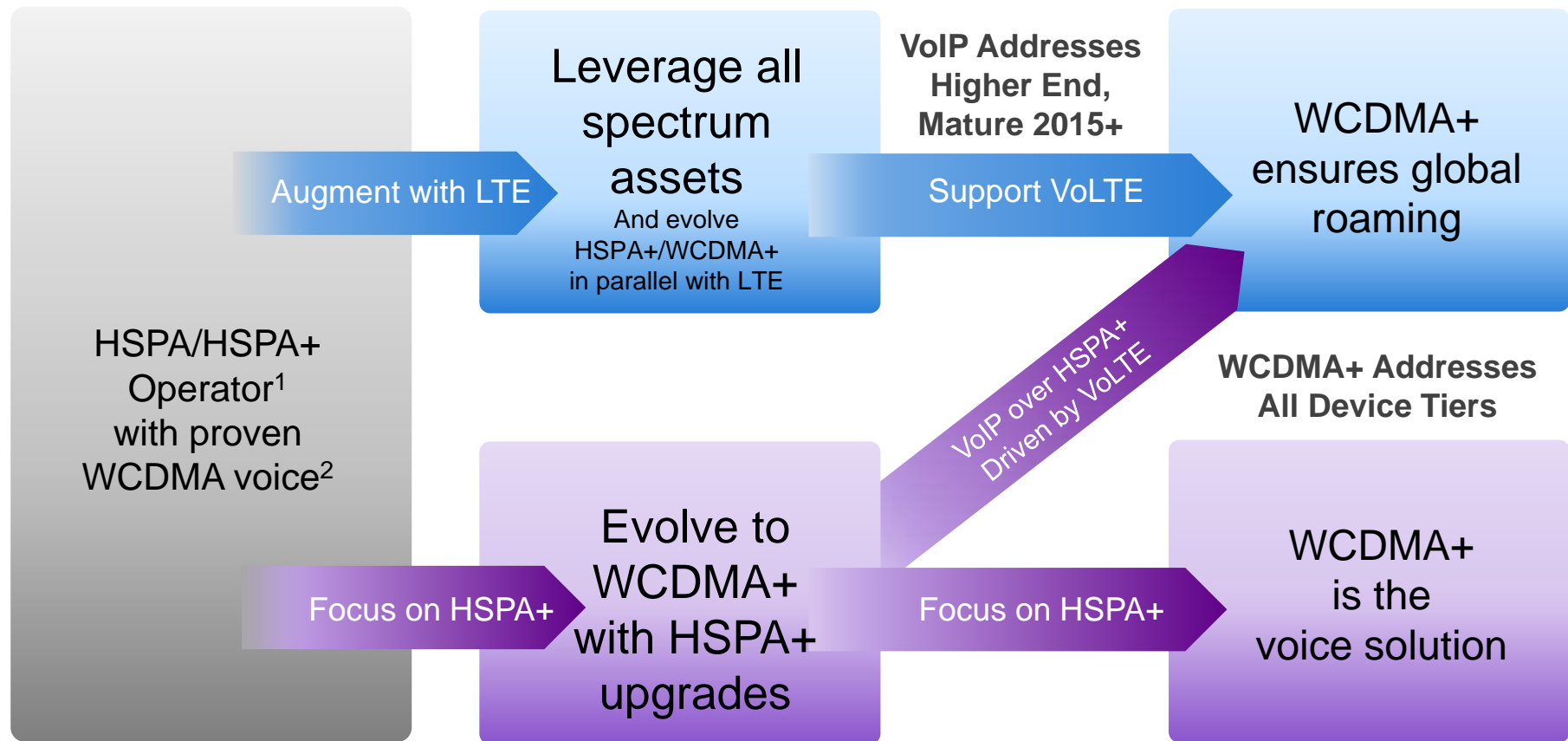
Basic features—such as single receive antenna and no HSPA+ required—ensures cost-effective entry/low-end devices¹

Latest HSPA+, dual receive diversity and latest advanced receivers² provide even better performance—especially for data services

