Accelerating Wearables: The New Connected Family
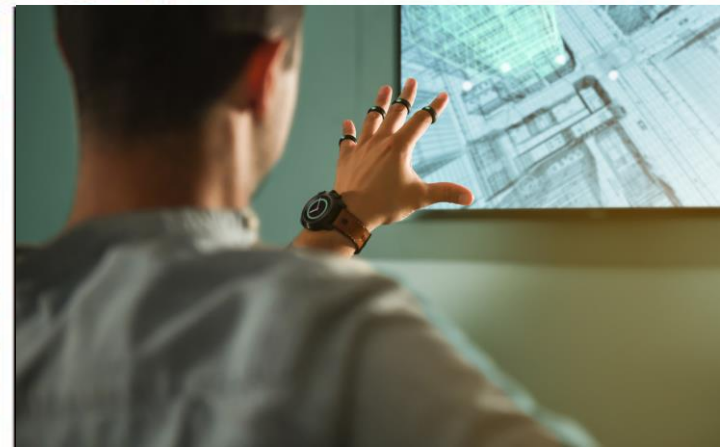
Pankaj Kedia
Sr. Director & Global Head, Smart Wearables Segment

TDK Developers Conference
09.17.2018.

QUALCOMM

LEADING MOBILE, IOT, WEARABLE TECHNOLOGIES

Industry Evolution

The Wearables Era

LGWatch 2014

Apple Watch 2015

The Mobile Era

Apple iPhone 2007

Apple iPad 2010

The Portable Era

NEC UltraLite 1989

The Desktop Era

IBM 5150 1981

Each Subsequent Era Bigger Than The Previous One

Complement, Not Replace

Wearables = First Inning

The "New" Connected Self

WEARABLE CAMERAS

SMART HEADSETS

SMART GLASSES

CONNECTED FITNESS TRACKERS

MEDICAL BANDS

SMART CARDS

SMART WATCHES

SMART SHOES

SMART PANTS

The "New" Connected Self + Family

WEARABLE CAMERAS

SMART HEADSETS

SMART GLASSES

MY PARENTS

CONNECTED FITNESS TRACKERS

MEDICAL BANDS

MY VALUABLES

MY KIDS

SMART CARDS

SMART WATCHES

MY SPORTS

SMART PANTS

MY PETS

SMART SHOES

MY IOT DEVICES

INTERNET of THINGS

The "New" Connected Self + Family

STAY
CONNECTED

MY PARENTS

GET FIT,
STAY FIT

ALWAYS
CONVENIENT

MY KIDS

ALWAYS
PRODUCTIVE

BE SAFE
BE SECURE

MY PETS

WEARABLE
CAMERAS

SMART
HEADSETS

SMART
GLASSES

CONNECTED
FITNESS
TRACKERS

MEDICAL
BANDS

SMART
CARDS

SMART
WATCHES

SMART
PANTS

SMART
SHOES

CONTROL
IOT DEVICES

MY VALUABLES

HELLO ALEXA
OK GOOGLE

ENTERTAIN
LISTEN TO MUSIC

MY SPORTS

IDENTIFY AND
PAY

INTERNET of THINGS
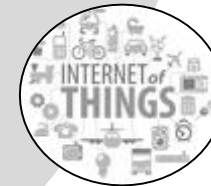
MY IOT DEVICES

STAY HEALTHY
STAY WELL

Qualcomm Wearables Segmentation

Smart Watches

- LUXURY
- FASHION
- SPORTS
- GEN PURPOSE

Kids Watches

- CHILDREN'S BRAND
- OPERATOR BRAND
- CE / PHONE BRAND

Smart Trackers

- KIDS
- PETS
- ELDERLY
- VALUABLES

Wearable Companions

- SMART CLIP / CARD
- SMART GLASS
- SMART SHOE
- SMART APPAREL

Smartwatch Segment

Gen 1 Snapdragon™ 400 Platform	Gen 2 Snapdragon Wear™ 2100 Platform	Gen 3 Snapdragon Wear™ 3100 Platform
Luxury	LOUIS VUITTON · MONT BLANC	LOUIS VUITTON · MONT BLANC
Fashion	BOSS HUGO BOSS · DIESEL · EMPORIO ARMANI · FOSSIL · Gc · GUESS · kate spade NEW YORK · MARC JACOBS · MICHAEL KORS · MOVADO SWISS HERITAGE JACOBS DESIGN · PORSCHE DESIGN · SKAGEN · TOMMY HILFIGER	FOSSIL GROUP
Sports	LG · HUAWEI · MISFIT · NIXON	PROJECT STAMINA
General purpose	ASUS · HUAWEI · LG · MOTOROLA · SAMSUNG	ASUS · HUAWEI · LG · Mobvoi · verizon✓ · ZTE	Announced On Sept 10

Many Many More Brands Entering

If Wear OS by Google, then Snapdragon Wear

Gen 1
Snapdragon™ 400
Platform

Gen 2
Snapdragon Wear™ 2100
Platform

Gen 3
Snapdragon Wear™ 3100
Platform

Luxury

Fashion

Sports

General purpose

Many Many More Brands Entering

Announced On Sept 10

100 smartwatches shipping from 25 brands

Qualcomm Snapdragon and Snapdragon Wear are products of Qualcomm Technologies, Inc. and/or its subsidiaries.

Smartwatch Usage
The "5-95" Rule

5%
Interactive

95%
Ambient

Smartwatches Today
Phone Based Architecture

5%
Interactive

95%
Ambient

A7

DSP / M4
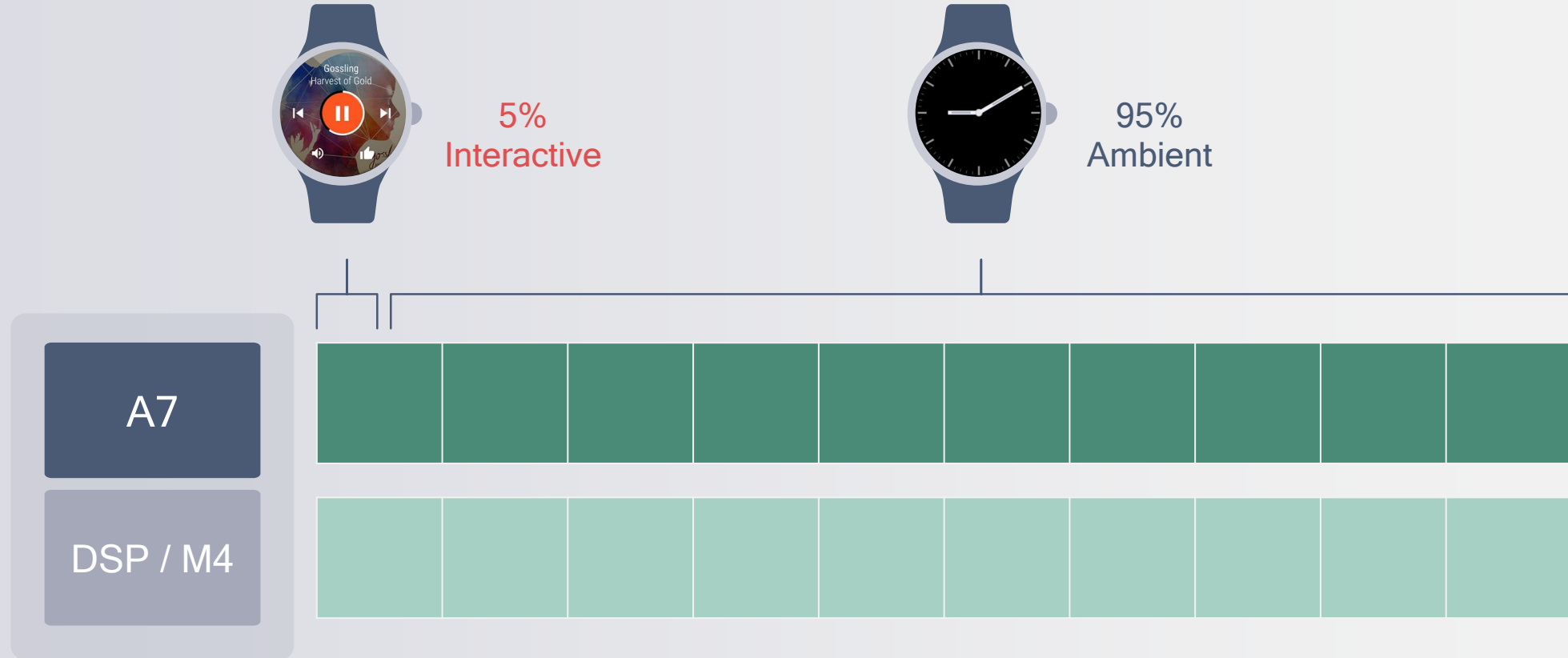
Snapdragon Wear 3100
Smartwatch Based Architecture

