

Consumer Tech with Globalscale Technologies and Atmosic Semiconductor

***New consumer products with energy
harvesting and ultra low power BLE***

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Overview

- **Company and Personal Background**
- **Introduction of the M2 module and M3 harvesting system**
- **Technical advancements and details with advanced features**
- **Energy Harvesting-PV Cells, Thermal, and Kinetic**
- **Applications in the IoT, Asset Tracking, and Medical applications**
- **Case Studies and design in examples**

Personal Background

- **Bachelor in Science, Mechanical Engineering
UC Davis College of Engineering**
- **Bachelor in Arts, History UC Davis College of
Letters & Science**
- **Masters in Business Administration UC Irvine
Paul Merage School of Management**
- **7 years in Engineering/Product Dev**
- **8 years in Sales & Marketing, General
Management**



Company Overview

- **Globalscale is an ODM based in Anaheim, CA with R&D and Manufacturing facilities in Taiwan and China**
- **Specializing in the IoT, Networking and Wireless space**
- **Founded in 2006 as a Contract Manufacturing company**
- **Began design services in 2008 with open source reference designs**
- **Linux and RTOS development**

Major Technical Partners



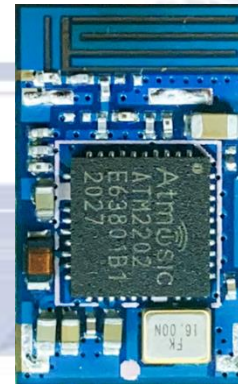
Bluetooth in consumer goods



GTI Atmosic Ultra-low power Bluetooth module

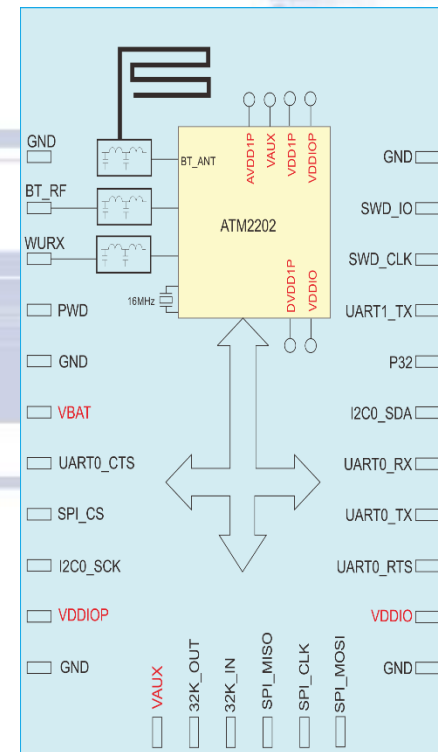
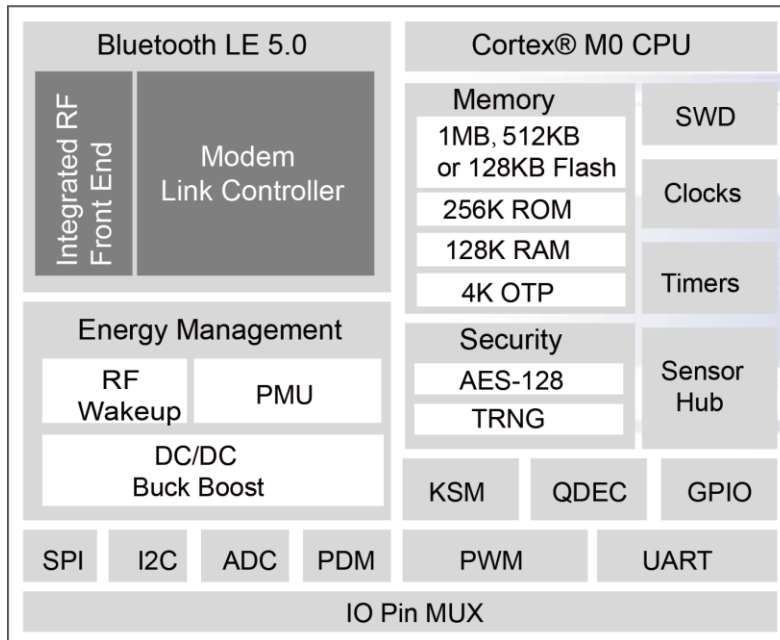
Arm Cortex M0 BLE 5.0 module

