



**NORDIC**  
SEMICONDUCTOR

Smarter Things

*An introduction to Nordic Semiconductor*

Ultra Low Power Wireless Solutions

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NTNU

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# About Nordic Semiconductor



- 667+ employees
- Founded 1983
- First 2.4GHz IC 2004
- First Bluetooth Low Energy IC in 2011
- R&D design centers
  - Norway (Short range)
  - Finland (Long range)
  - Poland
- Global sales & support offices
  - Across the entire US
  - Asia ( Hong Kong, Beijing, Shanghai, Shenzhen, Seoul, Taiwan and Tokyo)
  - Europe( UK, Netherlands, Poland)

# What do we make?

Embedded software



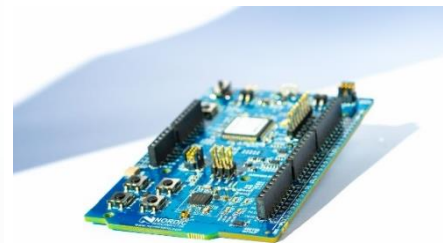
Wireless protocol stacks  
Software Development Kits(SDKs)

Integrated circuits



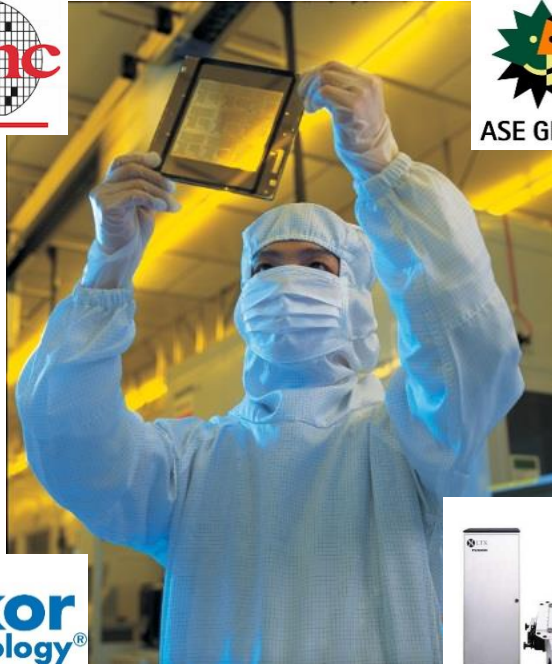
System-on-Chips (SoCs)  
System-in-Package(SiPs)  
Wireless connectivity ICs (Radios)

Development tools



Development kits  
Software tools  
Mobile Applications

# A «fabless» semiconductor company



Nordic Semiconductor outsources the IC manufacturing to a Semiconductor foundry

- Taiwan Semiconductor Manufacturing Company (TSMC)

Testing and packaging of integrated circuits

- Amkor Technology (Philippines)
- ASE Group (Taiwan)

Sales and distribution

- Nordic only sells ICs through distributors.
- Logistic handled by stocking distributors