5%
Interactive

95%
Ambient

Big   4 x A7

Small   DSP

Tiny   Co-Processor RTOS

RFFE w/ GaAs PAs
(QPA4360 / QSW8573 / QET4101)

Wi-Fi + Bluetooth
(WCN3620)

Core baseband
(MSM8909w / APQ8009w)

Wear OS

DSP

Modem / GPS RF
(WTR2965 / WGR7640)

Wearable PMIC
(PMW3100)

Ultra-low power co-processor
(QCC1110)

RTOS

Dual Display architecture

NFC
(NQ330 / NQ310)

Sensors
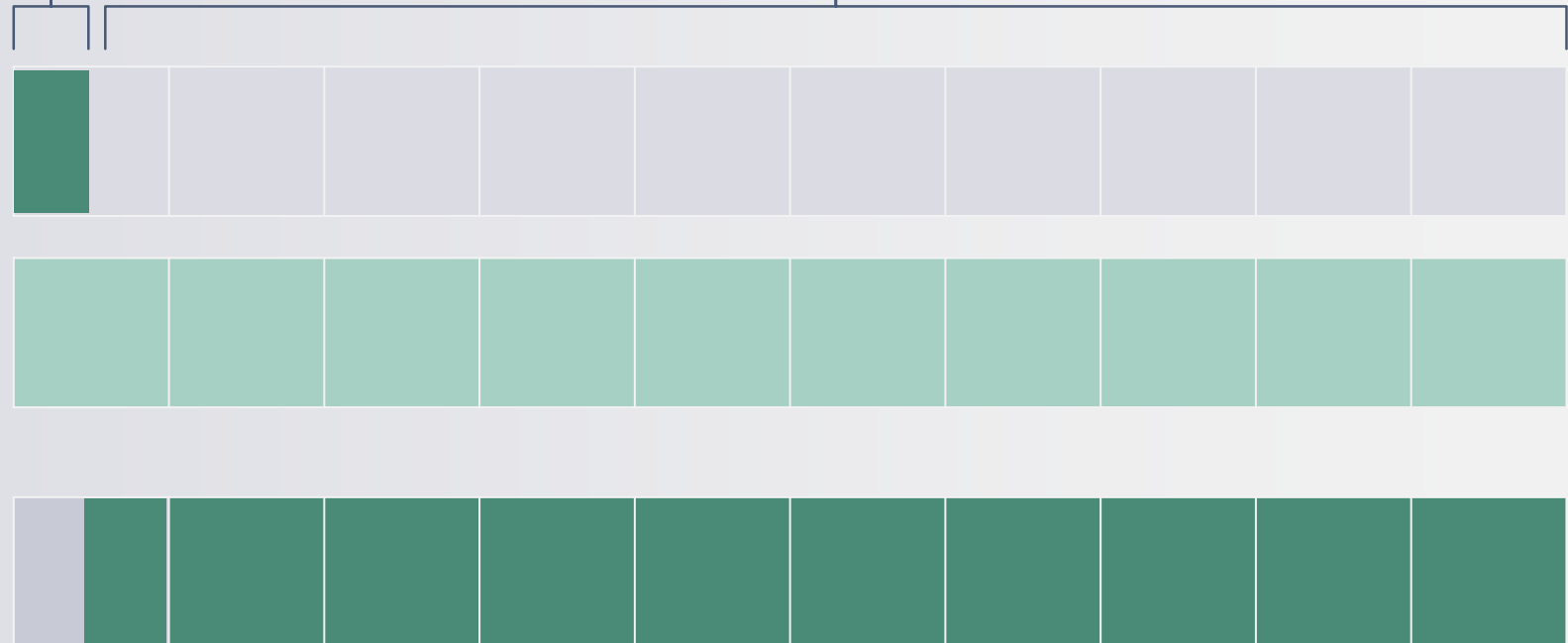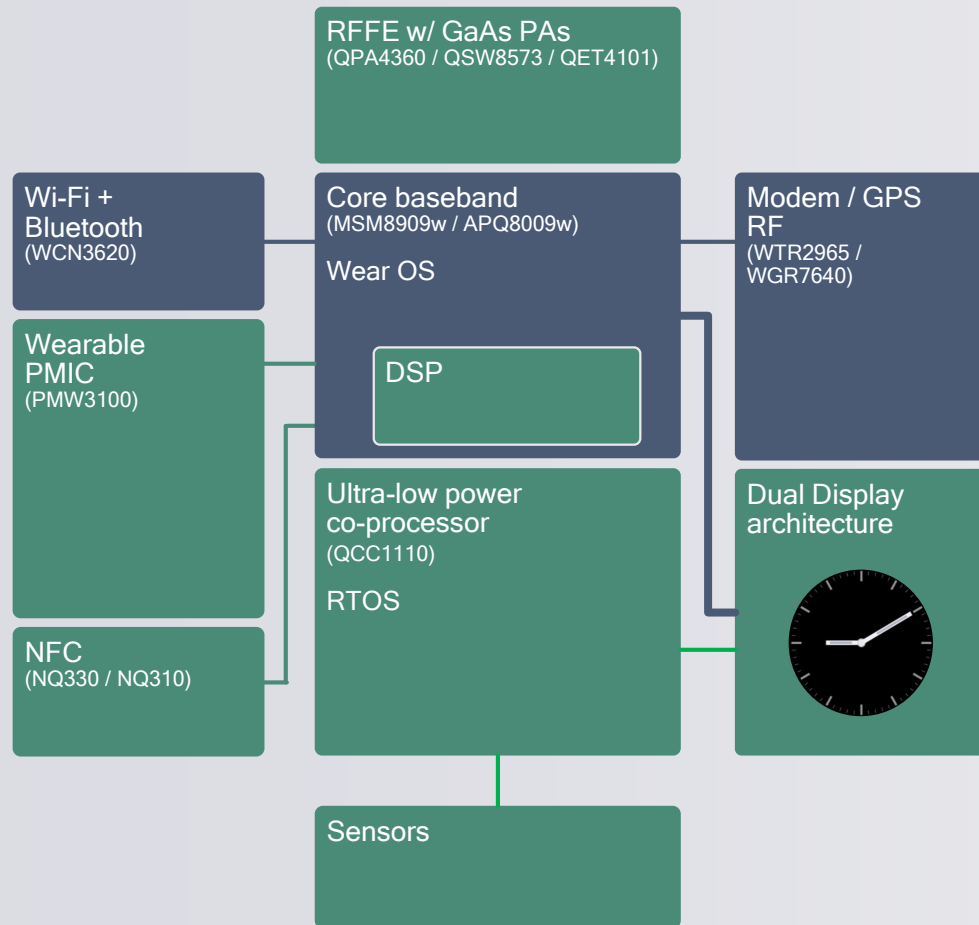
New ultra-low power co-processor
Designed from the ground up to re-imagine smartwatch experiences

New hierarchical system architecture
With optimal partitioning across A7, DSP, and QCC1110

New dual-display architecture
AP via MIPI, QCC1110 via SPI

Open Sensor framework
Next-gen sensor processing with open execution environment in the DSP and co-processor, enabling higher differentiation and faster TTM

