



On-Ramp Wireless

Connecting the
Internet of Things

Introducing On-Ramp Wireless

Next-Generation Wireless Connectivity for the Internet of Things



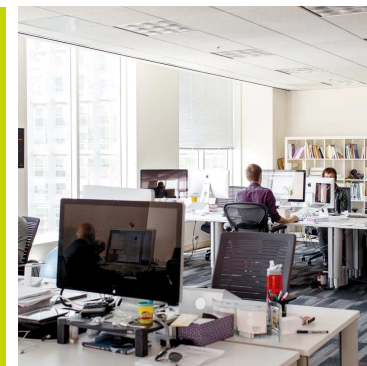
Headquarters

San Diego, CA



Founded

March 2008



Employees

85



Intellectual Property

32 Unique Patents



Investment to Date

\$76M



Key Customers

Industry Recognition



“RPMA provides a leap forward in technology relative to existing RF for sensors; similar to the advantage CDMA provided over analog cellular for its intended applications.”

Dr. Andrew Viterbi



“I am impressed by On-Ramp’s vision and future plans, and believe that it is a leading communications technology for a large majority of future M2M applications”

Ivan Seidenberg



“The reliability, security, and cost points made possible by On-Ramp’s technology and network design mitigate a huge chunk of the problems which, until now, have prevented these endpoints from being reached.”

