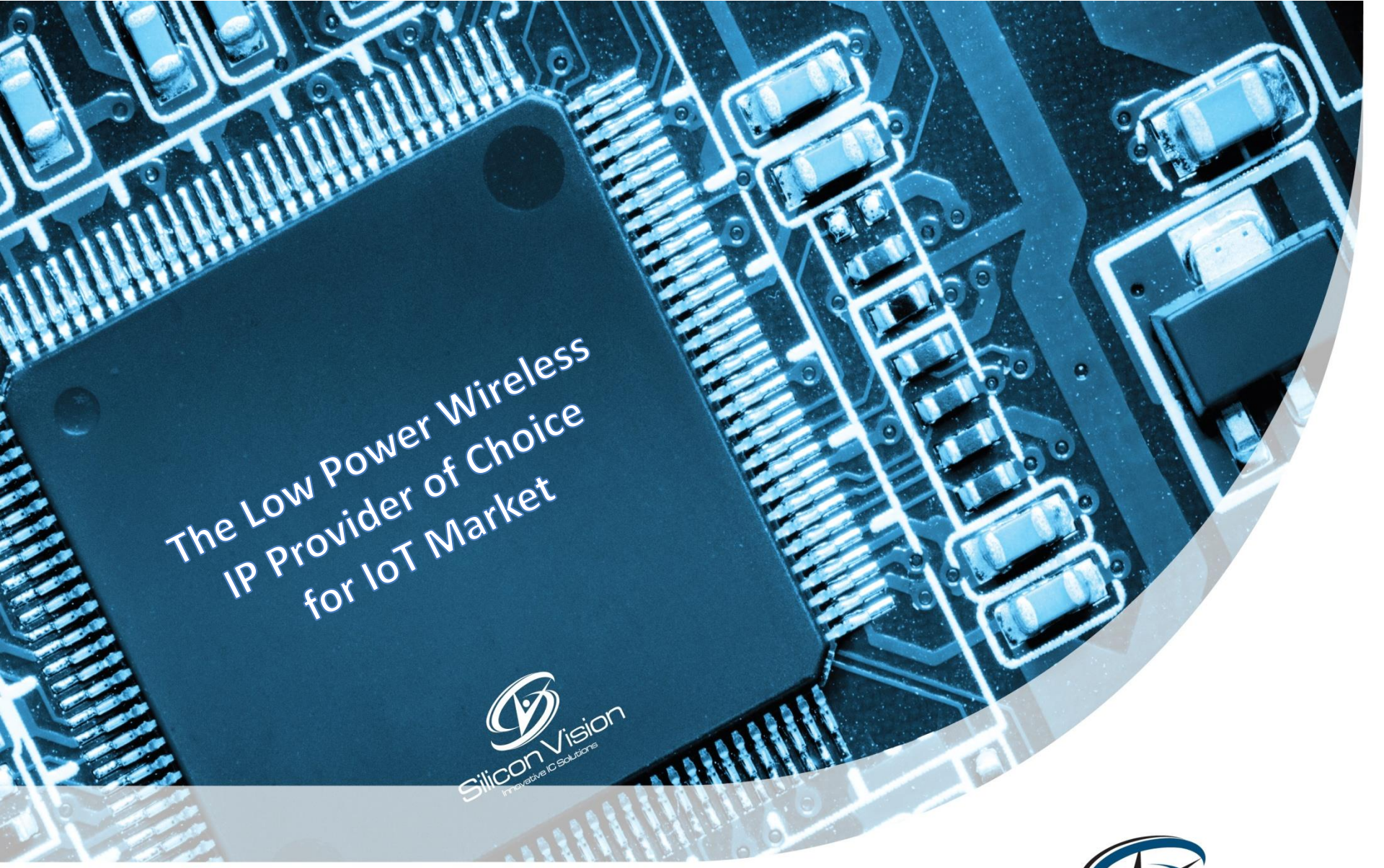


BLE & ZigBee RF IPs

June 2015

Silicon Vision
Innovative IC Solutions

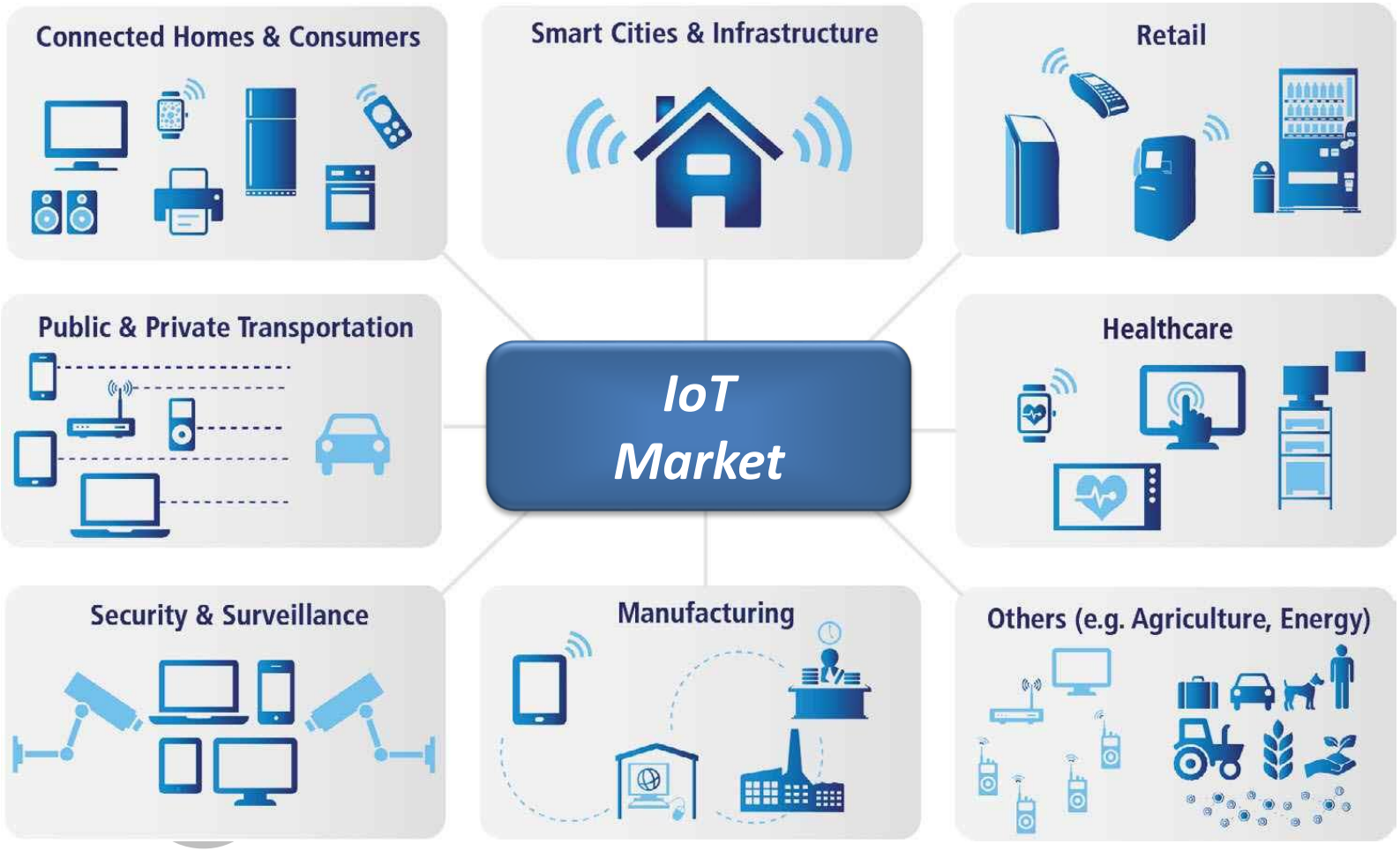
Silicon Vision Overview

- **Offices**
  - **HQ**: London, UK
    - **Design Center:** Cairo, Egypt – since 2006
    - **Design Center:** Istanbul, Turkey – since 2013
- **Total number of engineers 40+**
- **Over 400 years of cumulative design and management experience at companies such as National Semi, Philips Semiconductor, Ericson, Intel, Intel Mobile Communications, Centillium, LSi, MemsCap, Ensphere Solutions Inc., Discera, Innovics Wireless, NXP and Mentor Graphics.**
- **Silicon Vision focuses on the design of Low Power Wireless IP**
- ***Our vision is To be the Low Power Wireless IP provider of choice for IoT market***

What is IoT?