- Ultra low power BLE module for battery and battery less operation
- Small 8mmx15mm form factor
- Wake on receiver implementation
- 3x to 5x less power consumption than other low power BLE

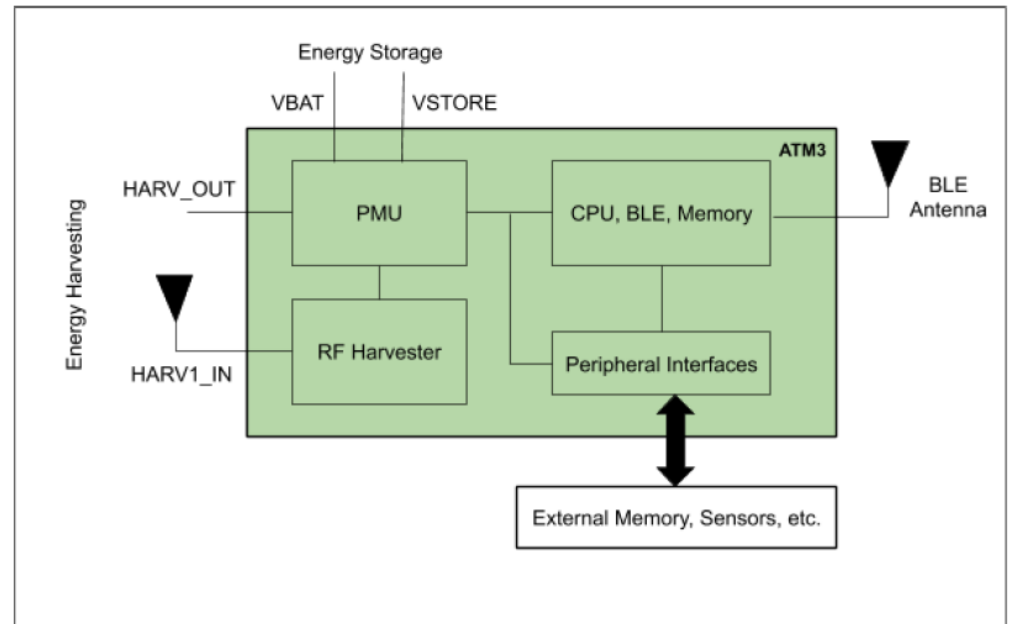


Block Diagrams

Hosted and Hostless Arm Cortex M0 BLE 5.0 module

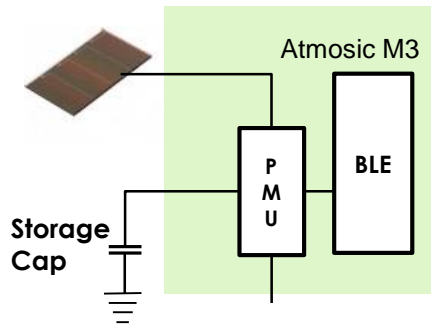


M3 module with energy harvesting



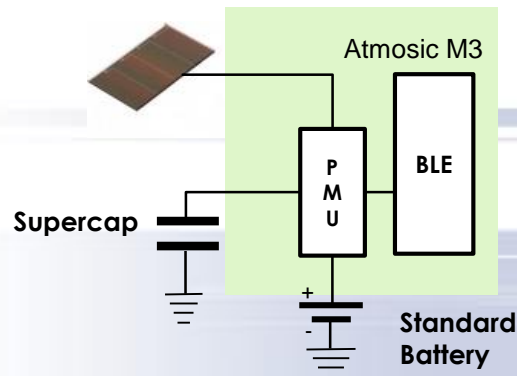
Energy Storage Configurations

Battery Free



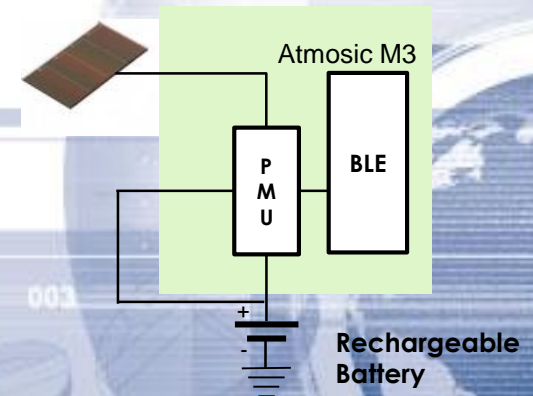