Richard Lynch



WORLD ECONOMIC FORUM

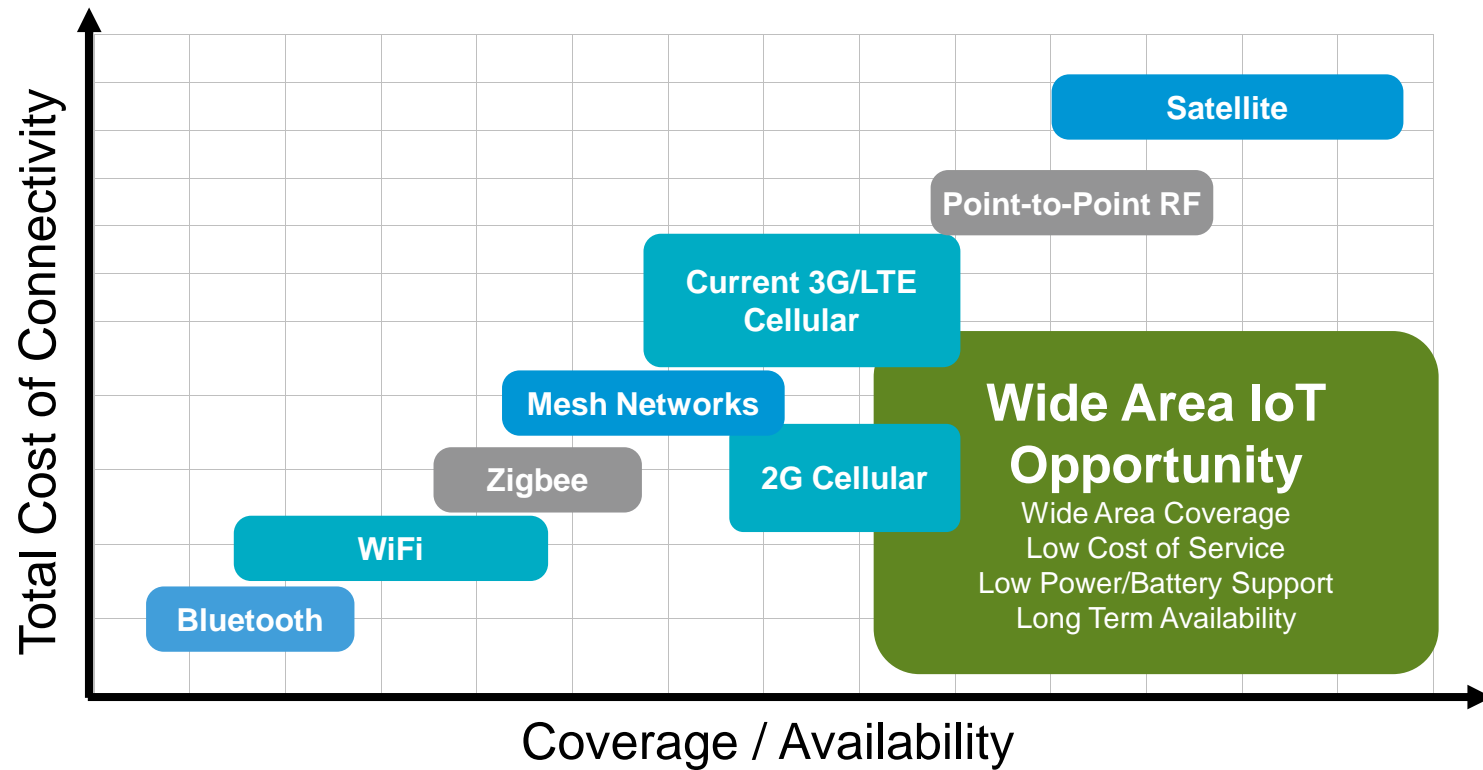
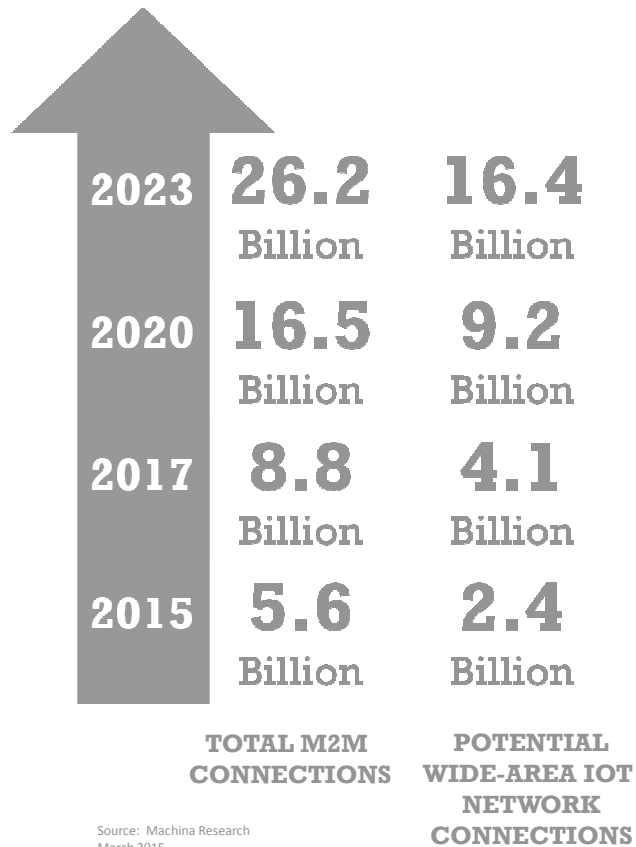


Technology
Pioneer
2011



Market Landscape

The Promise of the IoT Requires New Connectivity Options



Opportunity Across Diverse Applications

Connectivity Challenges Span Critical IoT Segments



Oil, Gas, Mining

- Pipeline monitoring
- Well head monitoring
- Personnel tracking
- Asset tracking



Asset Tracking

- Train yards, ports, airports
- Military, industrial
- Hospitals
- Construction



Automotive

- Usage based insurance
- BHPH, Stolen vehicle tracking



Smart Grid & City

- Smart meters
- Smart lighting
- Parking management
- Environmental monitoring
- Grid edge monitoring
- Transportation & safety