The Internet of Things is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment

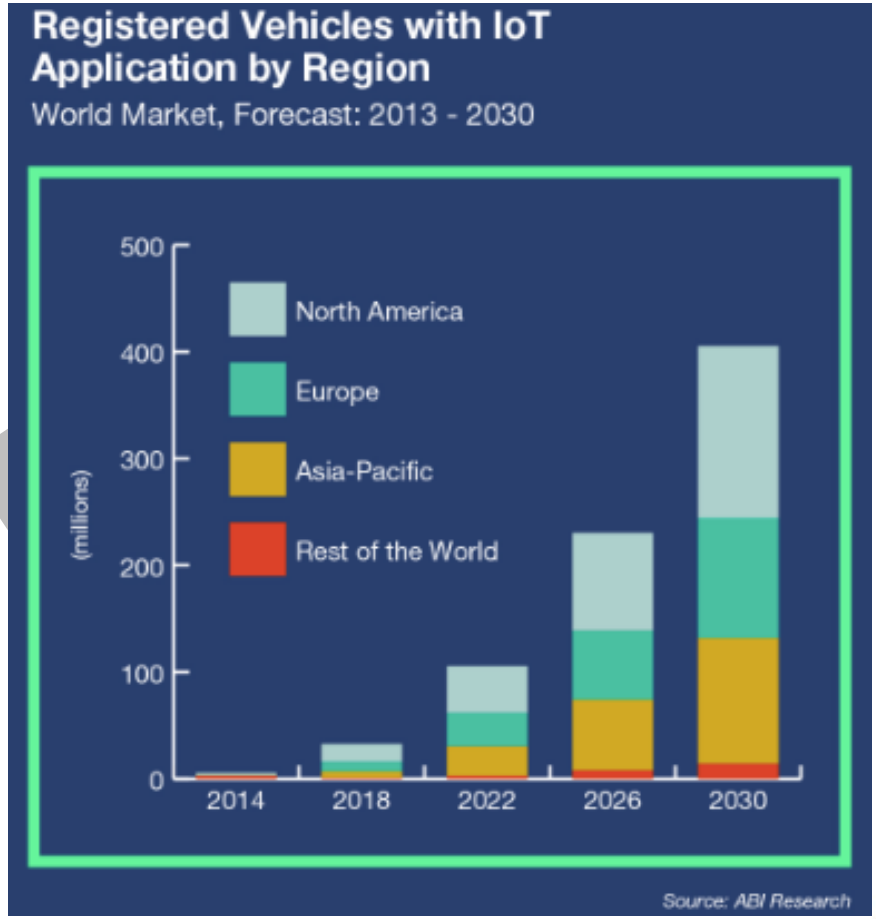
IoT Market Segments



Market Research

ABI Research

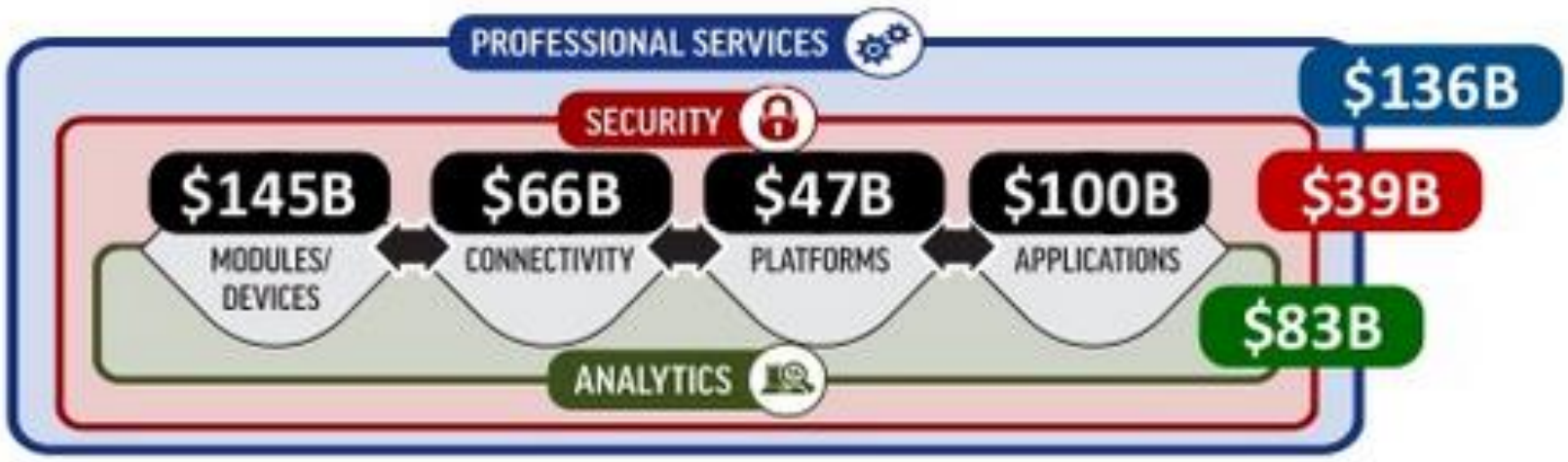
The installed base of active wireless connected devices will exceed ***16 billion in 2014***, about 20% more than in 2013. The number of devices will more than double from the current level, with ***40.9 billion*** forecasted for ***2020***. 75% of the growth between today and the end of the decade will come from non-hub devices: sensor nodes and accessories. The chart is from ABI's research on smart cars.



