Sub-1GHz: Robustness & Long Range

Technical introduction, Sub-1GHz

2013

Why Sub-1GHz RF technology

Long Range

- Radio range, up to several kilometers
- New technology from TI makes it more reliable

Co-existence

Rapidly growing number of RF devices requires good co-existence properties

License Free Radio Communication

ISM (Industrial, Scientific and Medical)

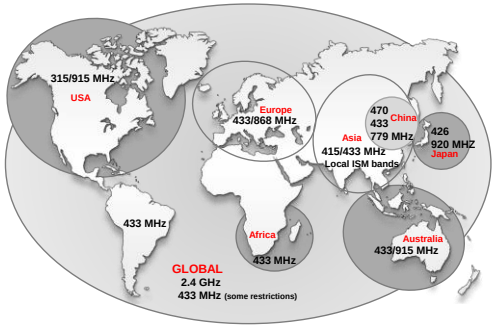
- License free RF bands
- Available worldwide
- No need for subscription or fees

Battery life

On small Lithium cells, designed to last up to 15 years

Sub-1GHz

Robustness, long range



Sub-1GHz target markets

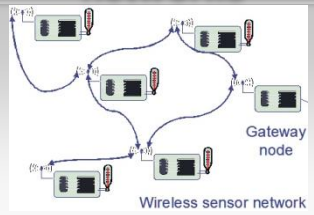
Metering & SmartGrid

- E-meters
  
- Water & Gas meters
  
- Heat Cost Allocators
  

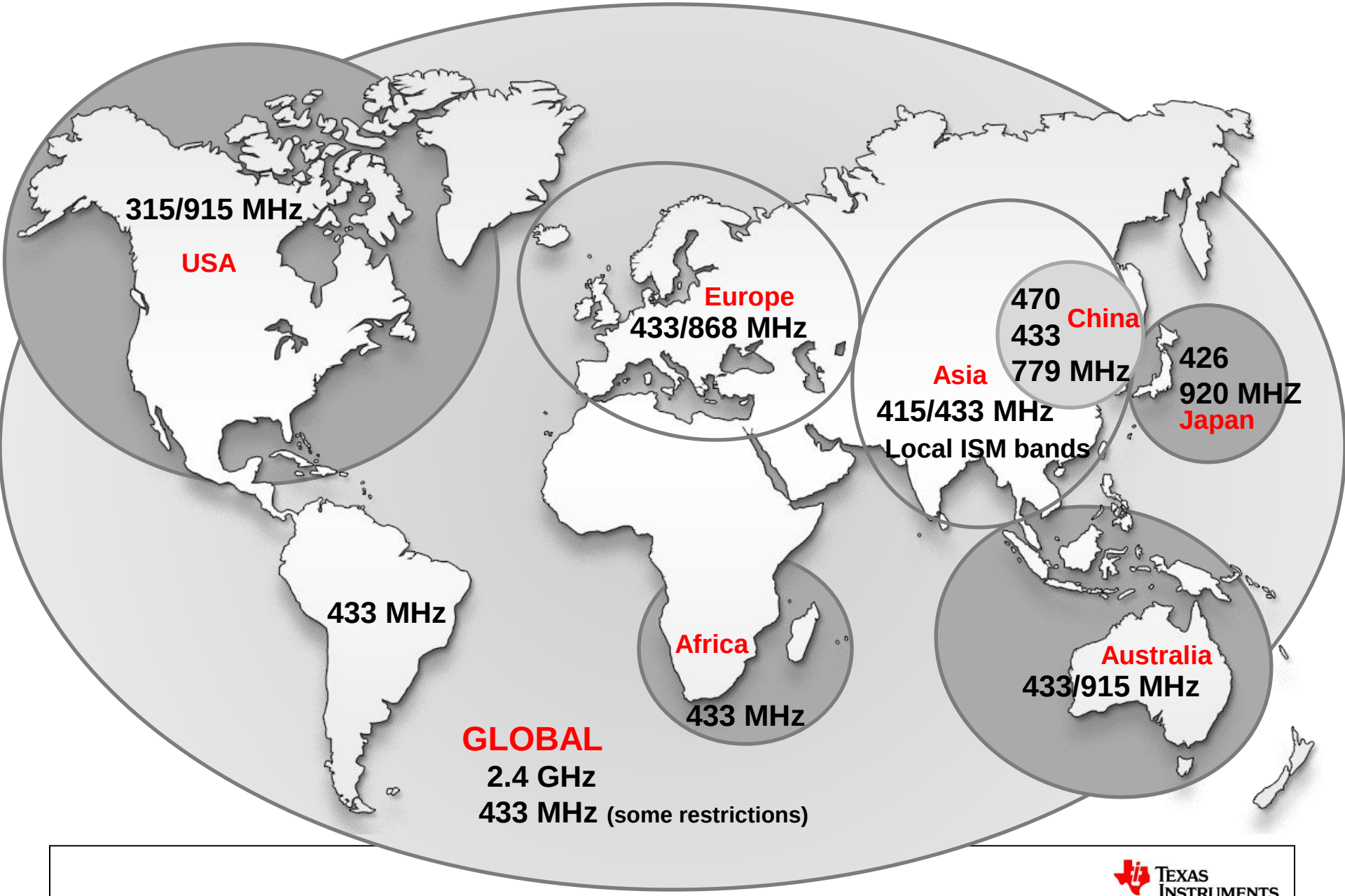
Alarm & Security

- Intruder Alarm
  
- Social Alarm (Cat 1)
  