# Powering an incredible range of products

Wearables



Enterprise  
Automation



PC/Phone/Tablet HID



Smart Home



Gaming



Beacons



Remote Controls



Automotive



Healthcare/Medical



Toys



Payment/ID



Proximity Tags



Logistics/Transport

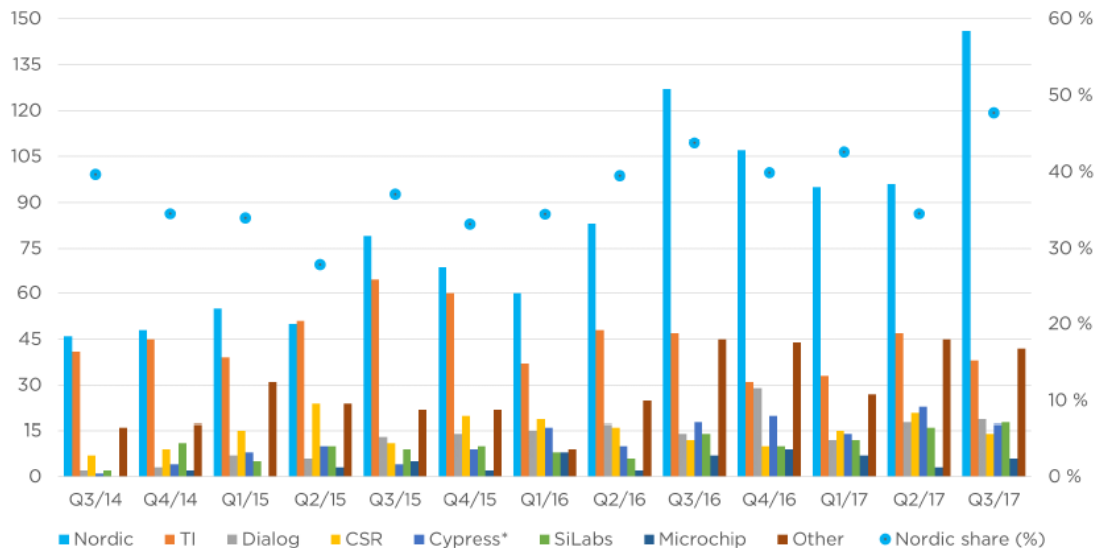


Industrial  
Automation



# Market Share in Bluetooth Low Energy

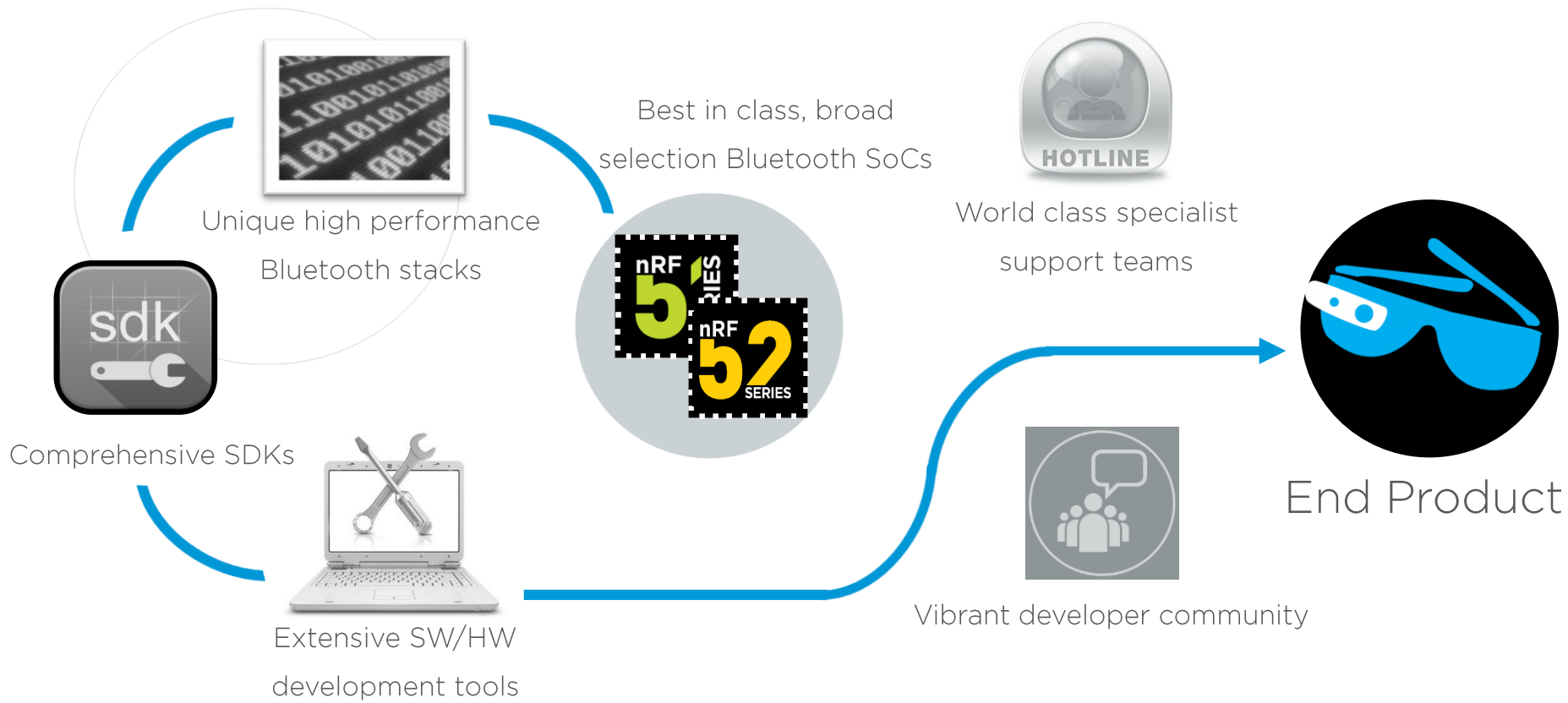
Bluetooth low energy end-product certifications\*