- Temporary storage of harvested energy in capacitor or super capacitor
- Good for environments with consistent light source
- Maintenance Free Solution

Extended Battery Life



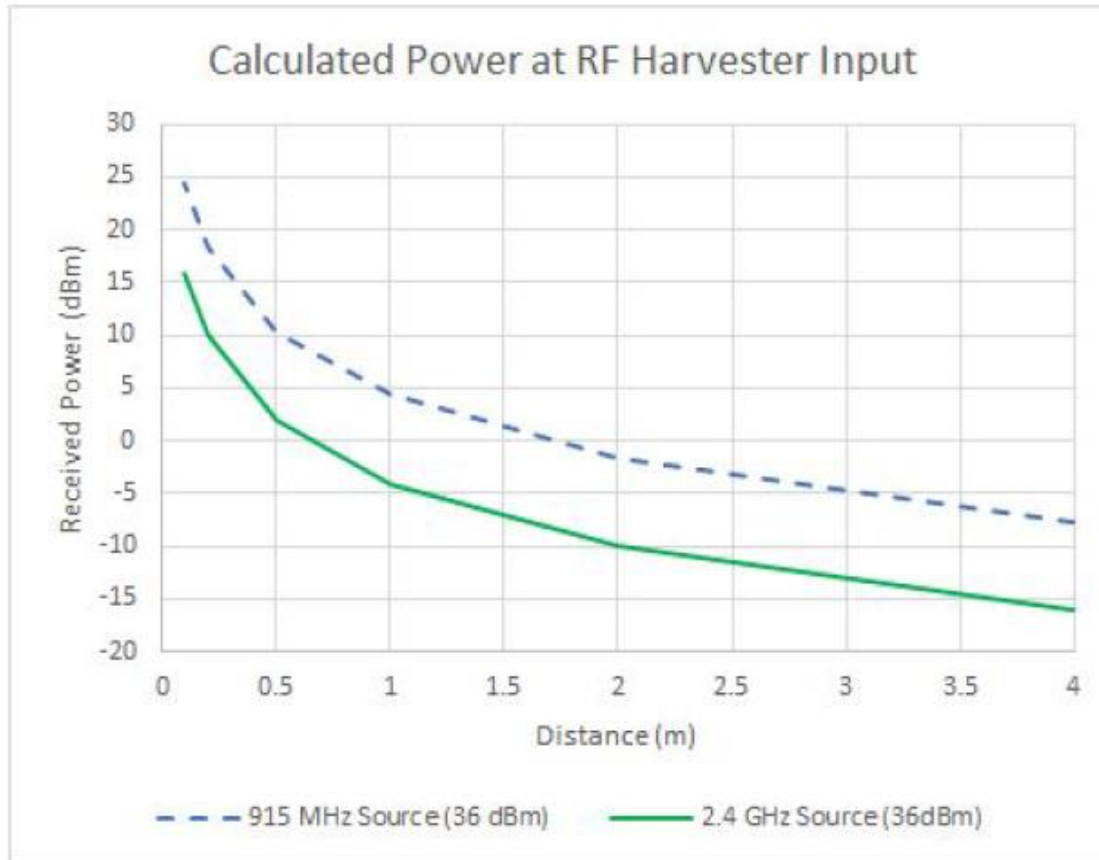
- Excess harvested energy stored and used before battery
- Battery used only when other energy sources are depleted
- Reduces service needs in intermittent energy environments

“Forever” Battery



- PMU manages battery charging from excess harvested energy
- For harvesting environments with significant but intermittent availability