- Smoke Detectors
  

Automation

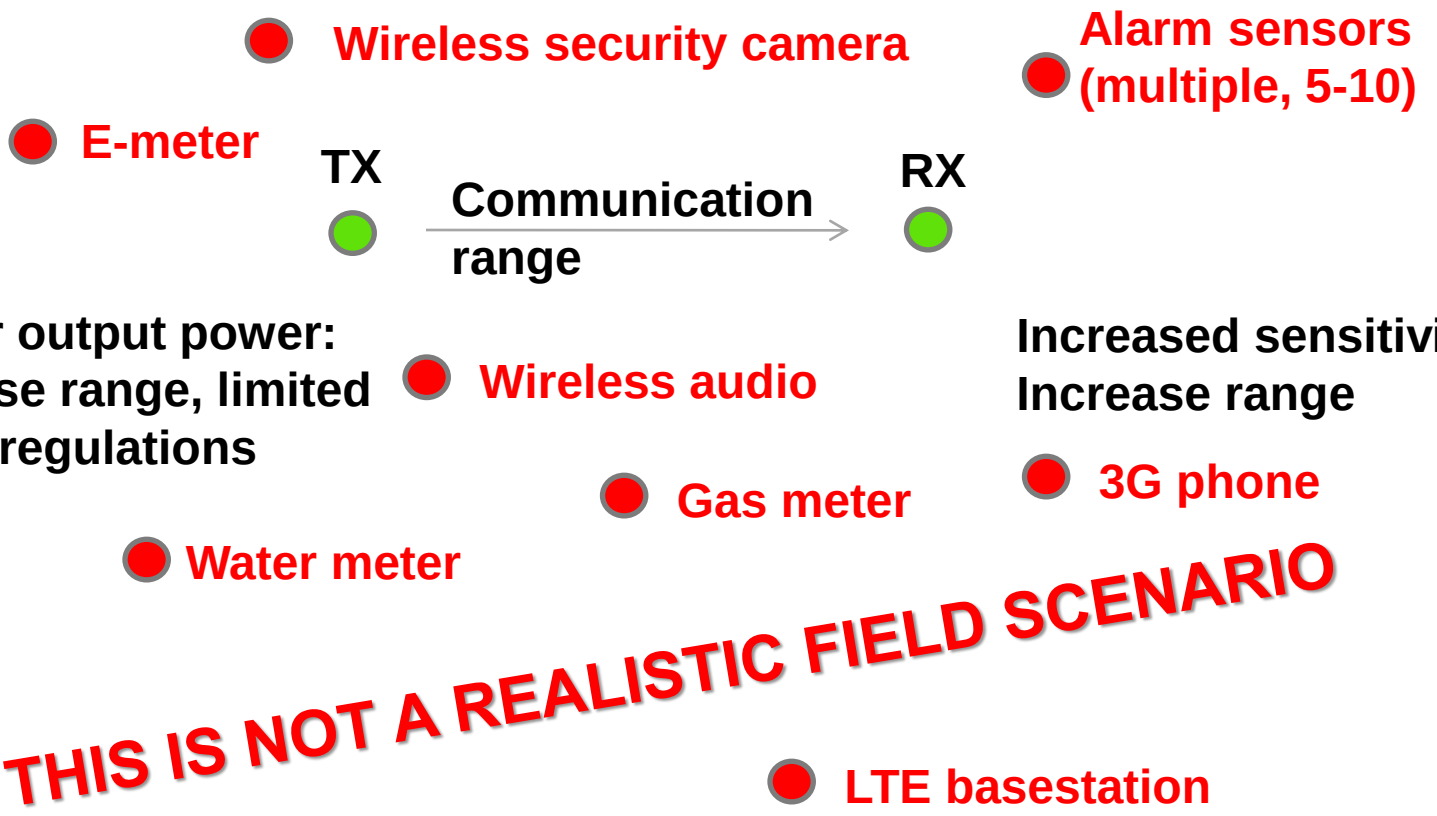
- Home and building
  
  
- industrial automation
  
- Wireless sensor networks
  

License Free ISM bands World Wide