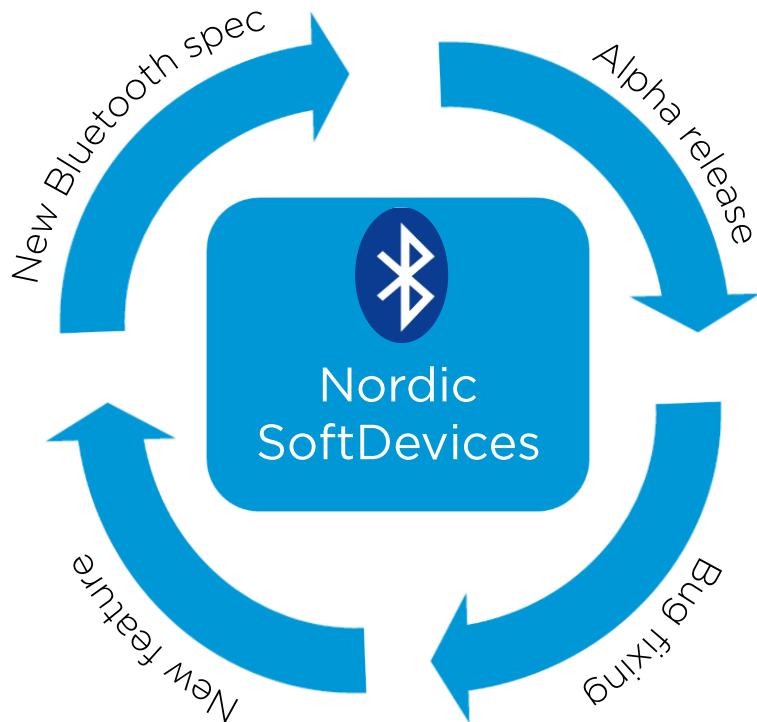
\*Source: DNB Markets

- All Bluetooth products must be listed with the Bluetooth Special Interest Group(SIG).
- RF products must also be certified by a tele-regulatory body like the FCC in the US.
- Based on this public information one can calculate the market share of the BLE market.
- Close to 50 % of all Bluetooth products certified in Q3/17 were using Nordic Semiconductor ICs.