RF Cell harvesting



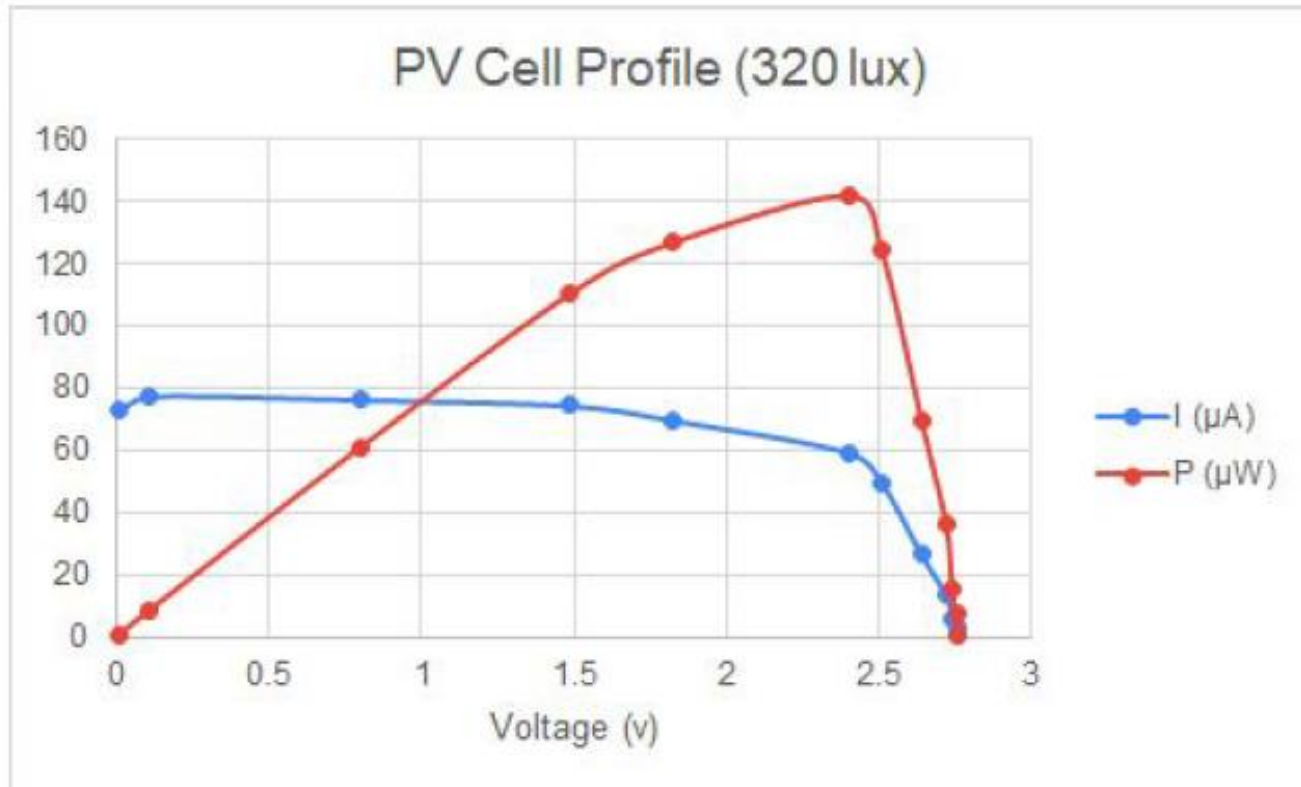
RF harvesting Applications

- **Asset tracking Tags**
- **Security badges**
- **HID such as Mice and Keyboard**

PV (photovoltaic) Cell harvesting

Lux	Conditions
50-200	Indoors, low-light
300-500	Indoors, typical
500-1000	Indoors, retail lighting
5K - 20K	Outdoors, cloudy
50K - 100K	Outdoors, sunny