Shipping

- Container tracking
- Asset management



Security

- Border patrol
- Intrusion detection
- Alarm monitoring



Agriculture

- Precision irrigation
- Moisture control



Consumer

- Fire & security alarms
- Propane tank monitoring

Gaps in Existing Technologies

Many Potential Endpoints Cannot be Connected at Scale

Cellular

- Sunsetting Technology
- Coverage Gaps
- High Cost
- Power-Consuming

Wide-Area Mesh

- Performance degradation at scale
- Coverage Challenges
- Deployment Inflexibility
- Power-Consuming

Other Wide-Area RF

- Limited scalability
- Limited downlink, reliability, security
- Inferior link budget
- Lack of proof at scale



The Future of Wireless Technology

Overcoming the network challenges of the last decade

RPMA[®]
Random Phase Multiple Access

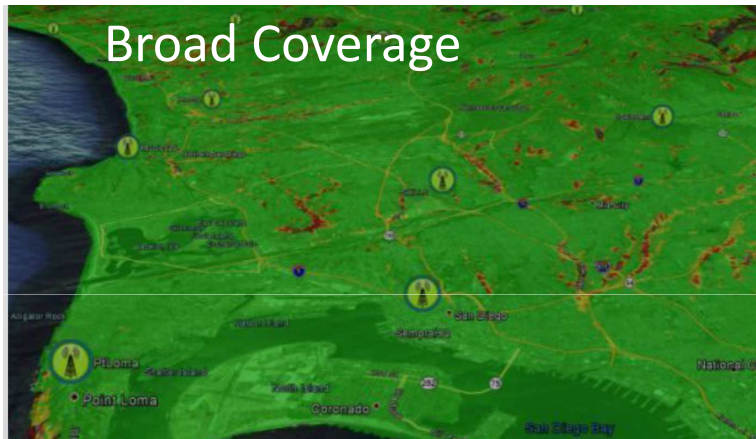
Breakthrough wide-area
communications for low
throughput smart devices

- 50-300+ sq. miles per Access Point, Highest link budget available
- Millions of messages daily per Access Point, 1,200+ simultaneous uplink multiple access
- Globally Available unlicensed 2.4 GHz
- Proven support for 15 year battery life devices
- Integrated security, proven by meeting NERC CIP 002-009 and NIST SP 800-53
- Dozens of Applications, Open Integration Model

Proven Commercial Deployment

RPMA Enables Low-Cost Deployment of High-Value Applications

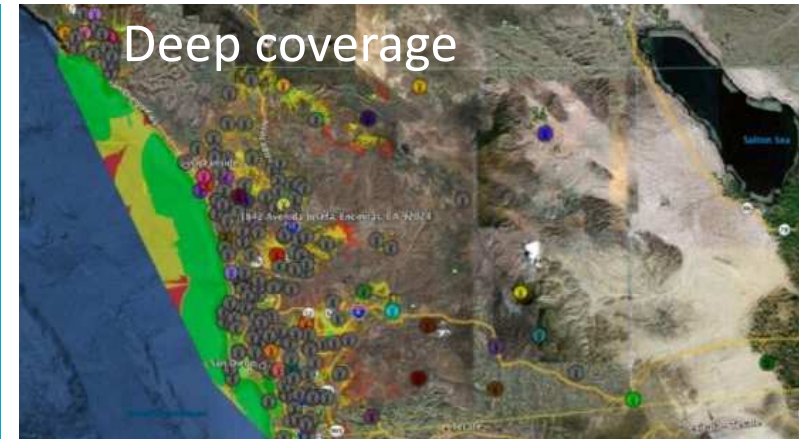
Broad Coverage



Smart Grid Network

RPMA deployed to provide wide-area coverage for multiple applications, including remote battery powered devices

Deep coverage



35 access points cover **4,100 sq. miles** of service territory for outdoor endpoints



50-200 sq. mile coverage per access point



4000+ endpoints from multiple application types using **<0.1%** of system capacity