New wearable PMIC
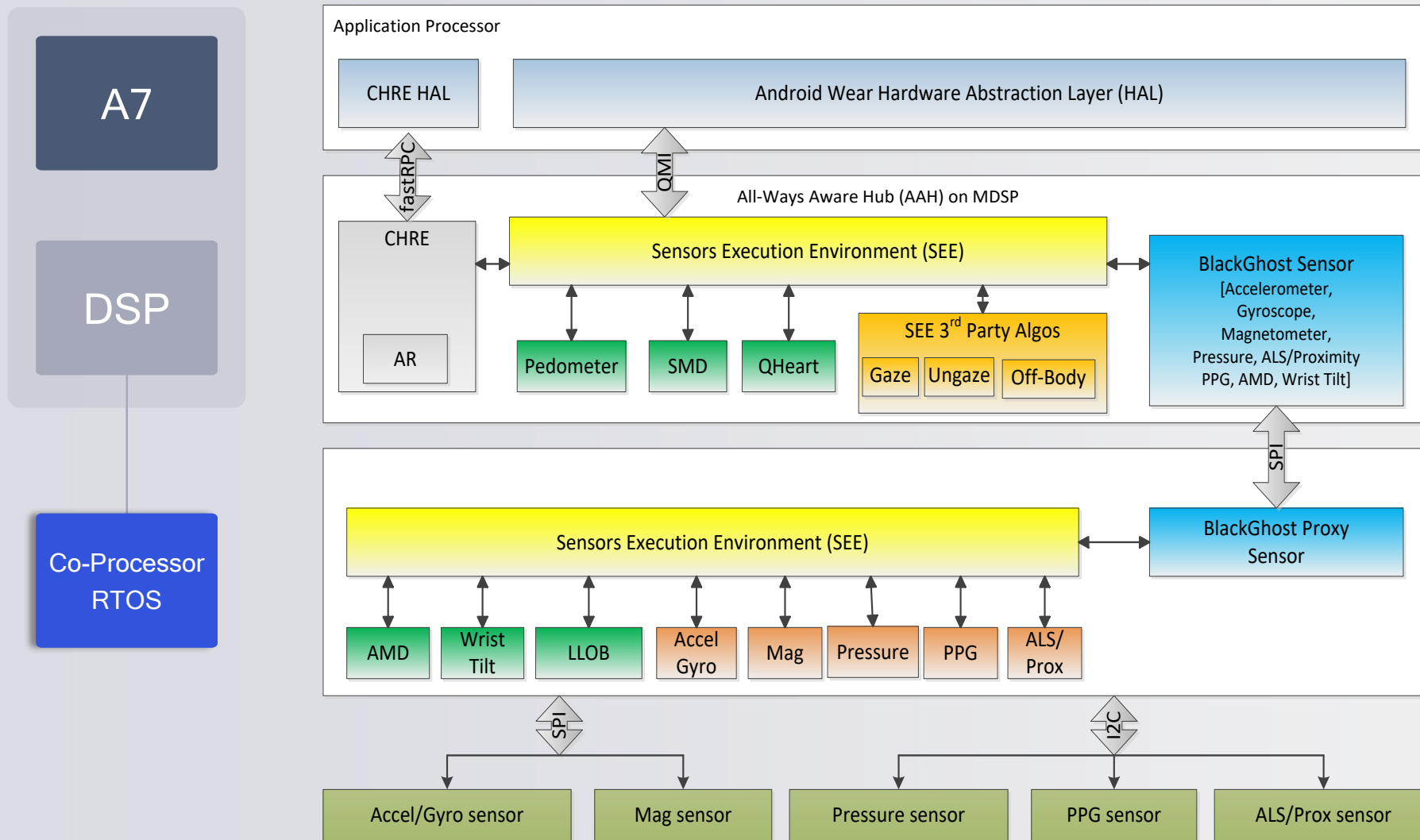for lower power operation while reducing size and increasing integration

New RFFE w/ Gallium Arsenide PAs
Optimized for power efficiency and wearable form factors

New NFC chips
Support for smaller antenna design and higher reader interoperability

Snapdragon Wear 3100: Next Generation Smartwatch Platform

New Sensor Framework in DSP and Co-Processor

Fashion Meets Smarts

Enhanced ambient mode

Today

Snapdragon Wear 3100

A7

DSP

Co-Processor
RTOS

Smooth second hand, multi-color,
live complications, adaptive brightness, full touch

Available at launch

Sports Meets Smarts

Dedicated sports experiences

Today

Heart rate
145
32.8 km/h
00:45 17

Up to

3
Hours
GPS + HR

Snapdragon Wear 3100

A7

DSP

Co-Processor RTOS

Up to

Hours
GPS + HR*

Range of Experiences: Run, Swim, Hike, Bike, …

Available via future release

*Qualcomm Internal Calculations. Based on typical sports watch 450mAh battery capacity.

Kid Watch Segment

Announced 6/26/18.

Qualcomm snapdragon wear
2500 platform

First Dedicated Kid Watch platform
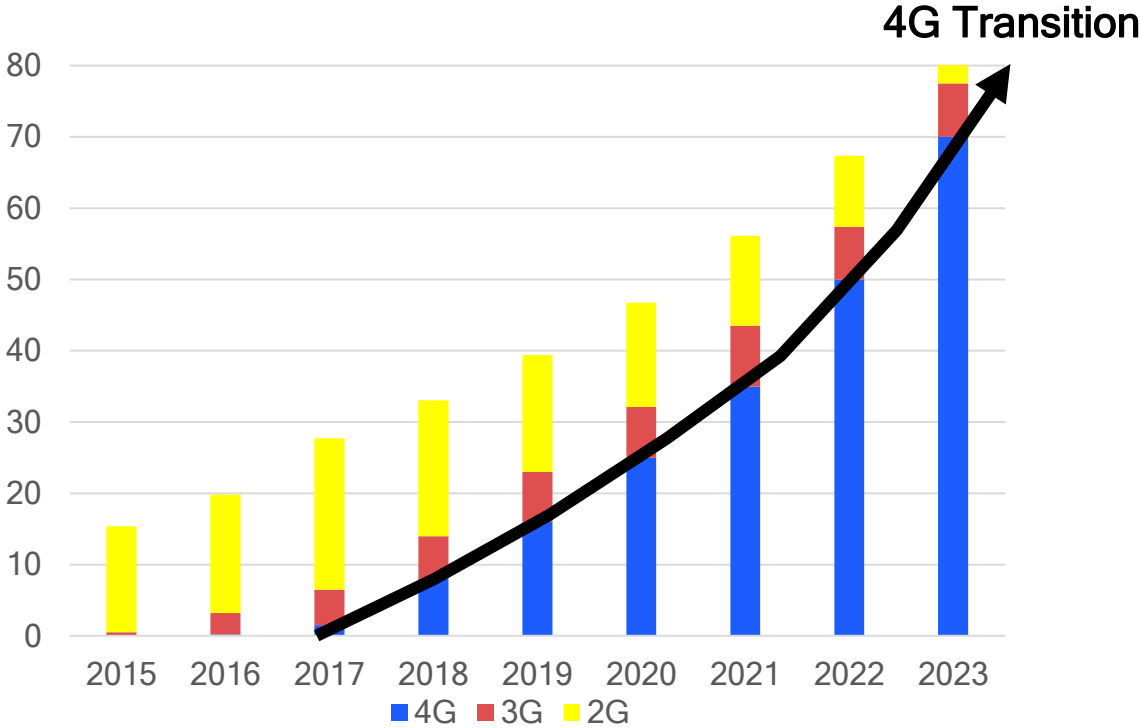designed to accelerate 4G based use cases