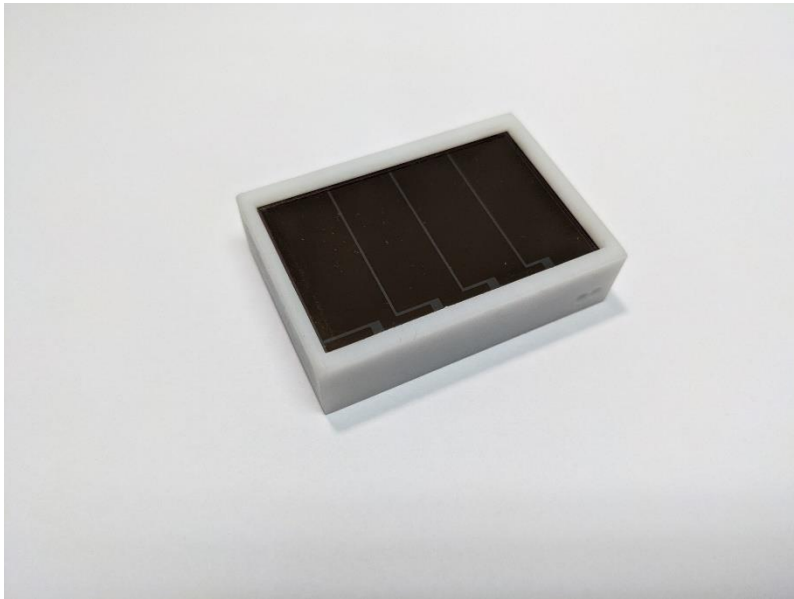
PV cell Cell harvesting



PV Cell Applications

- **Asset tracking**
- **Indoor and outdoor Sensor applications**
- **Weather station sensors**