Market Research

- ***Navigant Research:*** The worldwide installed base of smart meters will grow from ***313 million*** in ***2013*** to nearly ***1.1 billion*** in ***2022***
- ***Morgan Stanley:*** Driverless cars will generate ***$1.3 trillion*** in annual savings in the United States, with over ***$5.6 trillions*** of savings worldwide
- ***Machina Research:*** Consumer Electronics M2M connections will top ***7 billion*** in ***2023***, generating ***$700 billion*** in annual revenue
- ***On World:*** By ***2020***, there will be over ***100 million*** Internet connected wireless light bulbs and lamps worldwide up from ***2.4 million*** in ***2013***
- ***Juniper Research:*** The wearables market will exceed ***$1.5 billion*** in ***2014***, double its value in 2013

APeJ IoT Revenues: 2014



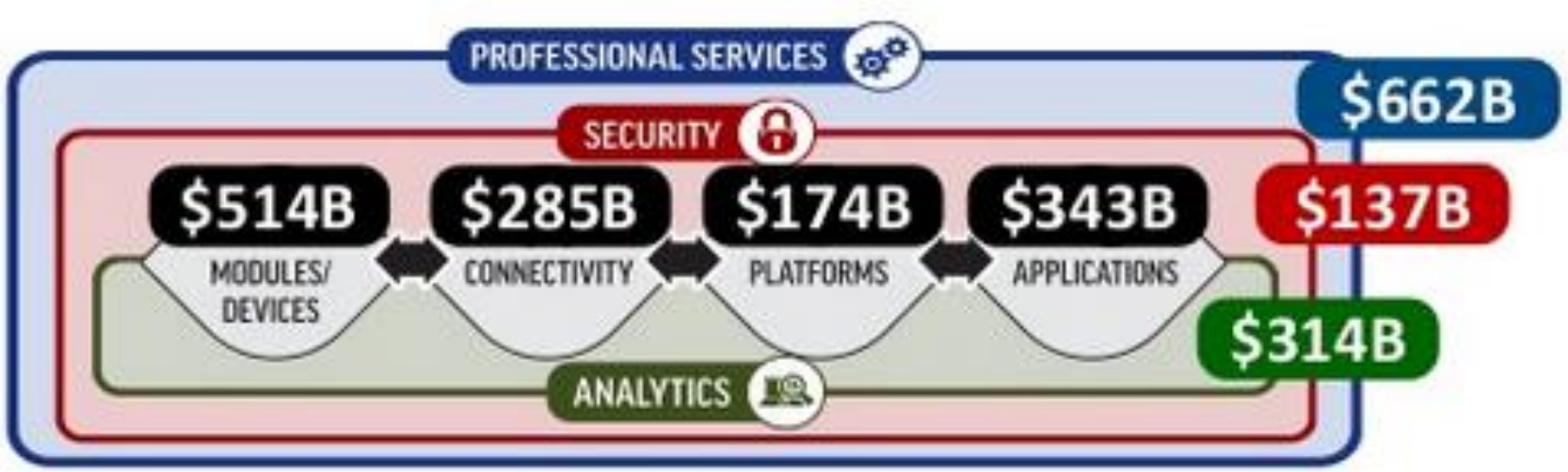
In **2014**, IoT will create a

$616 billion

market opportunity for APeJ

Source: IDC APeJ IoT Market Forecast, June 2014

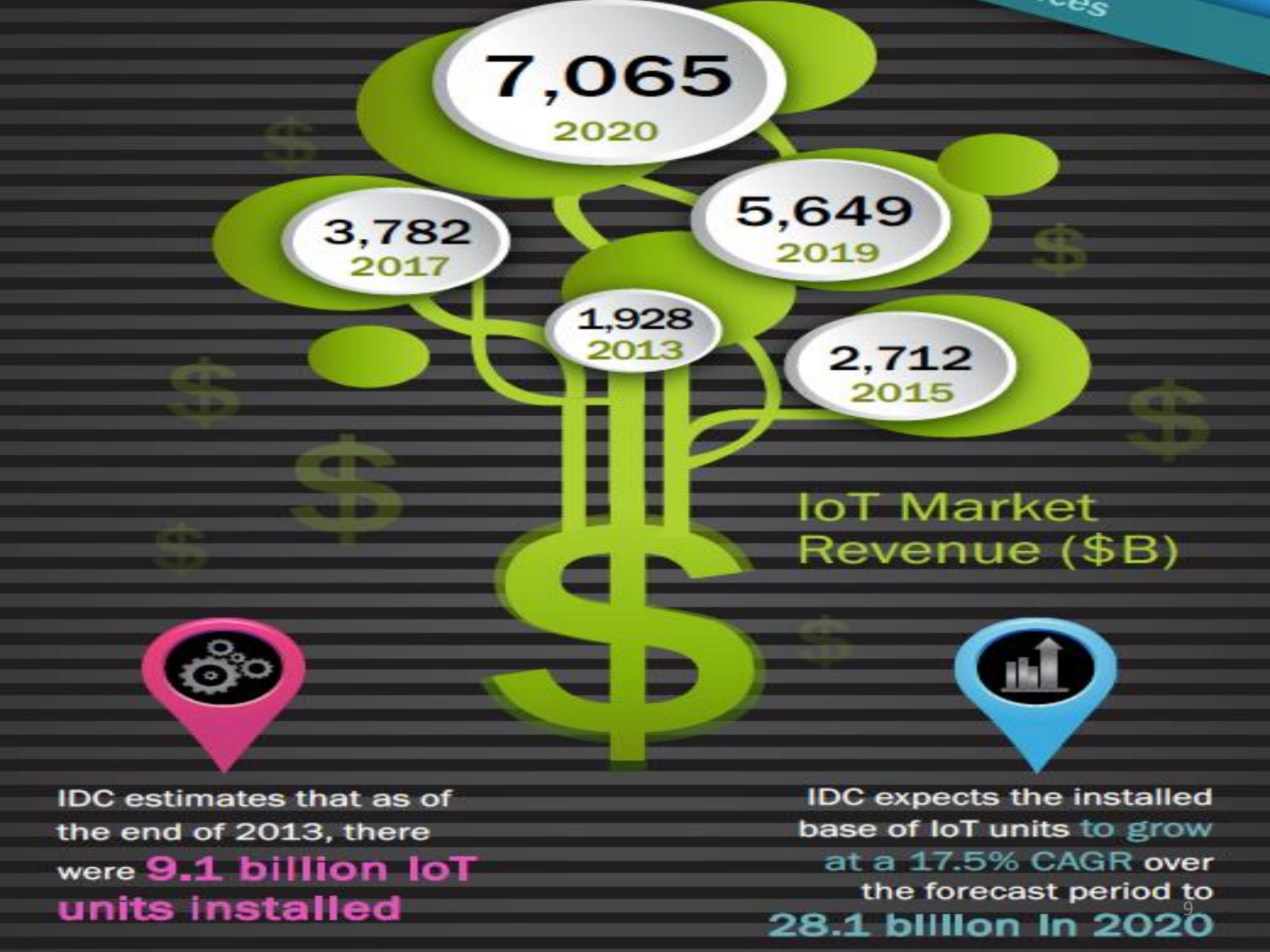
APeJ IoT Revenues: 2020



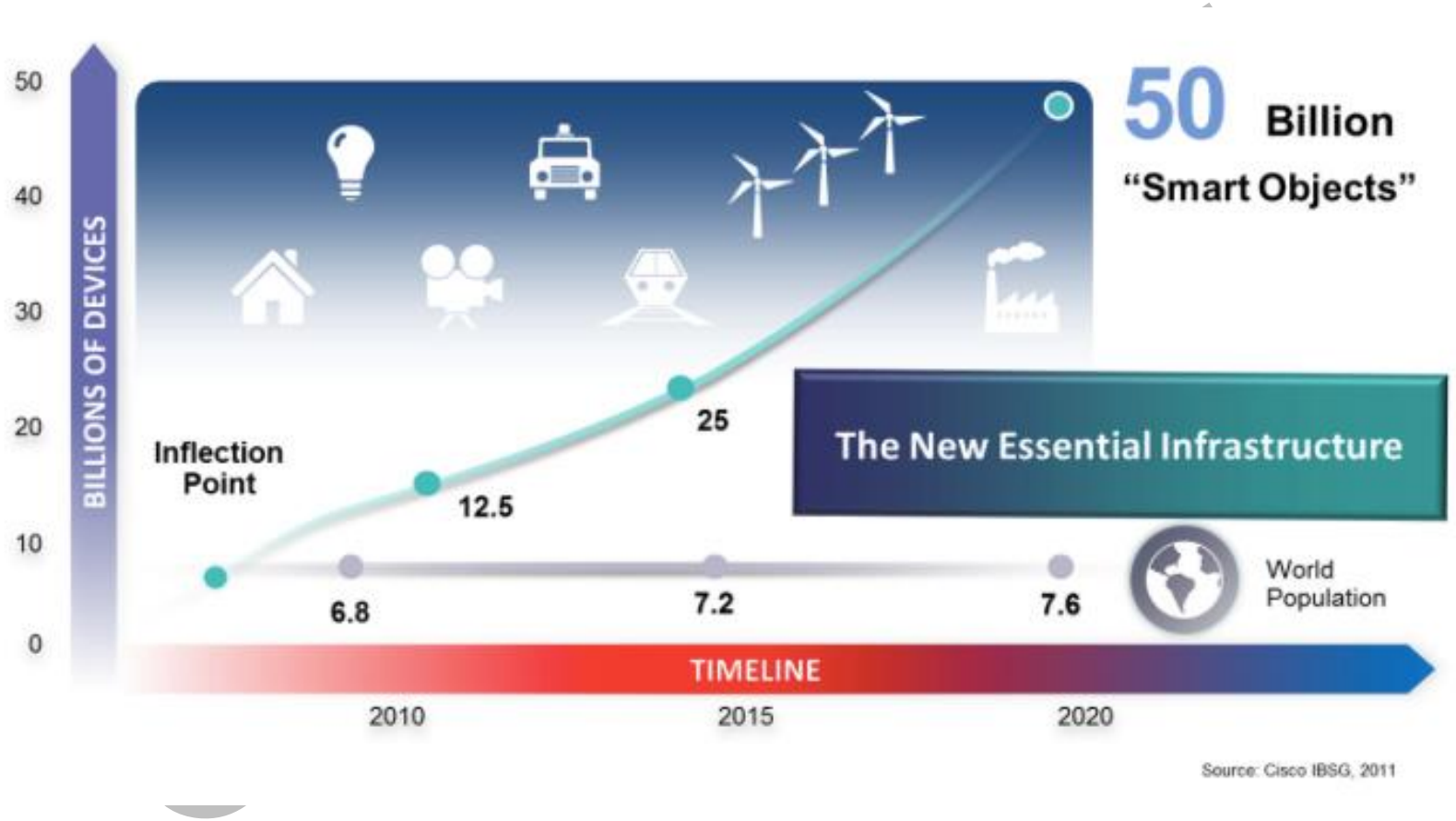
In **2020**, the IoT market opportunity for APeJ will grow to

$2.43 trillion

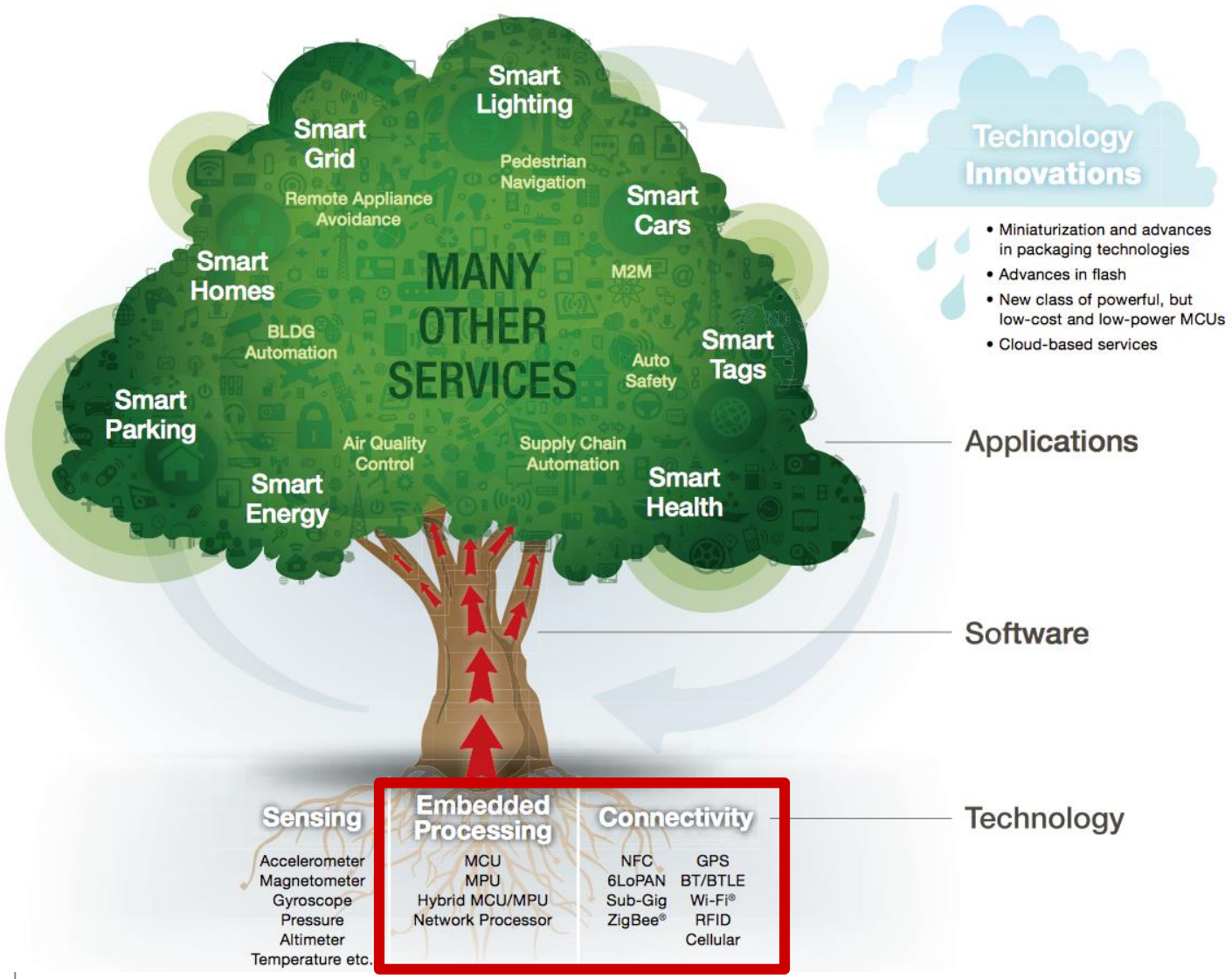
Source: IDC APeJ IoT Market Forecast, June 2014


7,065
2020
5,649
2019
3,782
2017
2,712
2015
1,928
2013
IoT Market Revenue ($B)
IDC estimates that as of the end of 2013, there were 9.1 billion IoT units installed
IDC expects the installed base of IoT units to grow at a 17.5% CAGR over the forecast period to 28.1 billion in 2020