140 access points provide coverage for underground/indoor endpoints



5-10 sq. mile coverage per access point



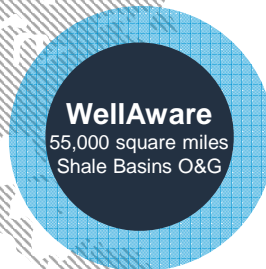
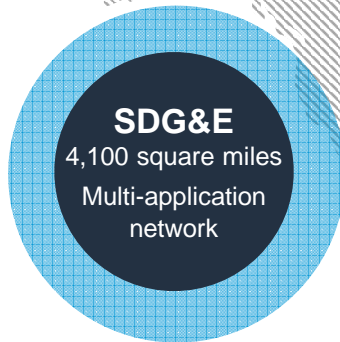
Only viable RF solution for these assets

Major Deployments Worldwide

Proven Real World Performance with Demanding Customers

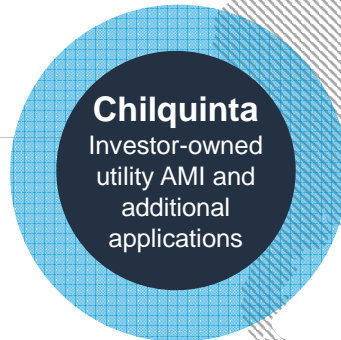
North America

15 Networks
50K Endpoints



South America

6 Networks
15K Endpoints



EMEA

5 Networks
20K Endpoints

Haseko

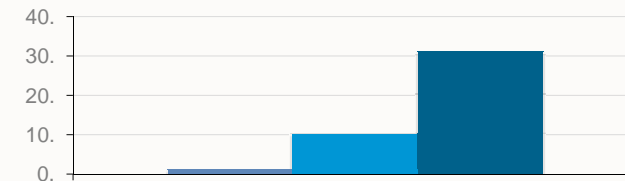
10K Endpoints
Apartment sub-metering

APAC

5 Networks
11K Endpoints

Rapid Growth in Deployments

- 30+ Networks
- 100,000+ endpoints deployed/committed

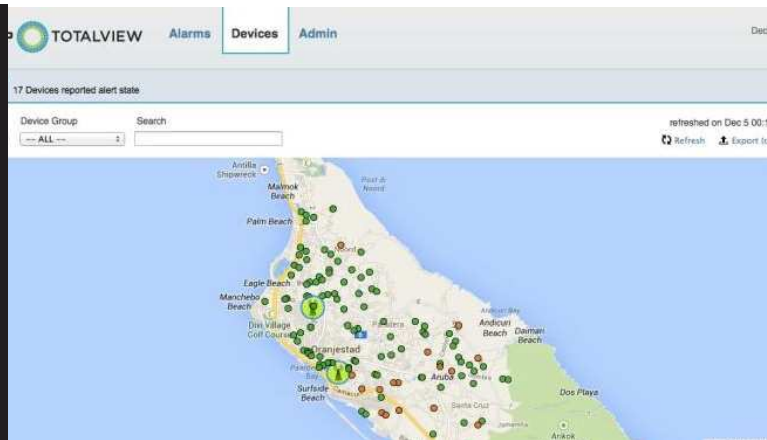


Case Study: Elmar (Aruba)

