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DENVER, CO
OCTOBER 17-20



IMPROVING IOT CONNECTIVITY

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Powerful LPWAN Solutions for IoT

Chris Kocks
Director, IoT Practice
pureIntegration



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History of Wireless

First wireless voice communication

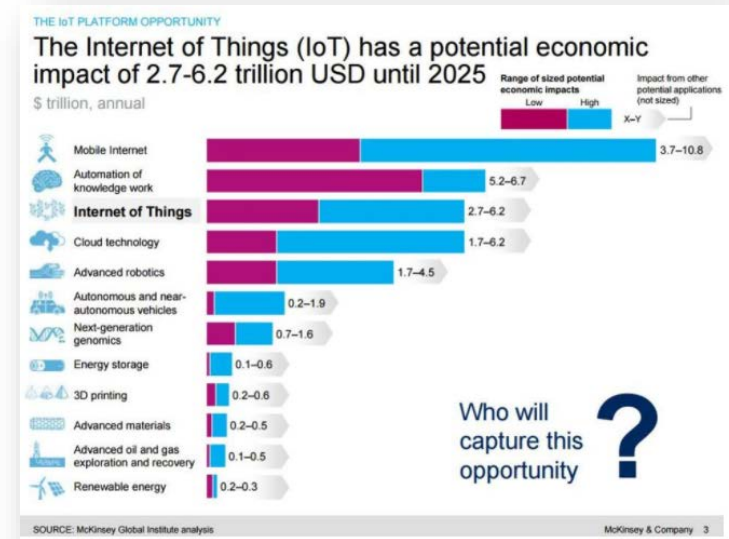
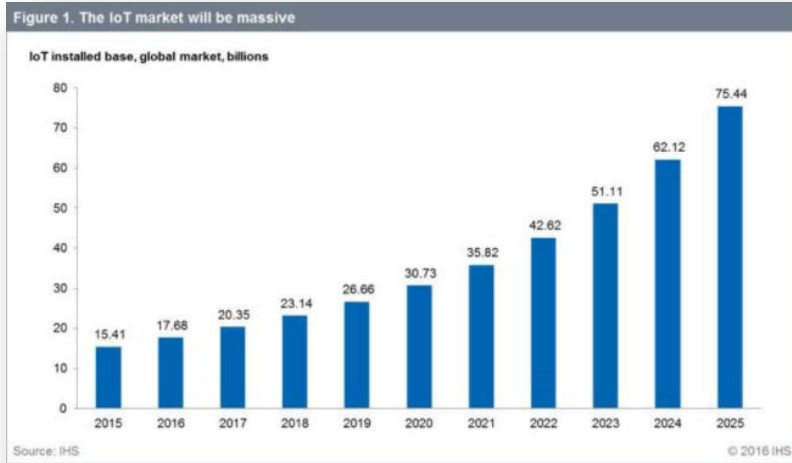
The *photophone*, invented in June 1880 used a beam of light to successfully transmit a voice message a few buildings away. However, *telegraph* transmitters were used predominantly until WW1 and the contributions from Guglielmo Marconi fueled the dominance of *radiotelegraphy* and *television* for most of the 21st century. It was in the 90s & 2000s when we began to see wide-spread use of *Wi-Fi* & *cellular*.

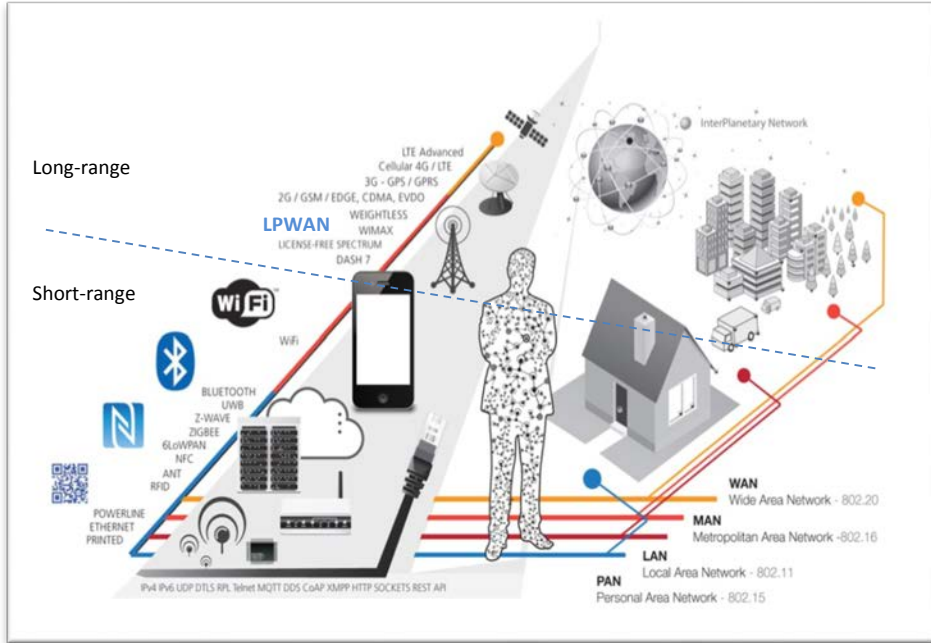


Photophone invented by Alexander Graham Bell in June 1880

IoT Market Forecasts

IoT is driving a dramatic increase in wireless communications; sensors to gateway to cloud