# The Complete Bluetooth® low energy solution



# Nordic Bluetooth Stacks

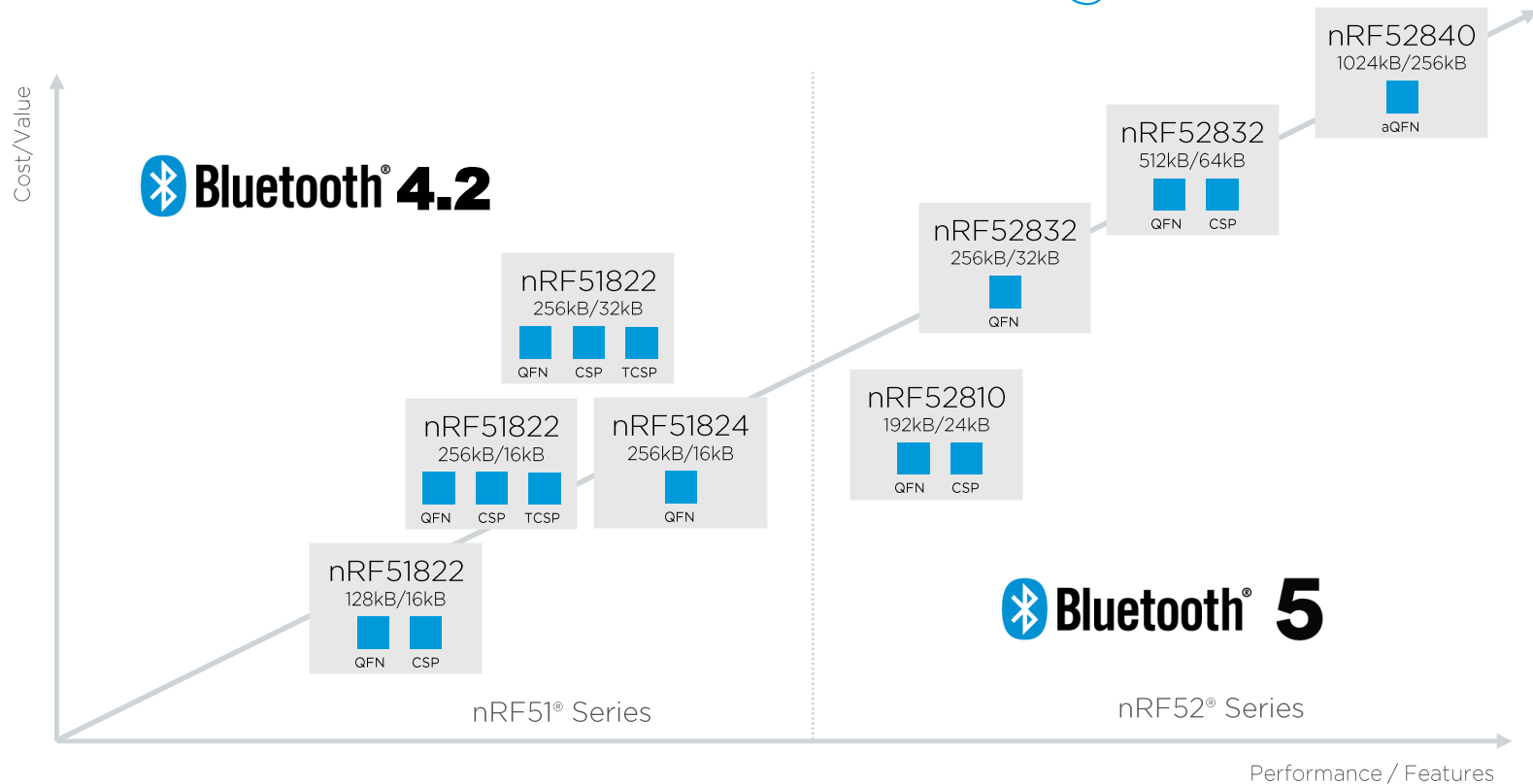


Nordic Bluetooth stacks developed entirely in-house

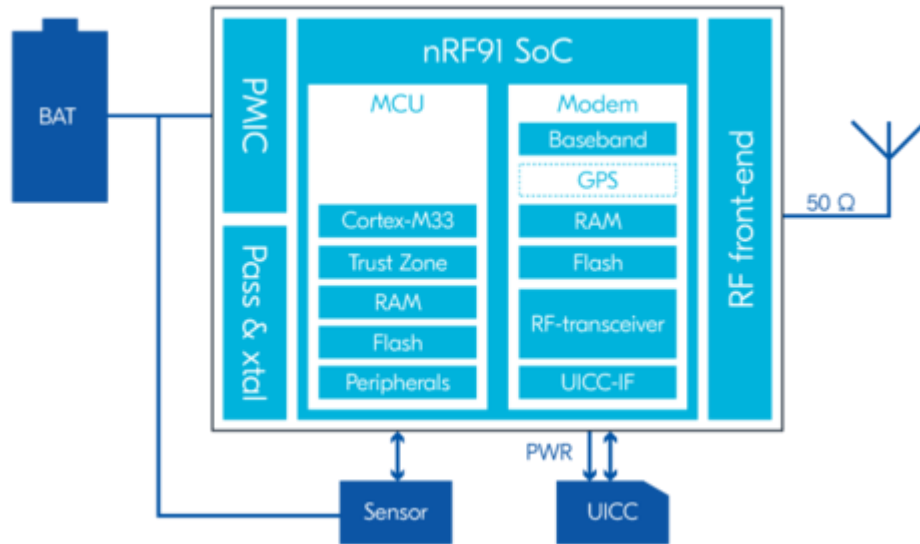
- Bluetooth 5 for nRF52 Series
- Bluetooth 4.2 for nRF51 Series
- Full control over development & improvements
- Best throughput performance in Bluetooth low energy
- Used as benchmark in Bluetooth interoperability tests



# The nRF5x Series – Short range



# The nRF91 Series – Long range



Nordic's LTE low-power cellular IoT solution

- Low power MCU with Integrated LTE-M and NB-IoT Modem
- Designed and optimized for cellular IoT applications
- Built-in GPS receiver for asset tracking



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# Course Agenda

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