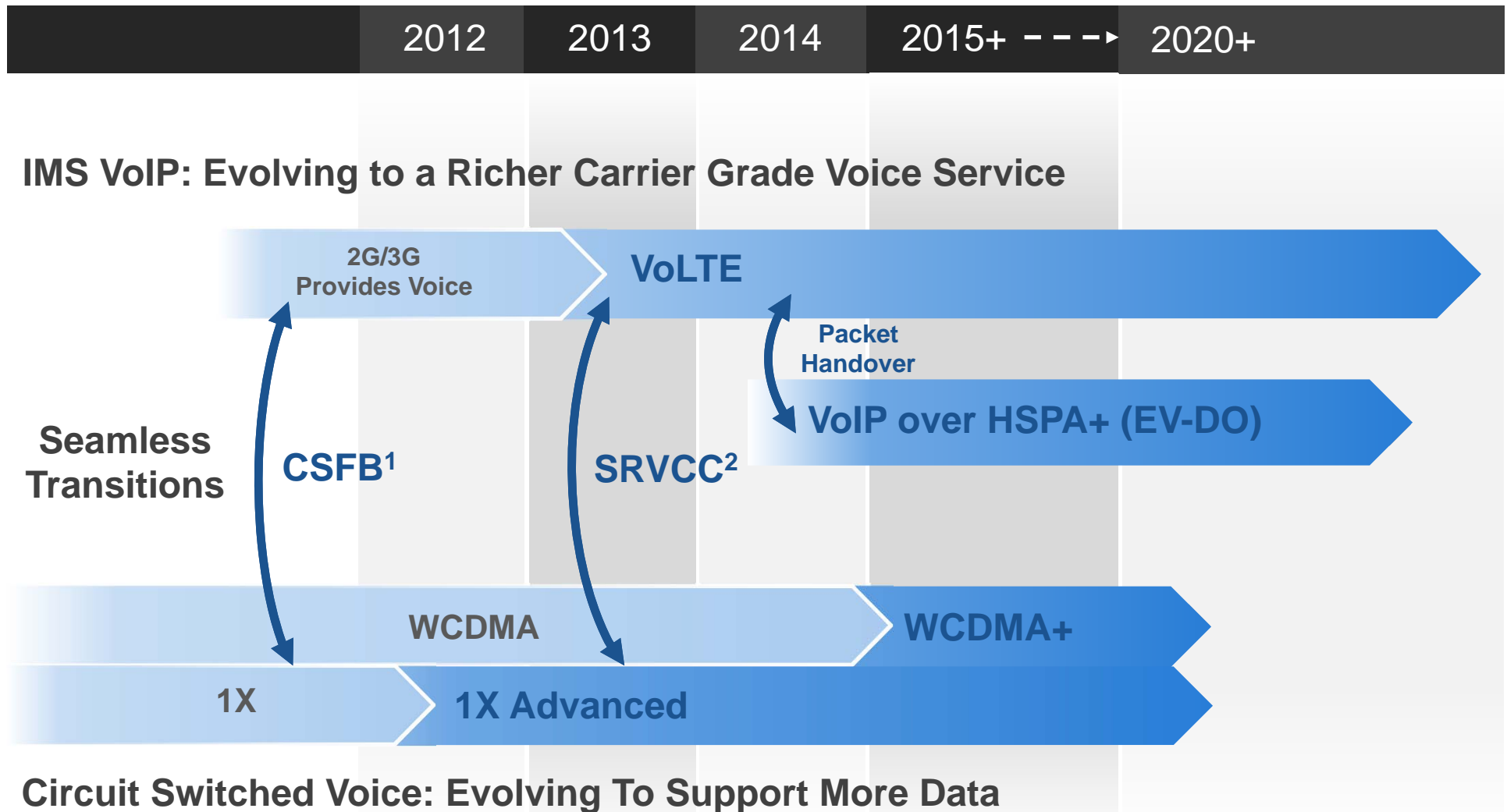
Need to address all device segments
—including 50% of shipped handsets in 2015 that are not Smartphones³

WCDMA+ Relevant to All Operators

The long life of HSPA/HSPA+ means a long life of WCDMA



Qualcomm: Comprehensive Voice Evolution Leadership



Blue: Qualcomm Technology Leadership

More Efficient Voice to Support More Data

WCDMA+

Triples Voice Spectral Efficiency

- To free up resources for data

Can Free Up ~2/3 of a Carrier for HSPA+ Data

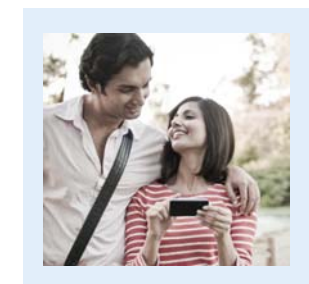
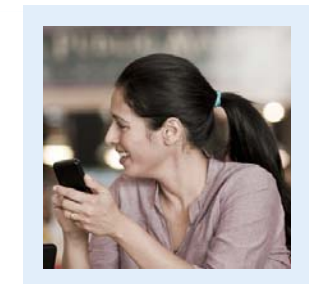
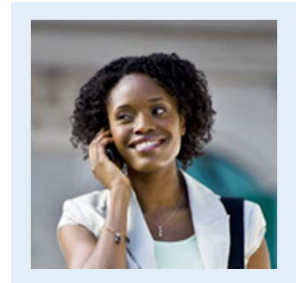
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