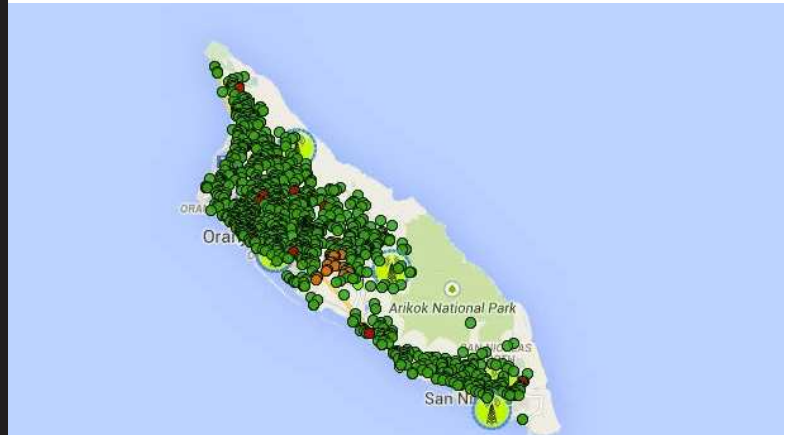
Multi-Application Enterprise Network



Dec
2013



Oct
2014



Network

- 6 Access Points provide deep coverage across the entire island of Aruba
- Ample support for current and future applications

Applications

- Initial deployment for AMI - 48K smart meters to be deployed (GE)
- Distribution line monitors (Schweitzer)
- Streetlights (LED Roadway)
- Oil pressure monitors (GE Wiyz)

Strategic Value

- Flexible multi-application network covering an entire service area
- Multiple applications sharing common RPMA network
- Path to open up capacity over time

Case Study: LED Roadway Lighting

Connected Application Integration



Network

- Multi-application support in utility private networks through multiple existing On-Ramp Channels
- Broad demand in smart city and smart utility deployments

Applications

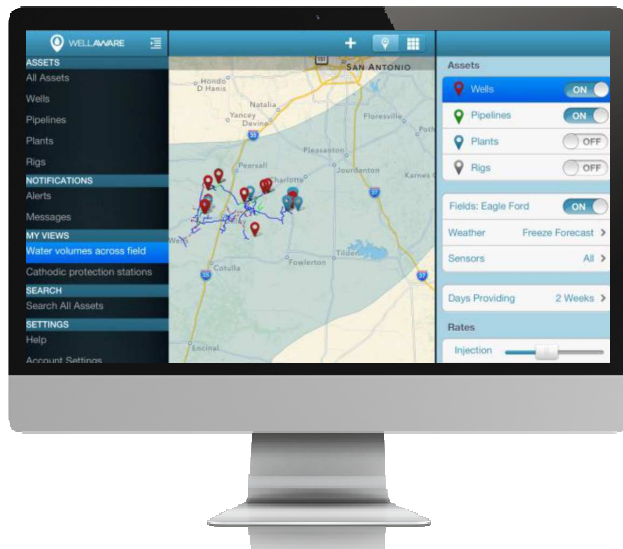
- Smart street lighting application
- LRL back end application
- Integrated RPMA enabled light heads and RPMA enabled retrofit

Strategic Value

- Lowest cost of communications for smart streetlighting deployments
- Demand from existing On-Ramp deployments
- Multiple channel opportunities through existing ecosystem

Case Study: WellAware

Multi-User Oil/Gas Network and Application



Network

- Multi-user wireless network covering major U.S. shale basins (Eagle Ford, Bakken, etc...)
- ~100 APs currently deployed covering 55K sq miles of shale basin (50% of US oil production)

Applications

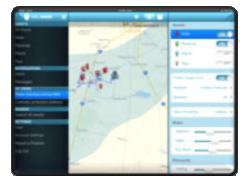
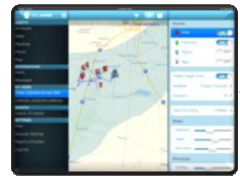
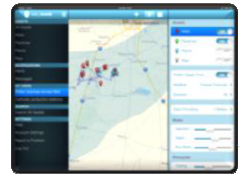
- Full-featured mobile monitoring platform for monitoring flow, valve, tank level, etc...
- Service offered by Well Aware, "powered by" On Ramp's RPMA technology

Strategic Value

- Economic monitoring of remote upstream oil/gas production assets
- Timely oil field intelligence delivered to diverse customer base
- Minimal customer investment required