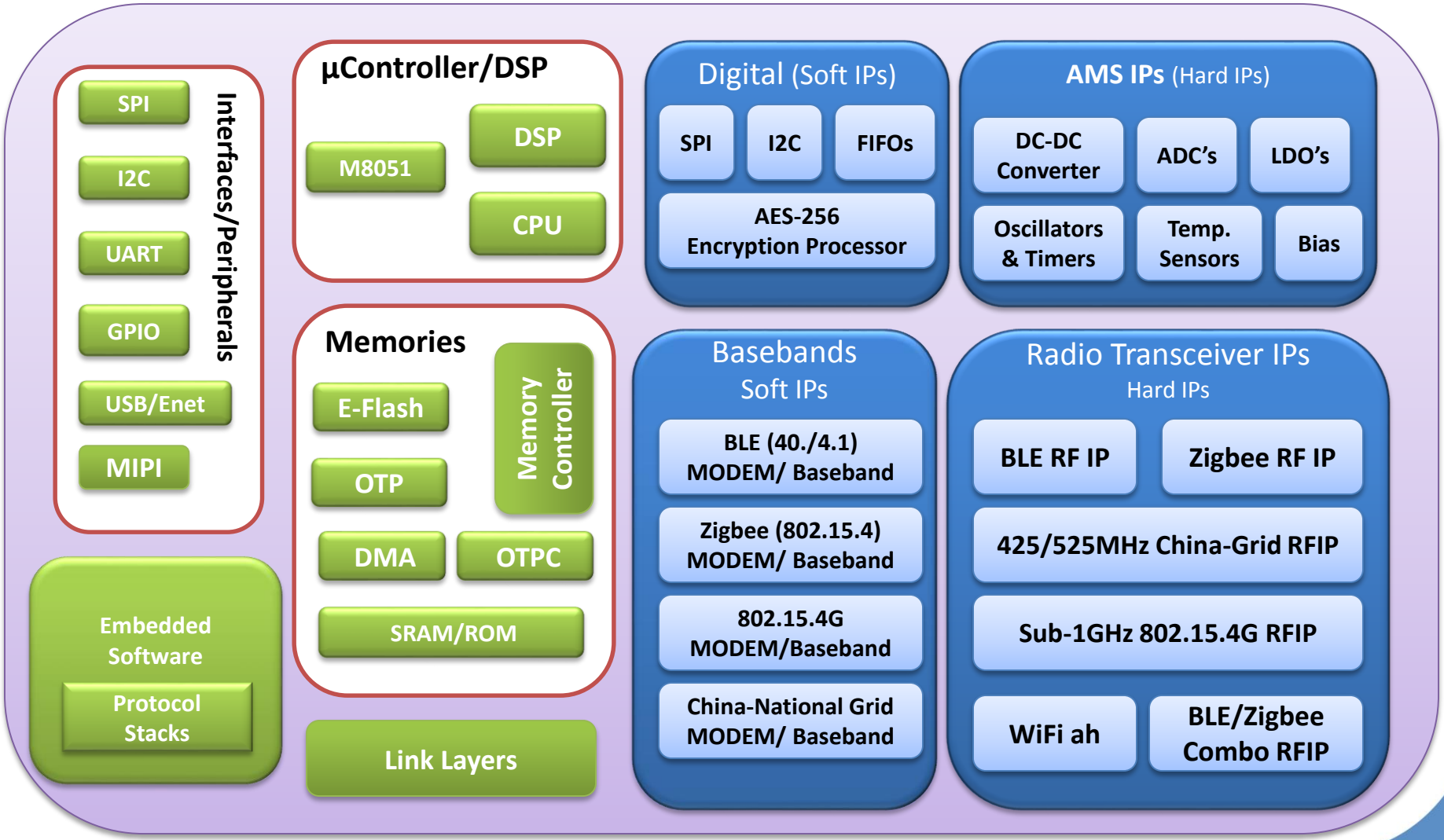
Internet-connected devices and the future evolution (Source: Cisco, 2011)