Range and Co-existence

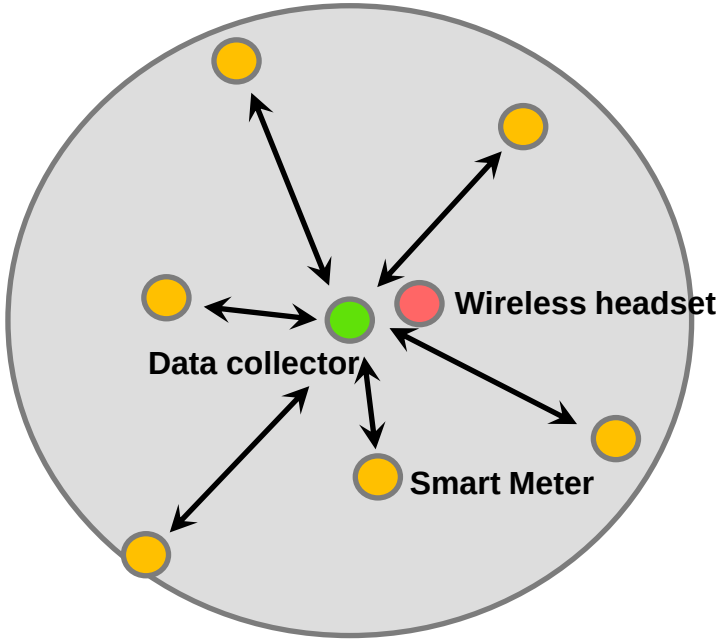
- Interference can severly limit communication range
- Good Co-existence = first pass installation success