RPMA Solution Architecture

Head End Applications

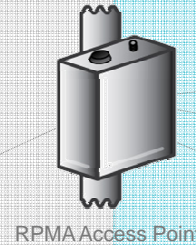


RPMA
Network
Gateway
Server

Cloud or Data
Center Network

On-Ramp RPMA Network Infrastructure

TCP-IP Backhaul
Network



RPMA Access Point



RPMA Access Point

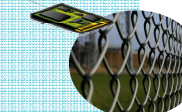
RPMA Radio
Network



Smart
Grid



Asset
Tracking



Intrusion
Detection



Equipment
Monitoring



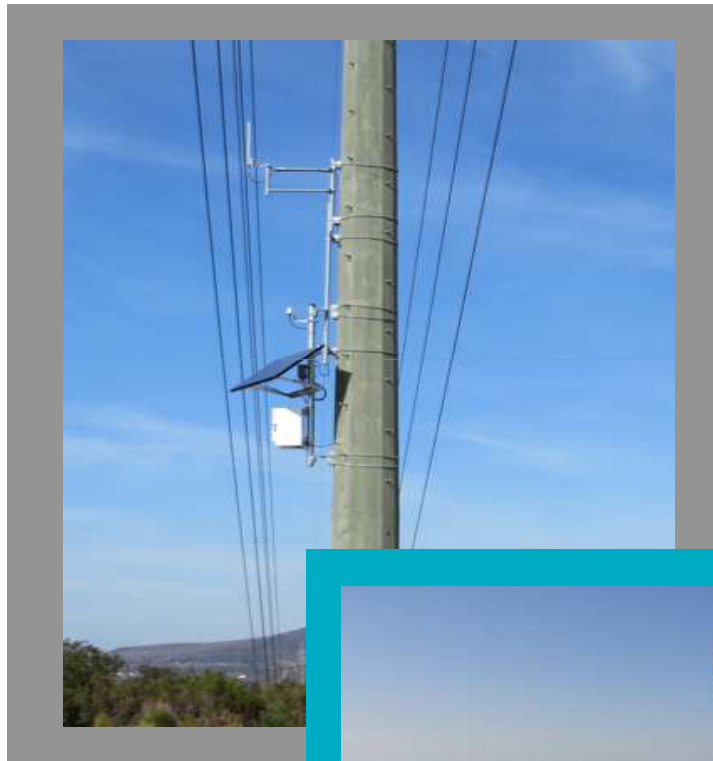
Irrigation
Controls

RPMA Node

RPMA Access Point



- Low cost network infrastructure for RPMA deployments
- Flexible deployment options in diverse environments
- Support for wide range of backhaul solutions, including cellular and even satellite
- Field proven performance globally



RPMA Radios for Devices and Applications

Multiple Paths for Rapid, Cost-Effective Integration

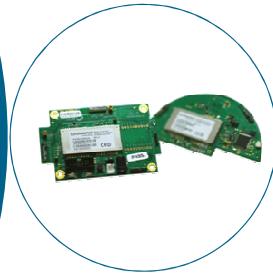
CONNECTED BY

RPMA®



General Purpose I/O Devices

- Standard Interfaces and Protocols
- Rapid Deployment for High Value and Low Volumes