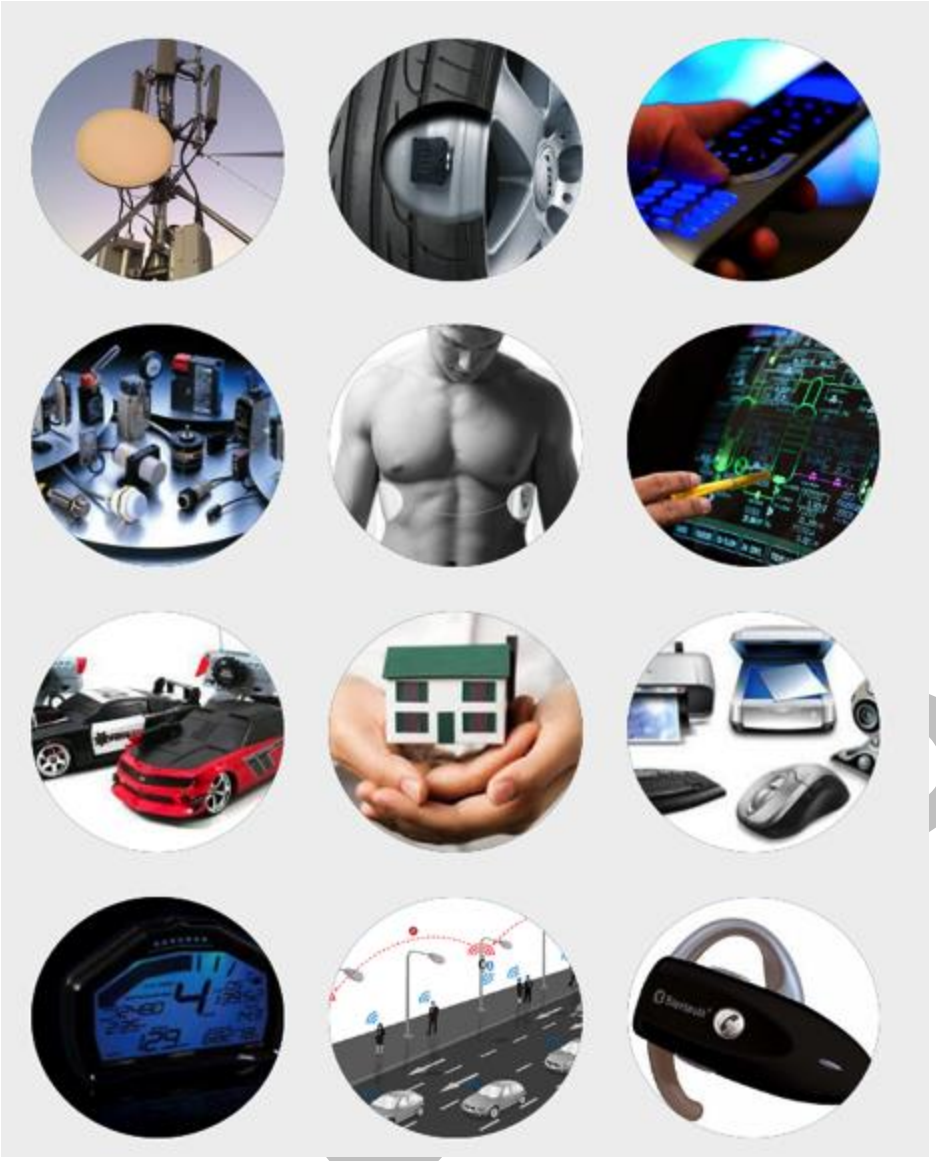


IoT Eco-System



IoT: General Platform



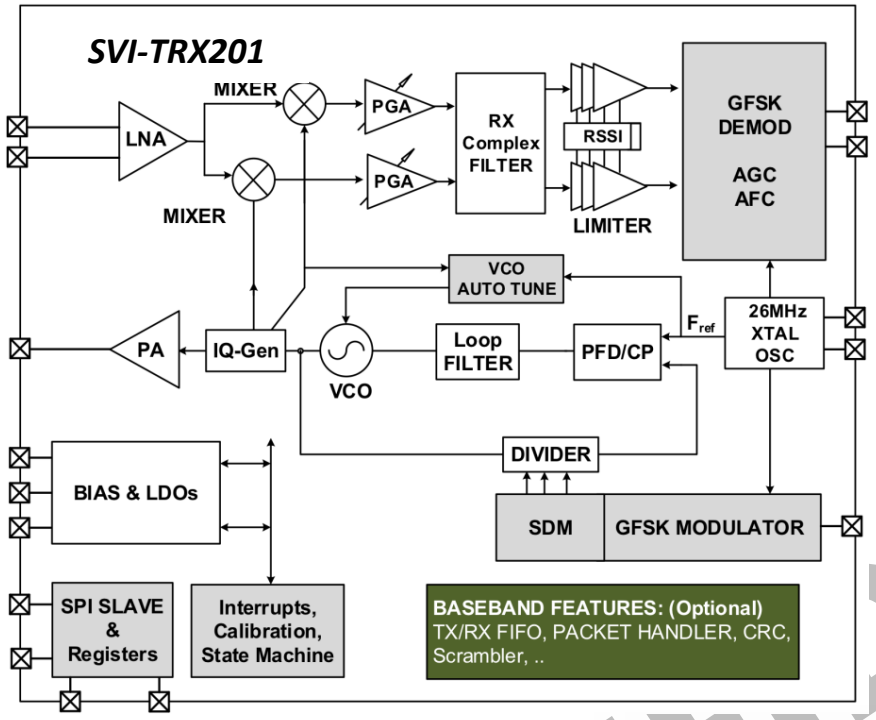


SV Radio's

Bluetooth Smart

BT 4.0 & 4.1

SVI-TRX201X Bluetooth Smart (BT 4.2)



- Silicon verified
- TSMC/SMIC 180nm CMOS Process
- Customer Production ramping Q4/14

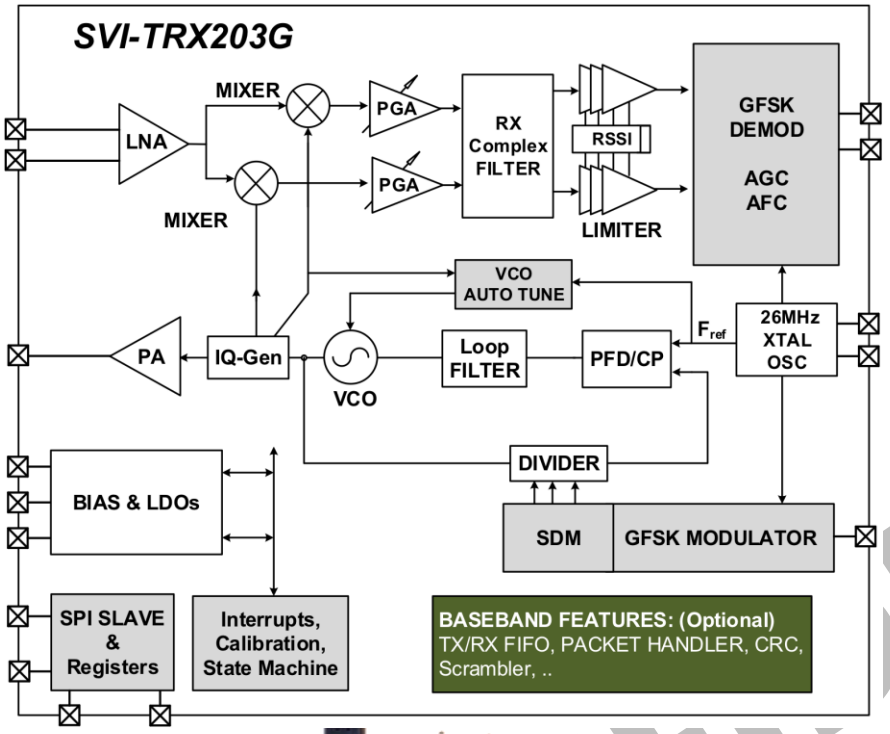
Key Features

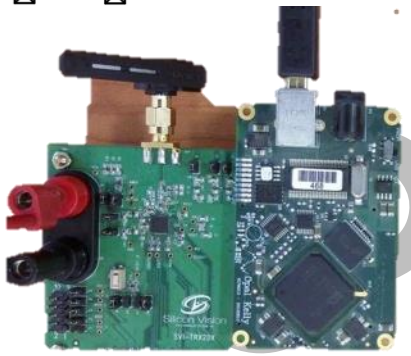
- Comply with **BT 4.0** & **4.1** (Single Mode)
- Single Mode BLE
- Frequency range: 2.4 – 2.4835GHz
- Data rates: 1.0Mbps
- Output power: -20 to +2dBm
- FSK/GFSK modulation
- -90dBm sensitivity @ 1Mbps
- Coe Supply : 1.7V
- Automatic frequency correction
- TX/RX FIFO's, CRC

Applications

- Metering systems
- Wearable's
- Wireless PC peripherals (HID)
- Advanced remote controls
- Sensor networks
- Home security & alarm
- Medical

SVI-TRX203G Bluetooth Smart (BT 4.2)





- **Process: HHGrace-110nm**
- **Silicon Verified**
- **Customer production Q2/15**

Key Features

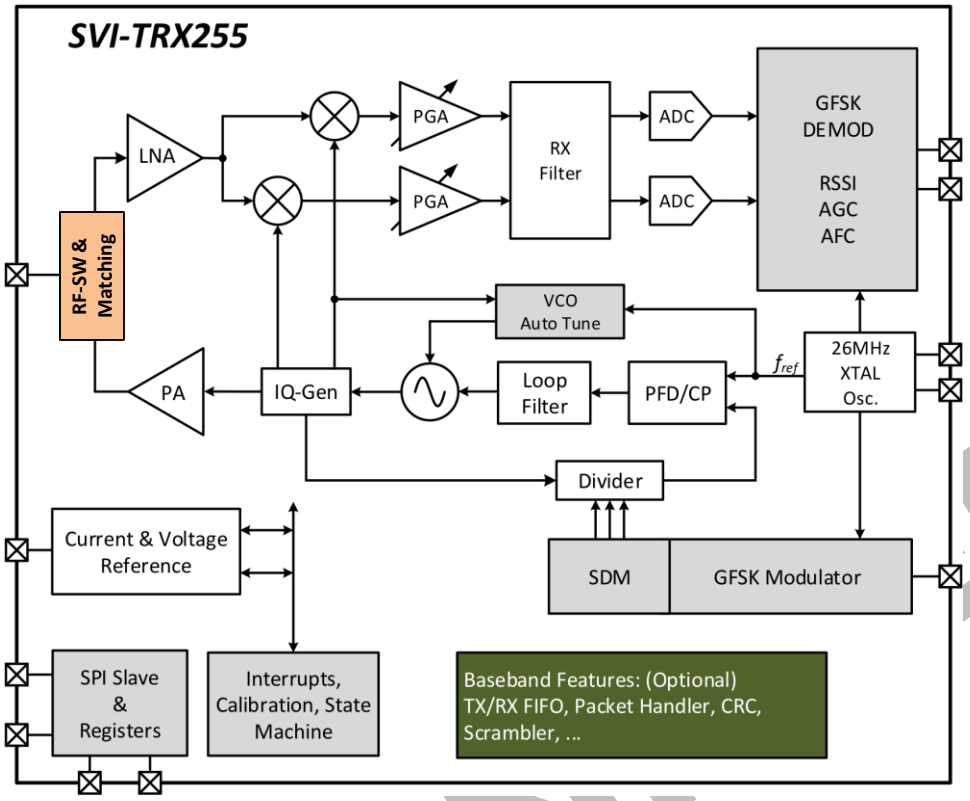
- Frequency range: 2.4 – 2.4835GHz
- Data rates: 1.0Mbps, 2Mbps
- Output power: -30 to +2dBm
- FSK/GFSK modulation
- -90 dBm sensitivity @ 1Mbps
- Core Supply: 1.2V
- BT 4.0/4.1/4.2 (Single Mode)