Co-existence – how it works

What Selectivity and Blocking translates to for real life applications

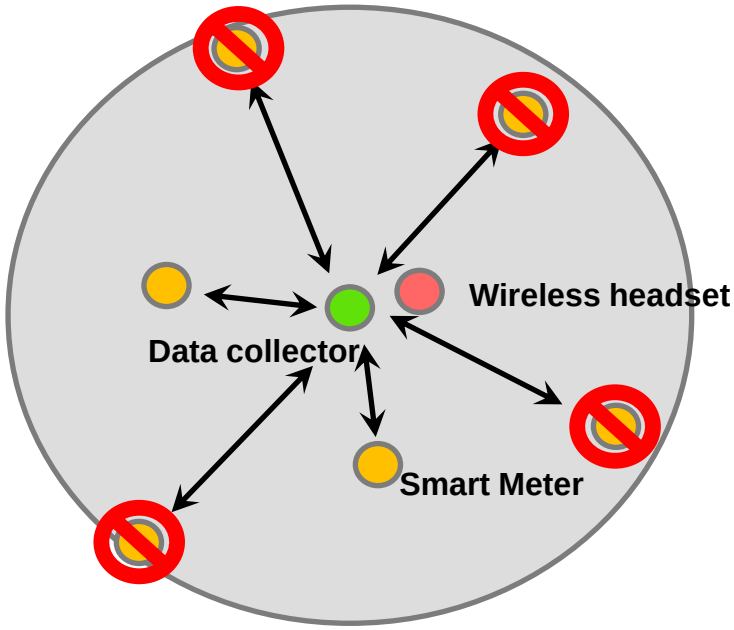
TI Sub-1GHz Performance Line



No range reduction for data collector

- Less data collectors needed
- Longer links possible
- Fewer re-transmissions

Competition



Data collector range is reduced

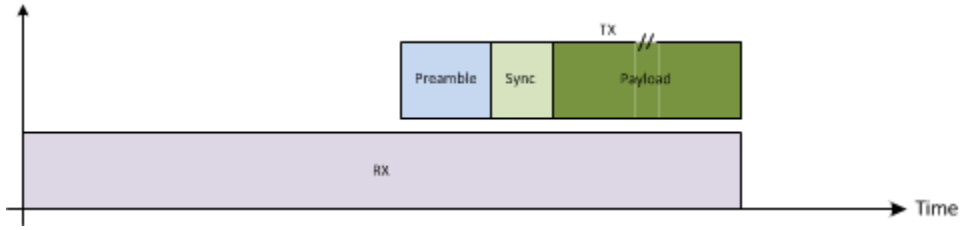
- More data collectors needed
- Temporary interference will result in higher packet loss, more re-transmissions needed

More than 10 km range (video from Oslo, Norway)

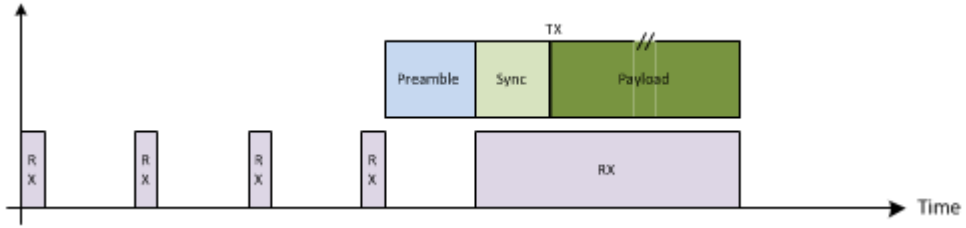
RX Sniff Mode with <3mA RX current

Short start-up times and a fast receiver will save power.

- **Competition (traditional receiver)**: Radio must stay in RX continuously to make sure the transmitted packet is received, settling the receiver during the preamble