Qualcomm Kid Wearables

Kid Trackers

4 YEARS

6 YEARS

10 YEARS

12 YEARS

18 YEARS

Kid Watches

Smartphone
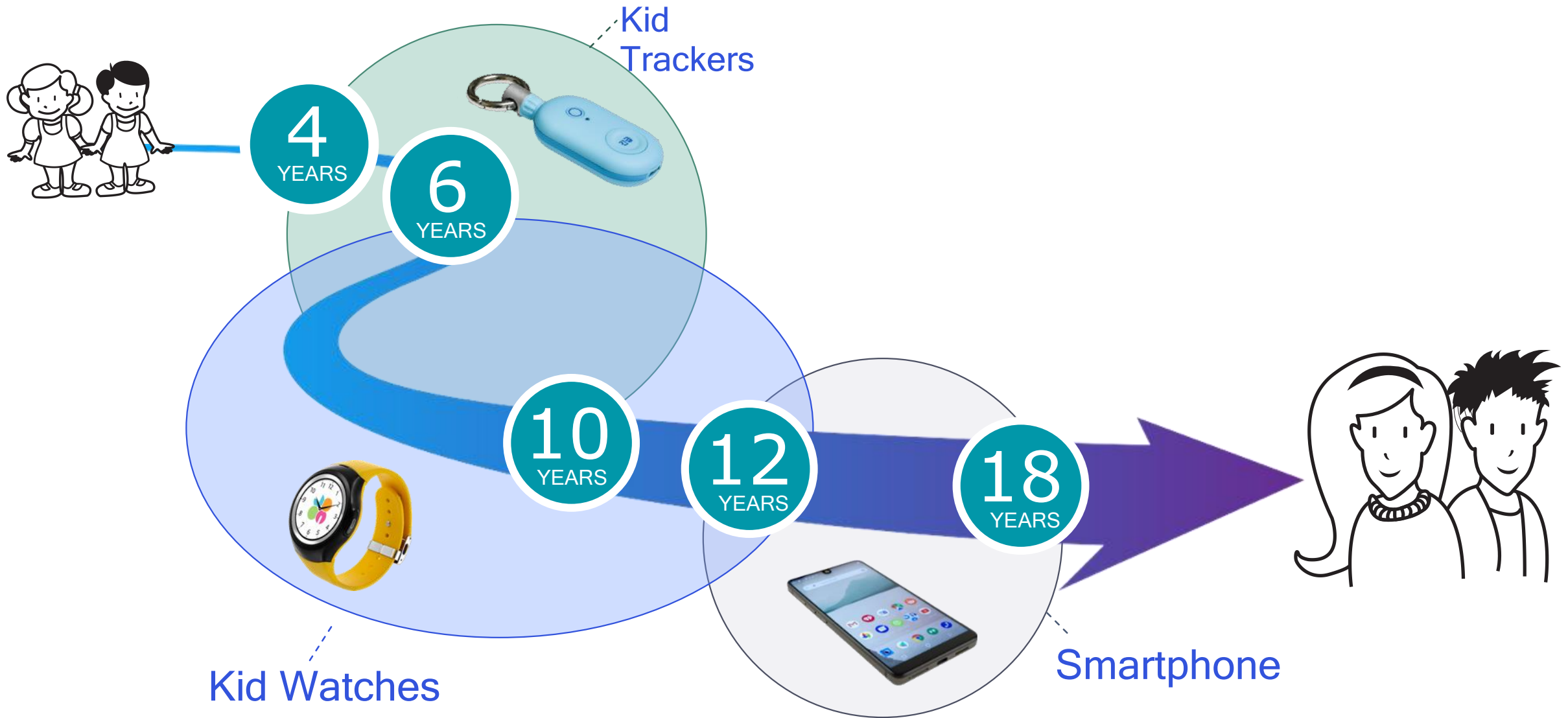
Kid Wearables: Transitioning to 4G

1 Billion 4-10 Year Kid Population Around The World

Region	Population
Africa	237
ROW	237
India	183
China	120
Latin America	78
Indonesia	35
US	30
W. Europe	14
Japan	8
UK	6
Korea	
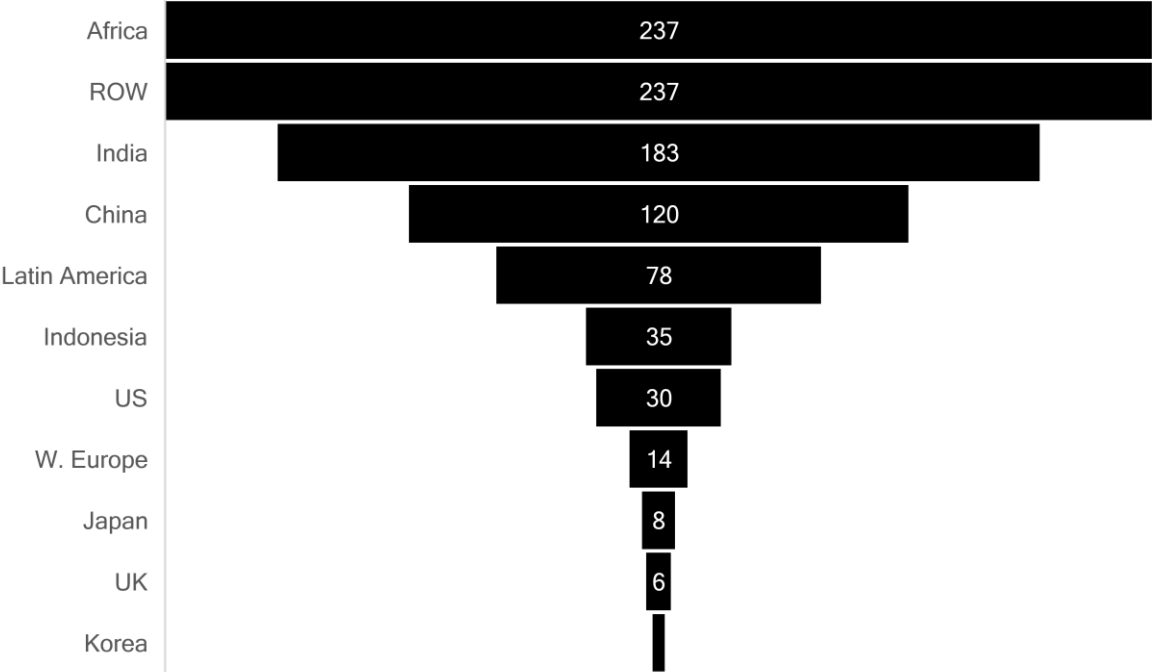
Kid Watch Segment Transitioning to 4G

4G Transition

Legend: ■ 4G ■ 3G ■ 2G

(Years: 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023)