Applications

- Metering systems
- Wearable's
- Wireless PC peripherals (HID)
- Advanced remote controls
- Sensor networks
- Home security & alarm
- Medical

http://www.si-vision.com/en/sivi-media/sivi-partners-with-hg

SVI-TRX255 Bluetooth Smart (BT 4.2)

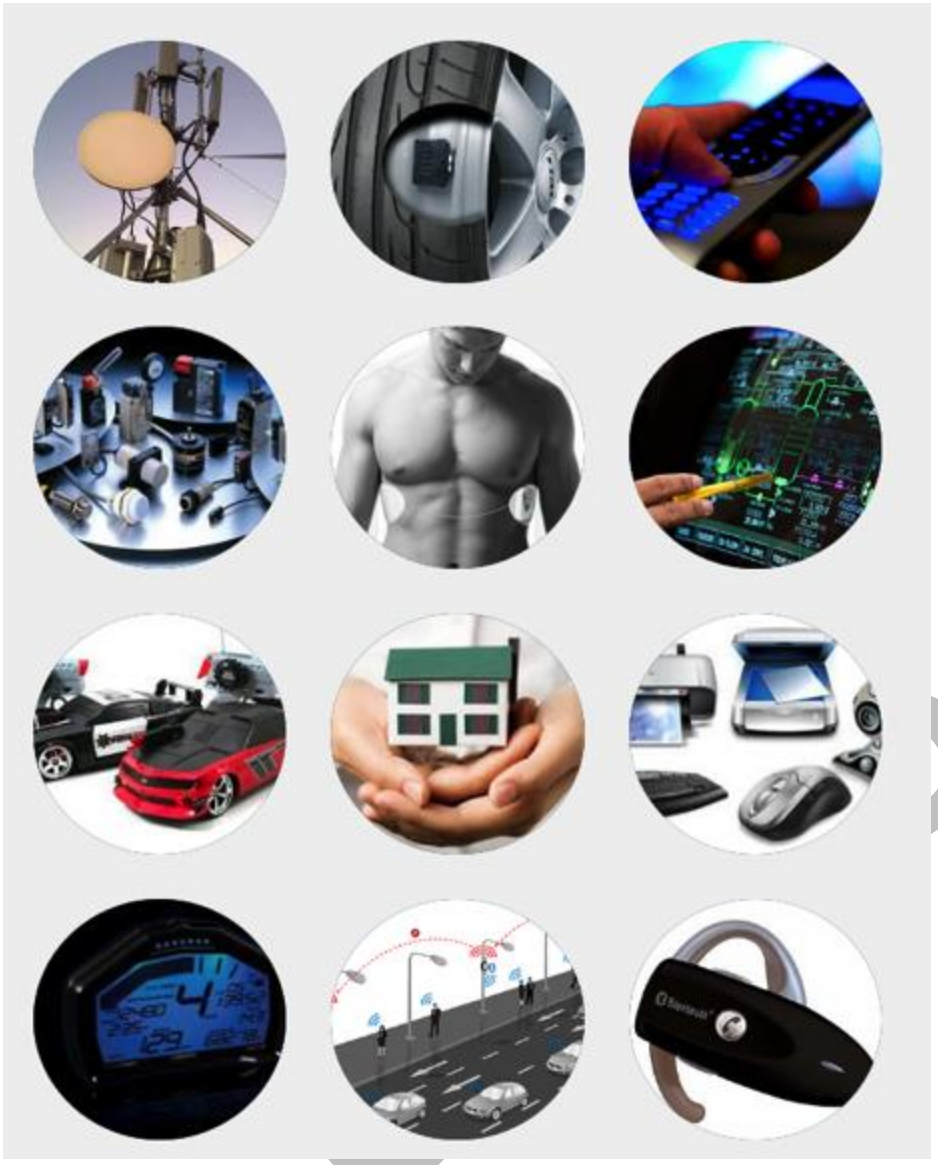


- **Process: TSMC-55nm LP**
- **GDSII: Ready & Tapped Out**
- **Silicon ready April-15**

Key Features

- Frequency range: 2.4 – 2.5GHz
- Data rates: 1.0Mbps, 2Mbps
- Output power: -30 to -2dBm
- FSK/GFSK modulation
- -94 dBm sensitivity @ 1Mbps
- Core Supply: 1.0V
- BT 4.0/4.1/4.2 (Single Mode)
- Fast Startup XTAL Osc.
- Lowest BOM in the market

Applications

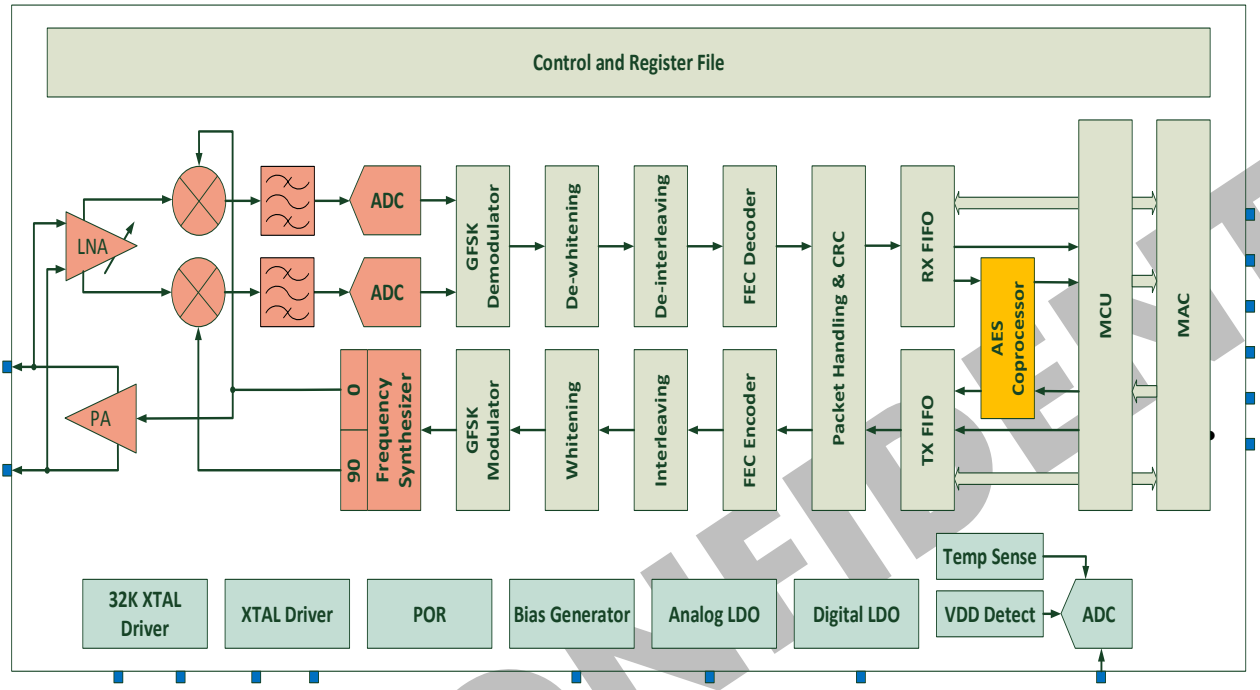


SV Radio's

IEEE 802.15.4

(ZigBee)