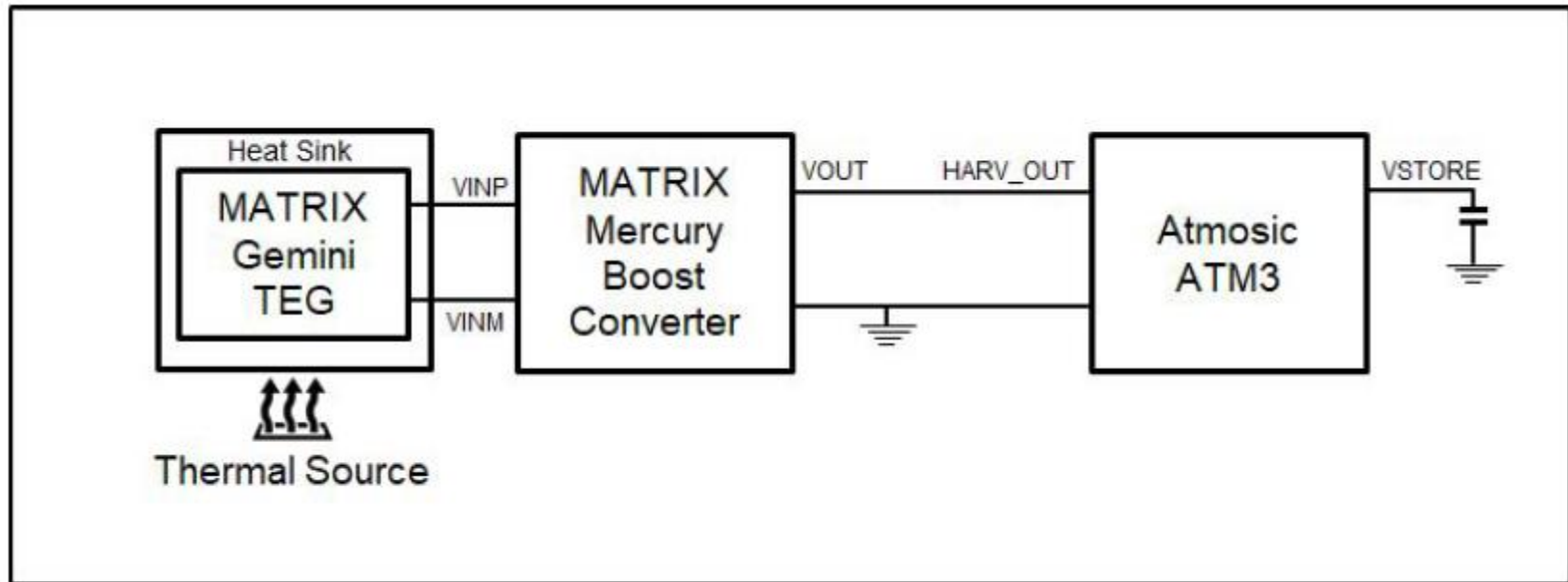
PV Beacons



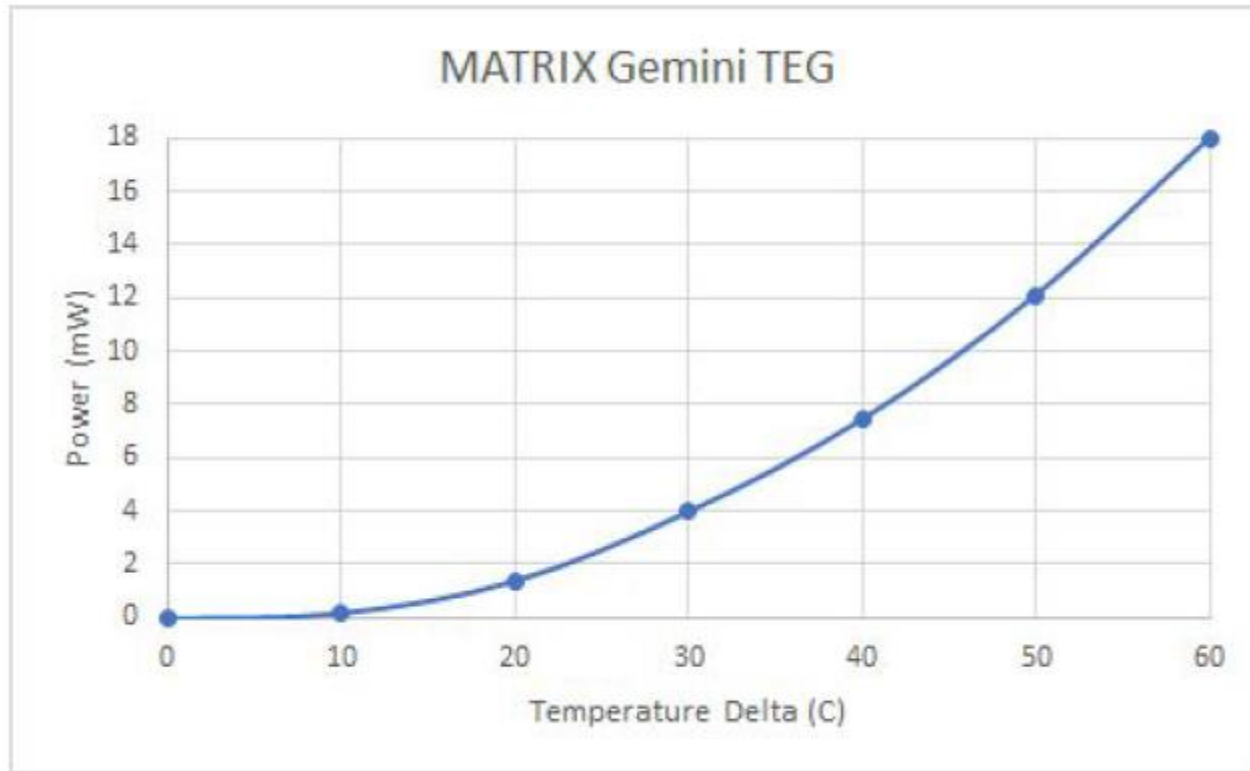
PV Beacons



Thermal harvesting



Thermal harvesting



Applications

- **Thermal harvesting for industrial environments**
- **Sensors inside of equipment**
- **Body sensors using human body heat**