**80+ Mu Total Market, 4G Accelerating to 85+% by 2023
Significant Upside Across India, Latin America, Indonesia**

Kid Wearables: Use Case Evolution

23
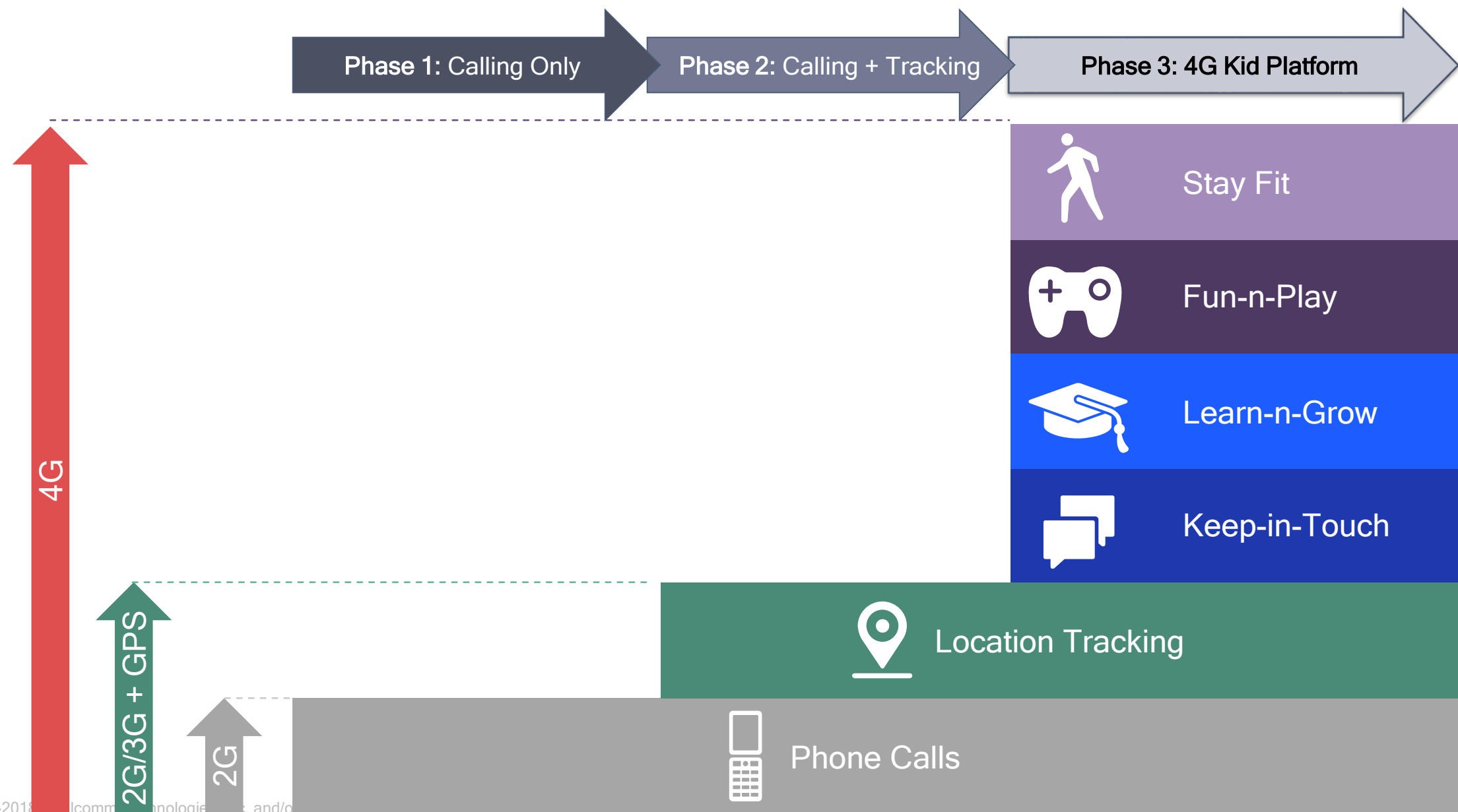
Accelerating 4G Kid Watches

QSC6270 / 6155

docomo
KDDI
LG
infomark

Qualcomm snapdragon wear
2100 platform

kido
TCL
360
360
LG U+

infomark
anda
小天才
小天才
小天才

MODA Inc.
中国移动 China Mobile
LINKTOP
vodafone

Qualcomm snapdragon wear
2500 platform

HUAWEI

Strong Customer Pipeline In Place

4 OEMs | 8 SKUs
5 Operators | 3 Countries

12 OEMs | 15 SKUs
13 Operators | 12 Countries

Going Global with Range of Brands

Qualcomm Snapdragon Wear is a product of Qualcomm Technologies, Inc. and/or its subsidiaries.

24

4G Kid Watches Going Global !!!

Devices based on Snapdragon Wear shipping at 15 operators in 14 countries

USA

COMING SOON

Germany, Italy,
Netherlands,
UK, Greece

Turkey

Japan

Spain

Mexico

Peru

South Africa

China

South Korea
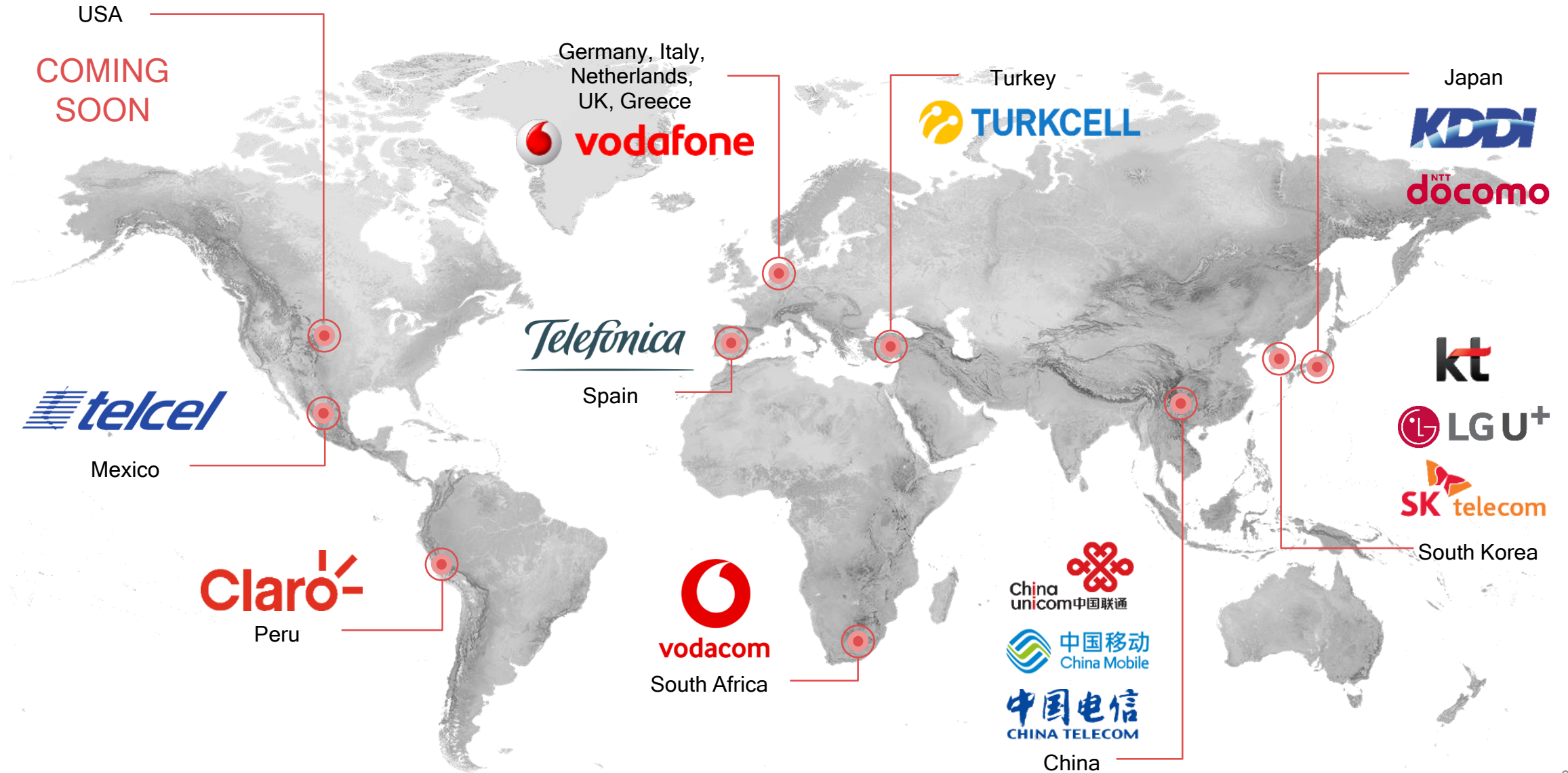
Strategic Collaboration with TDK
Expanding Algorithms Choices for Fun-n-Play

Description
Push arm down
Push arm up
Shake (2 half twists of the wrist)
Multiple arm shake front-back
Inverse B2S (Put Arm down for screen off)

Gestures (row label spanning the table rows)

Announced June 2018

Strategic Collaboration with TDK (Invensense)
- Optimized algorithms to enable new use cases
- TDK to provide algos running on A7
- TDK open to engaging with customers for OEM-customized algo solutions

Benefits to Customers
- More differentiated options for customers
- Enabling an out-of-the-box-experience via TDK-developed APK