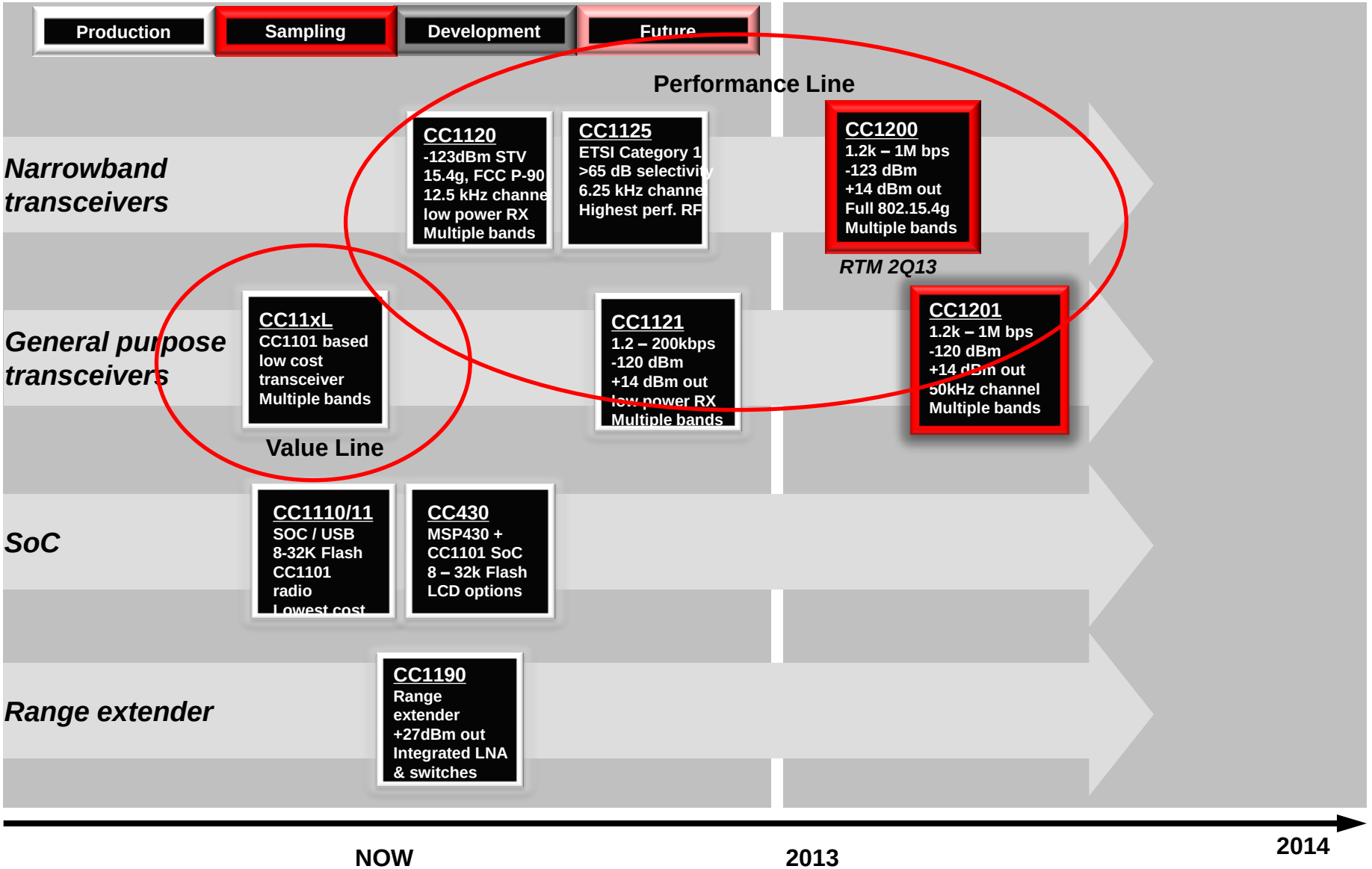


- **Performance Line; WaveMatch receiver**: The fast settling receiver can automatically duty cycle RX to greatly reduce average power consumption when searching for packets, without sacrificing RF performance



LOWEST RX current with keeping highest PERFORMANCE

Low Power RF – Industrial Sub-1GHz HW Roadmap

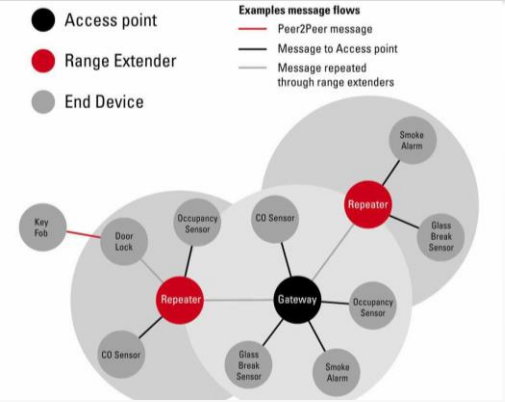


TI Sub-1GHz offering – Software

LPRF Software Solutions – Free of Charge

Sub-1GHz market dominated by Propretary and legacy solutions.