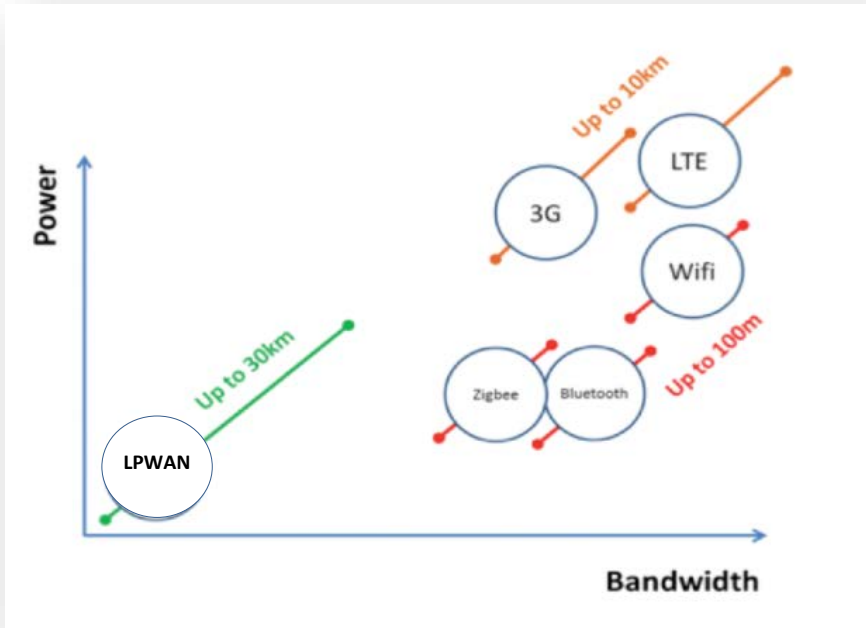
Wireless Technologies Spectrum

Short-range versus Long-range

Short-range wireless has exploded in usage for mobile internet usage, personal wearables, home security, and inventory tracking.

Long-range wireless has exploded to handle demand for mobile OTT video, M2M/V2V communication, and global access & distribution.

IoT Wireless Technologies Spectrum by Postscapes.com



Wireless Power Comparison

Low-power versus Low-latency

Low-power wireless is specifically designed to optimize sensor device power usage with very small, intermittent data packets. Many large-scale use cases fit this mode perfectly.

Low-latency wireless is designed to maintain a high QOS for persistent applications that require constant communications and immediate response.

Wireless Feature Comparison

LPWAN vs. Short-range vs. Cellular

LPWAN	Short-Range	Cellular 4G LTE
Range is 6km-10km	Range is 100m-300m	Range is 10km-20km
Unlicensed spectrum 915Mhz	Licensed Spectrum 2.4Ghz	Licensed Spectrum
Long battery life (8-10yrs)	Short battery life (1-2yrs)	Short battery life (hrs or wks)
High latency	Low-Medium latency	Low latency
Low data rates (10s of Kbps)	Medium data rates (100s of Kbps)	High data rates (Gbps)
Low cost sensors	Low cost sensors	High cost sensors
Medium cost gateways	Medium cost gateways	High cost base station
100s of devices/gateway	100s of devices/gateway	1000s of devices/base station
High penetration of walls/floors	Medium penetration of walls/floors	Medium penetration of walls/floors
Better in rural and indoor	Better indoor	Better in urban and indoor

LPWAN Test Devices

Semtech LoRaWAN on Raspberry Pi

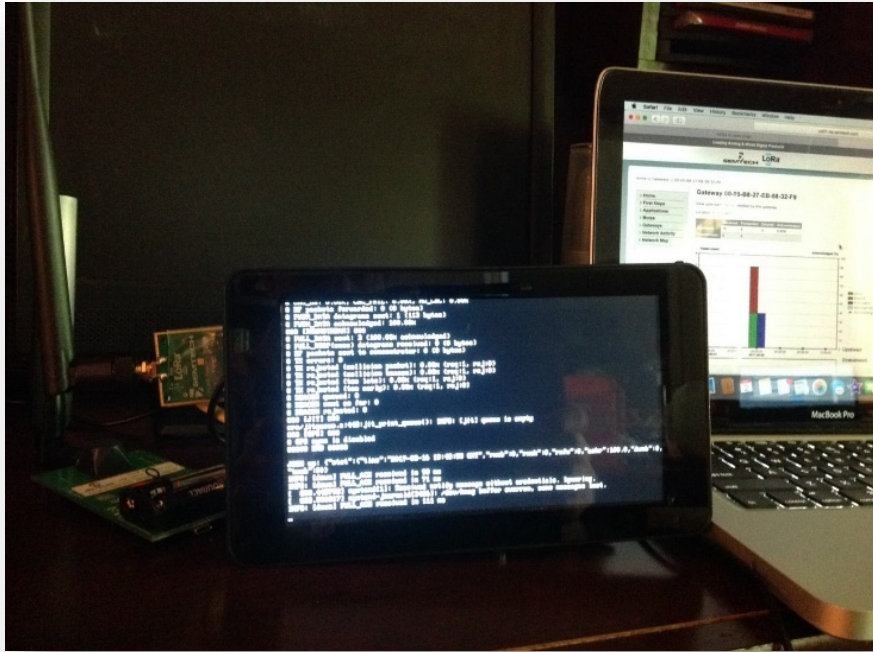
Initial prototypes can be quickly assembled and tested to prove the concept of hosting a LoRaWAN gateway on inexpensive reference implementations.