Smart
Tracker
Segment

Qualcomm
snapdragon wear
1100 and 1200 platforms

Cat 4/1 and Cat M1/NB-IOT Platforms
optimized for smart tracking

Pet Ownership High Across Regions
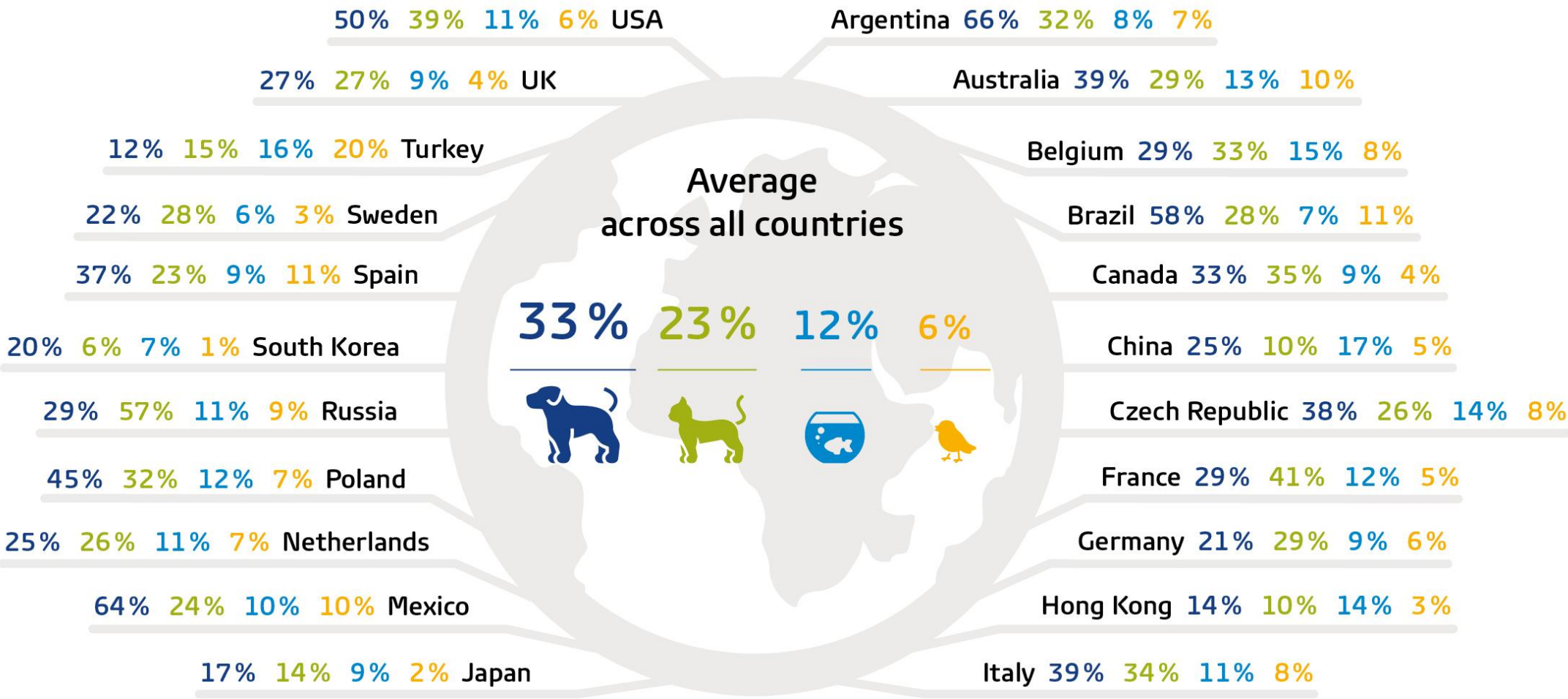
	Dog	Cat	Fish	Bird
USA	50%	39%	11%	6%
UK	27%	27%	9%	4%
Turkey	12%	15%	16%	20%
Sweden	22%	28%	6%	3%
Spain	37%	23%	9%	11%
South Korea	20%	6%	7%	1%
Russia	29%	57%	11%	9%
Poland	45%	32%	12%	7%
Netherlands	25%	26%	11%	7%
Mexico	64%	24%	10%	10%
Japan	17%	14%	9%	2%

Average across all countries

Dog	Cat	Fish	Bird
33%	23%	12%	6%

	Dog	Cat	Fish	Bird
Argentina	66%	32%	8%	7%
Australia	39%	29%	13%	10%
Belgium	29%	33%	15%	8%
Brazil	58%	28%	7%	11%
Canada	33%	35%	9%	4%
China	25%	10%	17%	5%
Czech Republic	38%	26%	14%	8%
France	29%	41%	12%	5%
Germany	21%	29%	9%	6%
Hong Kong	14%	10%	14%	3%
Italy	39%	34%	11%	8%

Pet Trends

4.5M pets lost each year, 1 pet lost every second

2M dogs killed on roads per year

95% of owners consider their pets to be part of the family

$70B Spent on Pets in 2017

If HH Income >$70K, >$1K Spent on Pets

Pet Tracking Use Cases

Value Proposition

Safety	Activity	Behavior	Health
• Indoor & Outdoor Location • Geo-fence • Virtual fence • Monitor environment temp	• Count steps • Measure active time • Track sleep • Heat map logging	• Re-enforce good behavior • Bark detection & training • Discourage anti-social behavior	• Track heart rate • Monitor respiration • Measure temp • Detect abnormal posture and behavior • Vaccination reminders

Pet Tracking Segmentation

Premier Tier
4G Pet Tracker

Health: Vital Signs Monitoring

High-End
4G Pet Tracker

Activity & Behaviour

Multi-purpose
Tracker

Location: Safety & Security

Behavioural Training

ID

Step Counter

4G
3G
2G
RF
RFID
USB

$50 $100 $200
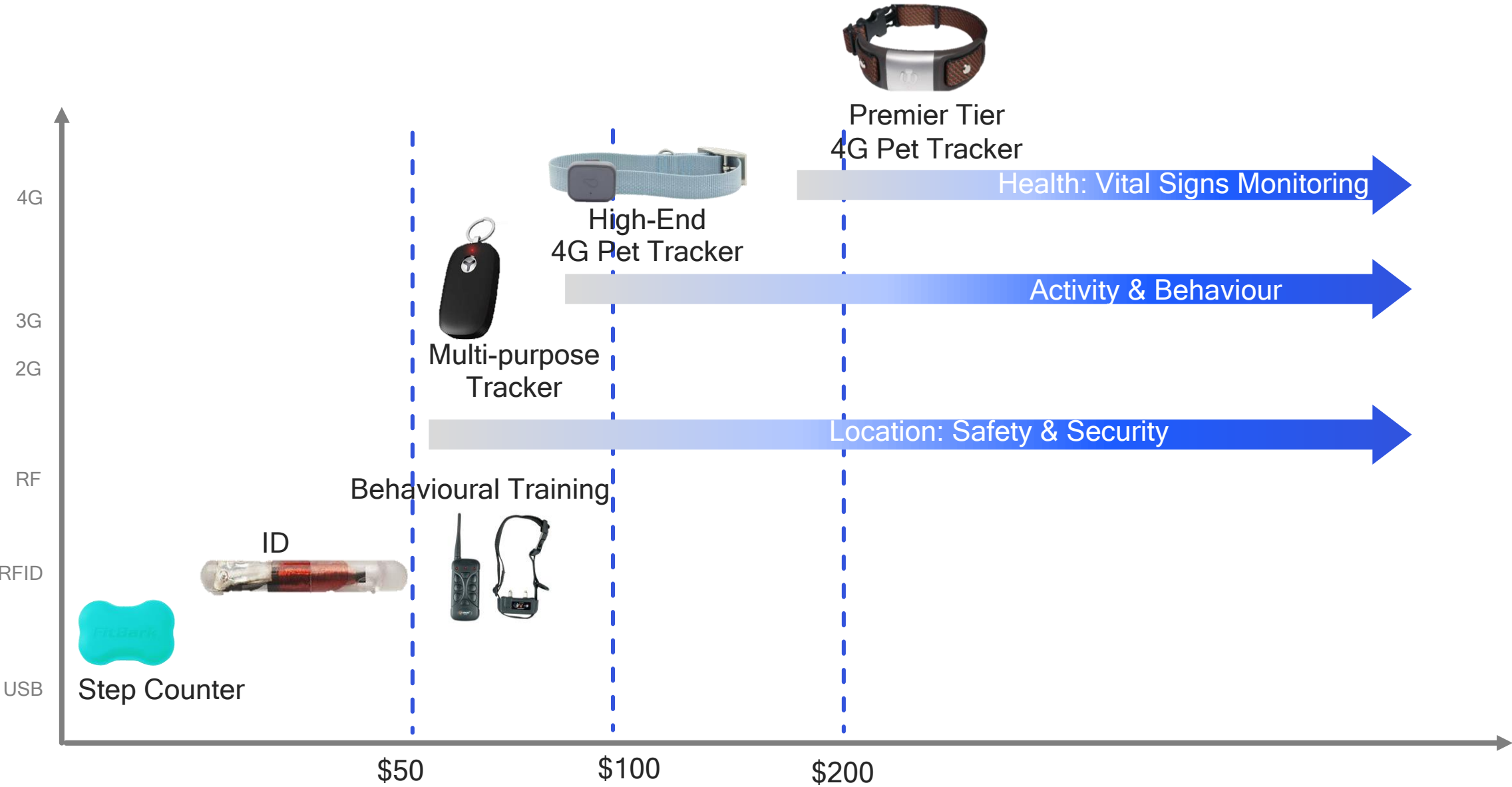
Example Qualcomm Based Trackers