Basic Software Examples:
- **Easylink**
- **Packet Error Rate tester**



SimpliciTI – star network, source code

M-Bus wireless

KNX®

LoWPAN

IPv6-based Low-power Wireless Personal Area Networks

6LoWPAN, mesh network

TI Sub-1GHz offering – RFICs/kits

RF ICs

CC112x/CC120x Performance line

CC11xL, CC115L Value Line

CC1190 Range Extender

CC1110/CC430 SoC

Development Kits

Boosterpack

Anaren module With value line RX/TX For MSP430

CC11xxEMK

Refference design. Two modules and two antennas.

CC11xxDK

Complete kit for RF evaluation and PER testing. Includes MSP430

Antenna kit

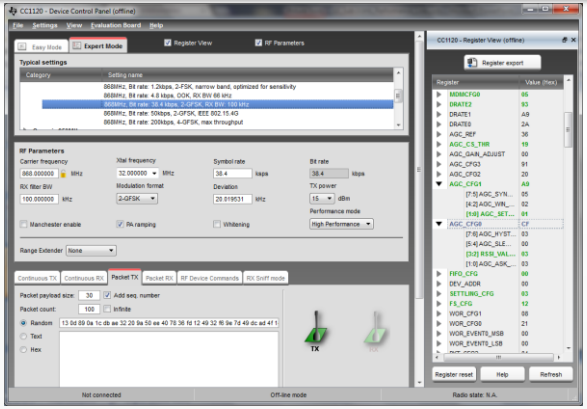
Selection guide and belonging application note

CC1110 mini kitC

Low cost kit for prototyping

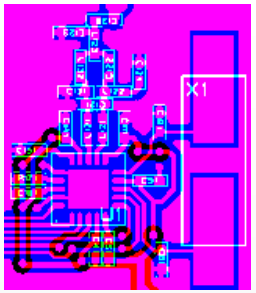
TI Sub-1GHz offering – Tools

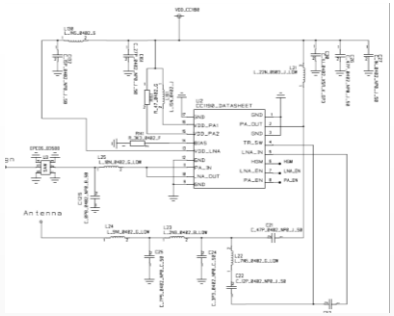
LPRF tools and support



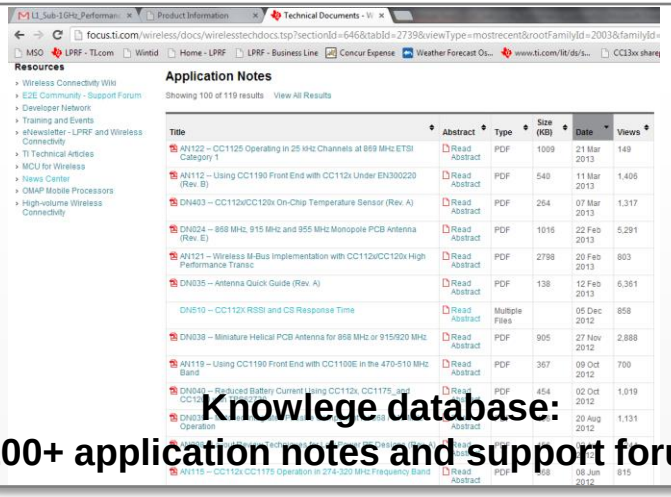
SmartRF Studio: RF configuration tool

Packet Sniffer





Reference designs:
Layout and schemetics



Knowlege database:
100+ application notes and support forum

Learn more on Sub-1GHz

- Performance Line: www.ti.com/rfperformanceline
- Value Line: www.ti.com/rfvalueline
- App notes: Application Notes
- E2E forum: www.ti.com/e2e
- “Getting Started on Sub-1GHz” training:
  Available on TI training portal
- Wireless Connectivity Selection Guide:
  www.ti.com/wirelessconnectivityguide