Reference Platform

- Ready to Develop System
- Fast Prototyping, Rollout of Integrated Solution



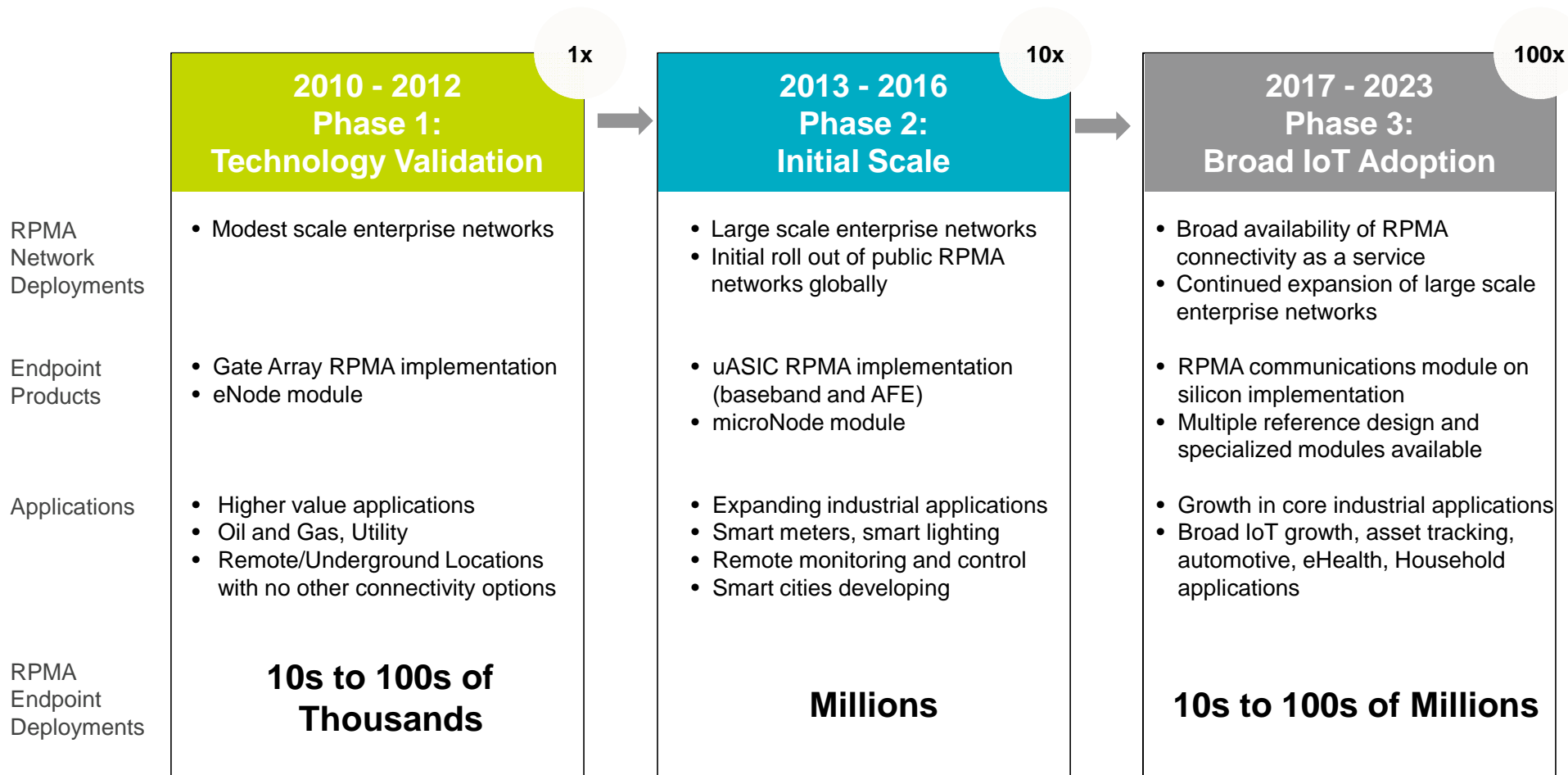
Radio Modules

- Flexible, Low-Cost Radio
- Integrate into Existing Architectures and Communications Applications