Wearable Companion Segment

Qualcomm snapdragon wear
2100 and 2500 platforms

4G + Android based platforms
optimized for wearable companions
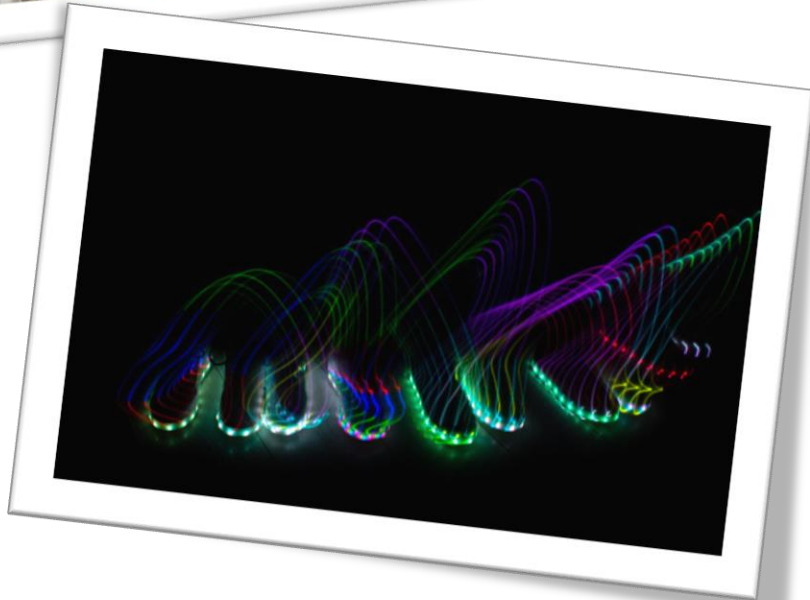
Range of Opportunities

Range of Opportunities

Light Phone 2

Beautiful hardware + Non-addictive OS/tools

Eink (e-paper) touch display
4G connectivity
15 days stand-by
Esential Tools. (i.e. ride-sharing)

10:06

The Light Phone is built to all federal and
carrier level specifications and regulations.
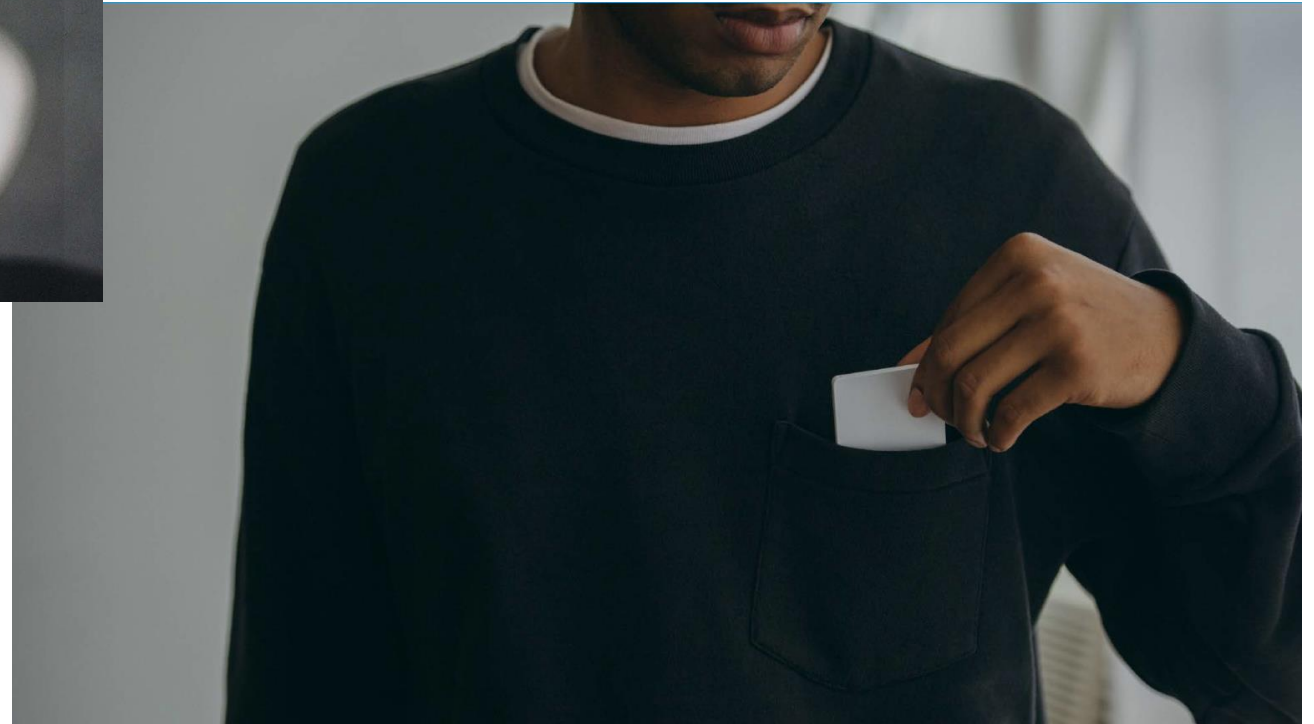
Range of Opportunities

Streams music from range of services

Hands-free Voice calling

Your Voice Assistant (Alexa, Hey Google) to go

Your wireless modem for tethered wearables

Your fitness companion

Your smart home hub

Sensor Opportunities

Qualcomm Sensor Approach
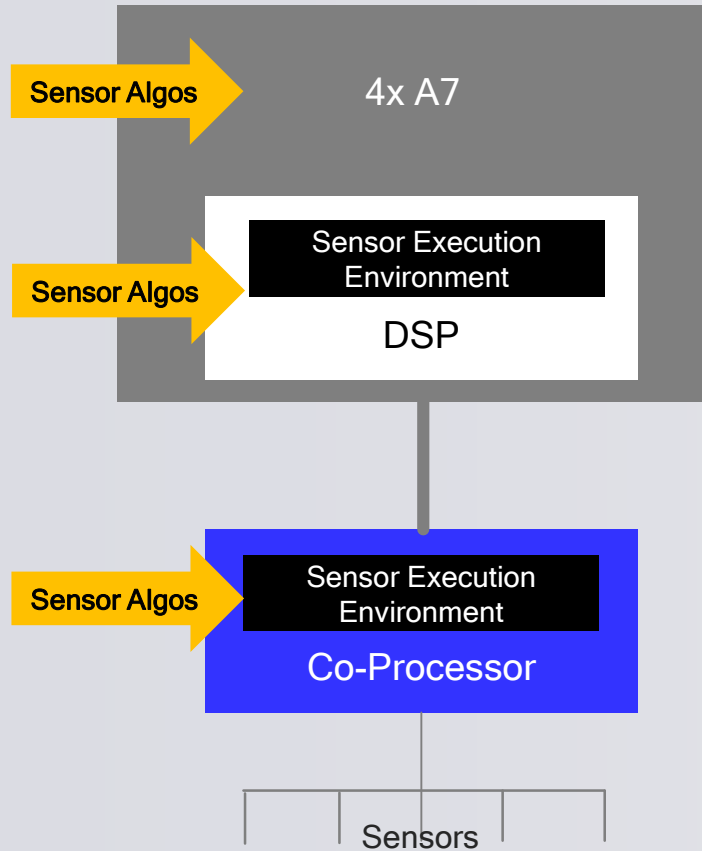
Qualcomm Sensor Approach