SVI-TRX301 IEEE 802.15.4 Radio



- **Silicon verified**
- **TSMC 180nm CMOS Process**

- **Key Features**
  - Frequency range: 2.4 – 2.4835GHz
  - Data rates: 250kbps
  - 2.0 MChip/s chip rate
  - Output power: +5dBm
  - O-QPSK modulation
  - -95 dBm sensitivity
  - Supply range: 1.9 to 3.6V

- **Applications**
  - Metering systems
  - Home automation
  - Wireless PC peripherals
  - Advanced remote controls
  - Sensor networks
  - Home security & alarm
  - Remote control Toys

IoT RF IPs Next Challenges

- Lower Power Consumption (< 5-6mW)
  - Operate at sub-1V supply voltage
  - Make use of the state-of-the-art ULP processes developed for IoT market
- Integrability
  - Matching Network
  - Power management (DC-DC converters)
  - Link layer sub-system integration
- Lower Sensitivity (< -95dBm)
  - For better link budget calculations
  - Requires new demodulator design with SNR better than 11dB
- Work on the development of RF front-ends for new standards, like IEEE 802.11 ah

Recommendations

- For the next 5 years focus on one IoT application
  - Main suggested application: Smart Grids

  Why? Coming next
  - Secondary suggested application: Medical
- The agreed on application should focus on the whole application stack to include all layers mentioned before, in addition to building a generic security and management platforms that can be used in new applications

Recommendations

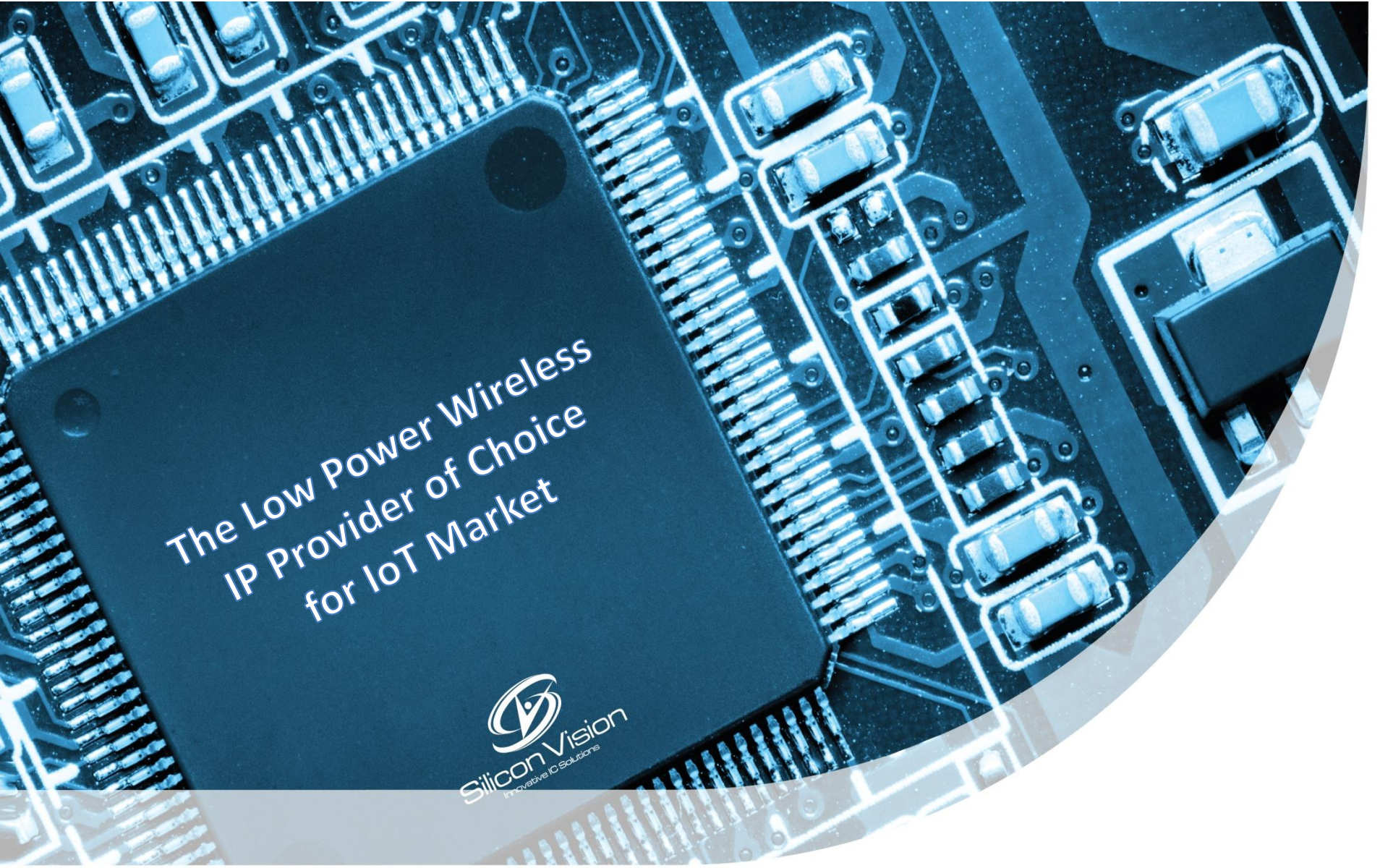
- Why Smart Grids?
  - Address a country pain
  - An international new trend that can be a good marketing tool to get Funds and FDI
  - Use an infrastructure that is already built
    - Smart Meters industry
    - Electronics manufacturing
    - Fabless companies
    - S/W development houses
    - Cloud computing
    - Big data
    - Mobile operator infrastructure
    - Broadband project

Recommendations

- Education Programs
  - Program for Technicians to create an HR pool for related industries, to include
    - Joint partnerships with parties focusing on technicians
  - Post graduate Program for university graduates to focus on
    - Electronics design
    - Embedded S/W
    - Cloud computing/Big data
    - Make use of Tier-1 companies in Egypt to localize the products and have a national industry that can be independent from those international platforms in 5 years time

Recommendations

- Industrial Programs
  - FDI
    - Establish a program to encourage international industry to inaugurate factories/focused development companies serving Smart Grids
  - Funds
    - Create Funds/VC money to help existing and newly established companies serving the Smart Grid focus areas
  - Marketing Communications
    - Market Egypt as a Smart Grid development country
    - Create awareness internally for the importance of the Smart Grids
  - Smart Grid Gov projects
    - Use PPP projects to use the current industry and future FDI created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IP Provider of Choice
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Silicon Vision
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Thank You