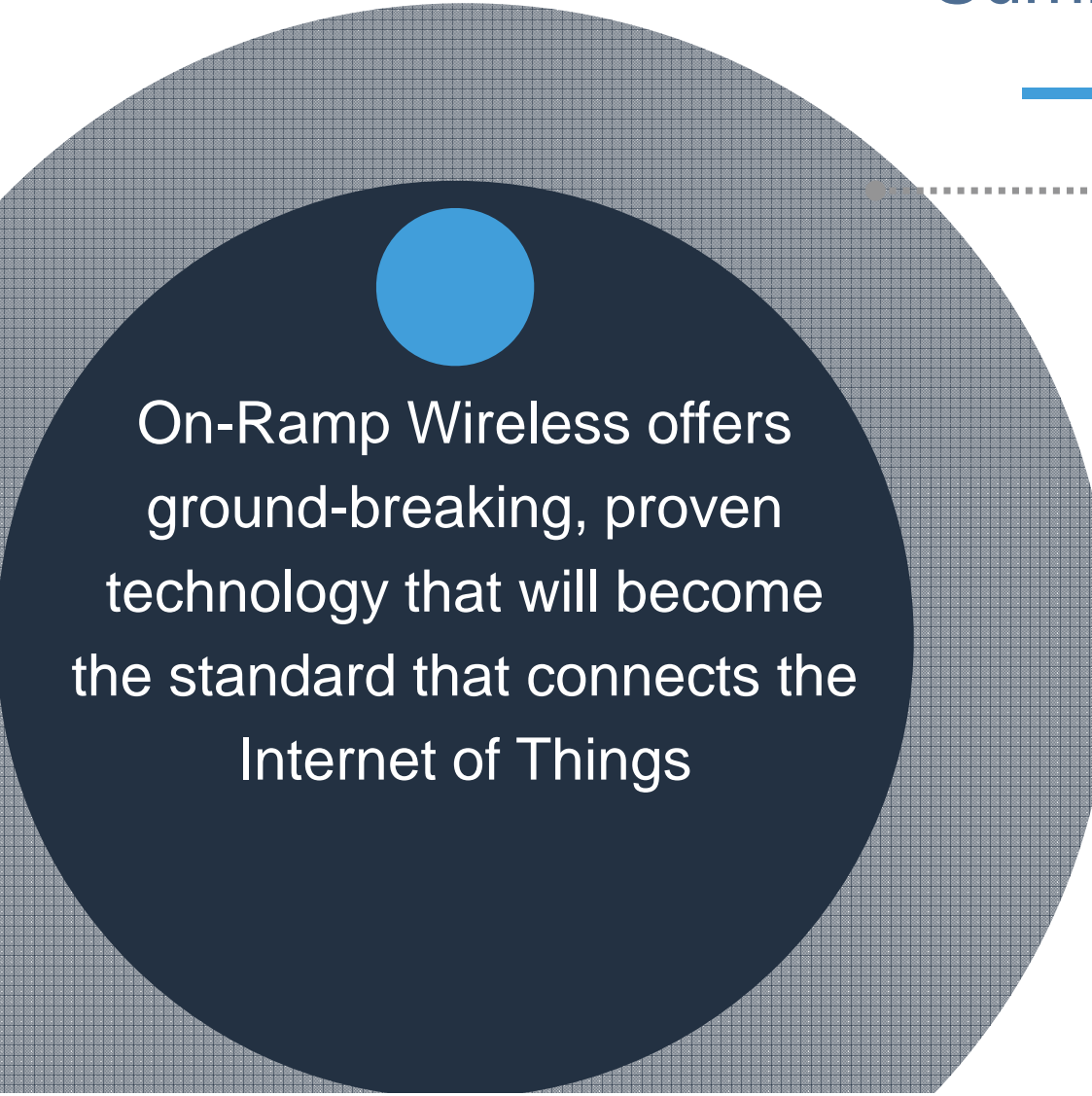
On-Ramp provides Integration Support, Training and Certification

RPMA Evolution and Growth

Three Phases of Products and Networks



Summary



On-Ramp Wireless offers ground-breaking, proven technology that will become the standard that connects the Internet of Things

- Addresses a massive IoT market opportunity
- Highly differentiated and patented technology
- Operationally proven at scale
- Rapidly growing business partner ecosystem
- High-margin, high-leverage business model
- Experienced management team and board