The LoRa Alliance maintains an ecosystem of sensor device vendor solution on their website.

www.lora-alliance.org



“First-ever” LoRaWAN on RDK-B Cable Platform



Enabling Smart City Solutions

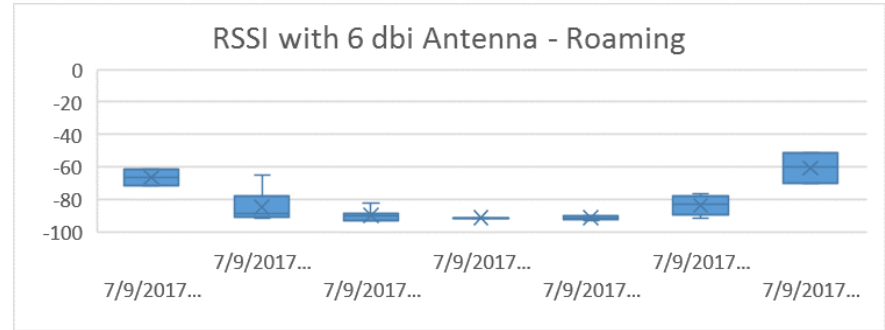
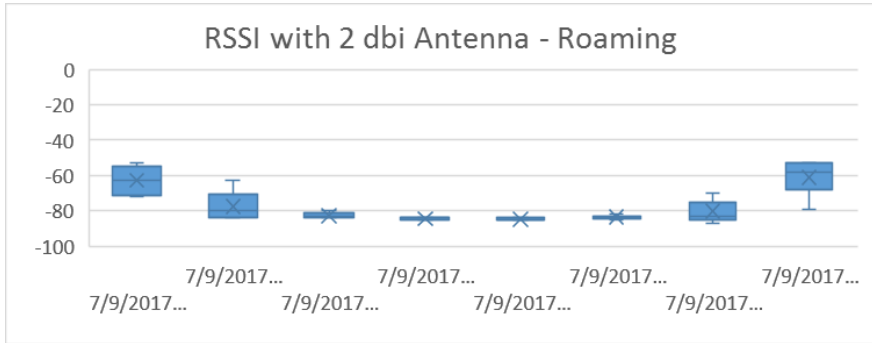
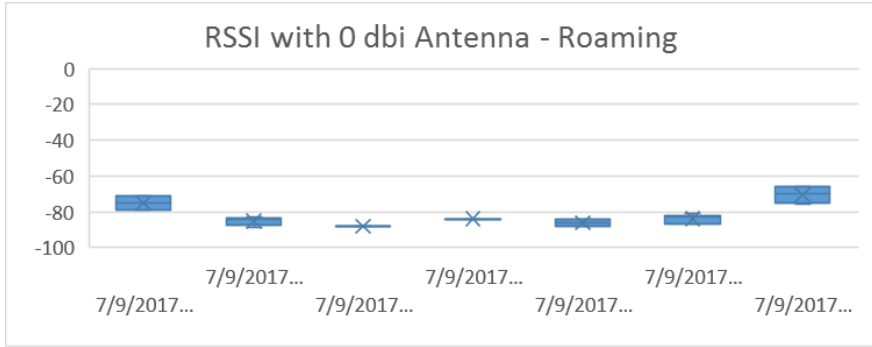
The big deal is that large smart city initiatives greatly benefit from just a few gateways and a longer range of (6km – 10km).

Home & Business Automation

Home & business gateways with LoRaWAN can enable high density and sensor battery life exceeding 8-10 years to control equipment and plug into the smart city ecosystem to manage meters and utilities.

LPWAN Test Results

The graphs on this page illustrate signal strength maintained in the -60dbm to -90dbm range.



Conclusion

LPWAN technologies are very robust and are positioned well to lead the IoT industry with low-power and low-data-rate solutions.

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THANK YOU!

Chris Kocks

Chris.Kocks@pureIntegration.com

678-467-7458



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