Mechanical Harvesting

- Mechanical harvesting from depressing a switch or vibration



Mechanical Harvesting applications

- **Garage and access panels**
- **Remote controls**
- **Smart home appliances**

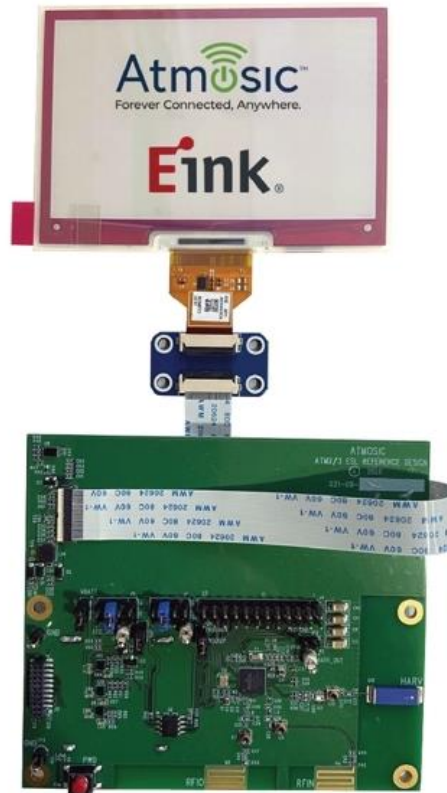
Impact on consumer technologies

- **Allow long lasting ‘forever battery products’**
- **Convenience and reduced maintenance and waste.**
- **Opens new opportunities in the IoT space**

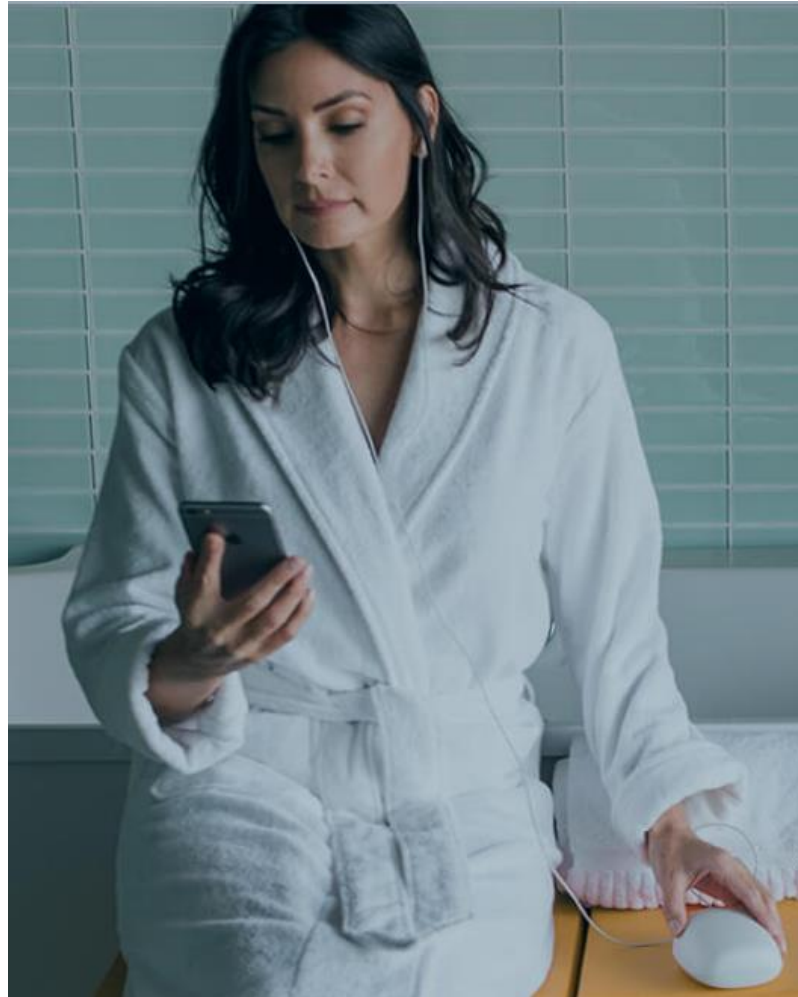
PV Beacons with sensors+blockchain based encryption



Eink Displays



Migraine relief with Nocira



Medical monitoring-Tracesafe contact tracing



Thank You!

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