Sensor Fusion

- Accelerometer
- Gyroscope
- Magnetometer
- Optical Heart Rate
- Barometer
- **Low Power DSP**
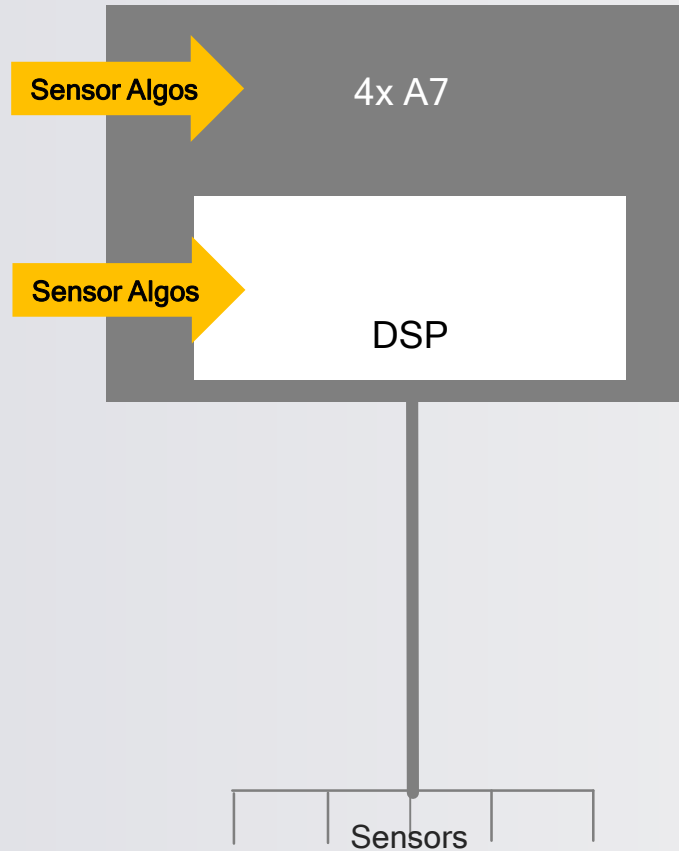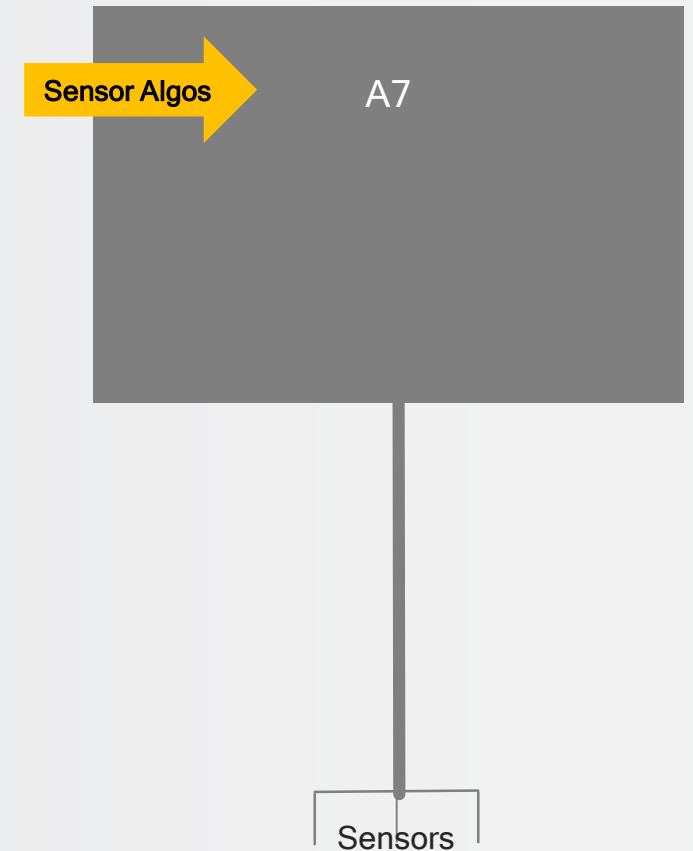
Fitness

- Pedometer
- Step detect
- Step count

Motion Estimation

- Tilt-to-wake
- Significant Motion
- Relative Motion
- Absolute Motion

Accurate Location

- 1 Hz low power location
- 9-DOF Sensor fusion
- GNSS + MEMS + WiFi

Heart Rate
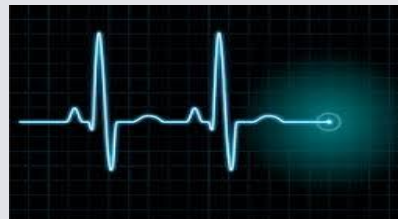
- Advanced OHR algorithms

Broad Ecosystem Support
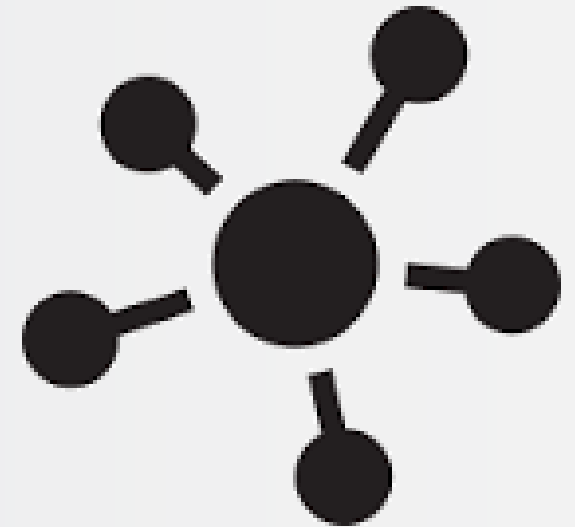
- Open development platform for 3rd Party Solution Providers
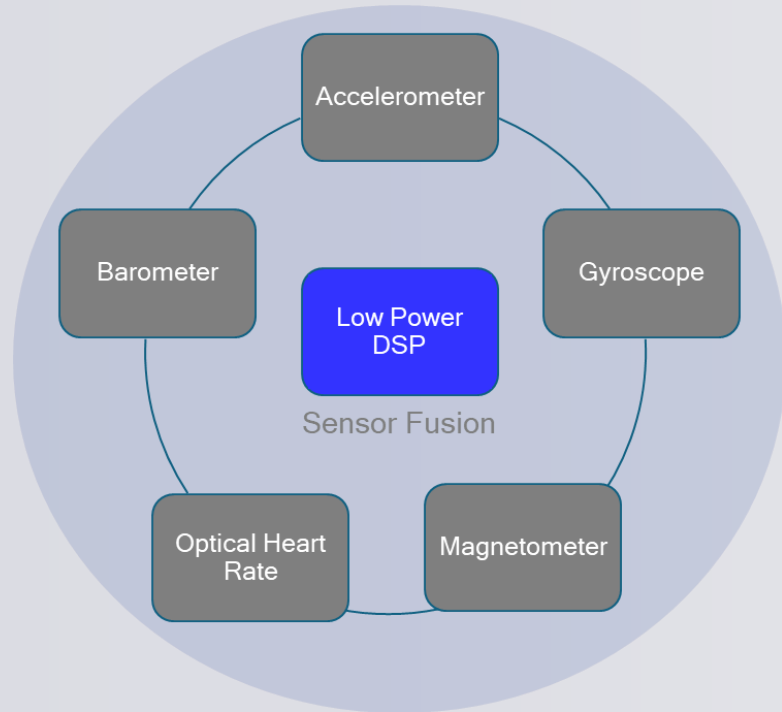
Sensor Ecosystem Opportunities

Humidity

RF Enhancement

Proximity

Compass

Temperature

Microphone

Pressure

Sensor assisted location

Ambient Light

Gyroscope

Touch

Accelerometer

Environment   **Navigation**   **Context**   **Health/Fitness**

Lower Power + Smaller Size + Higher Accuracy
New Sensor Types AND Optimized Sensor Algorithms Across Categories

Qualcomm
snapdragon wear

THANK YOU.

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Qualcomm

Thank you

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