
lumenradio
Device-to-device connectivity
for HVAC & Building Automation

Agenda

- Quick introduction to LumenRadio
- Cognitive Coexistence – mitigating interference in a unique way
- Concurrent Bluetooth – industrial-grade mesh, while not sacrificing UI/UX opportunities
- Why wireless technologies in Commercial Buildings?
- W-Modbus – product example of “wireless cable”
- Produal – customer case within HVAC & Building Automation
- Questions & Answers

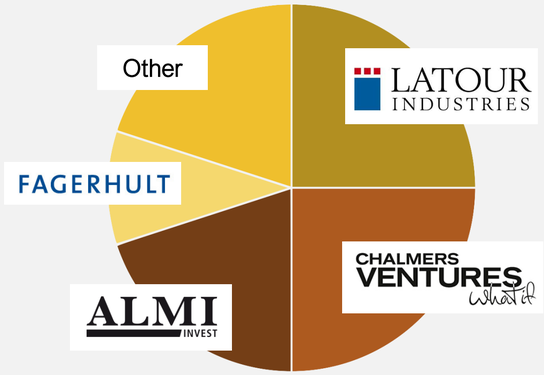
Our Company

45

employees

13

years in the business



18

patents

4

locations

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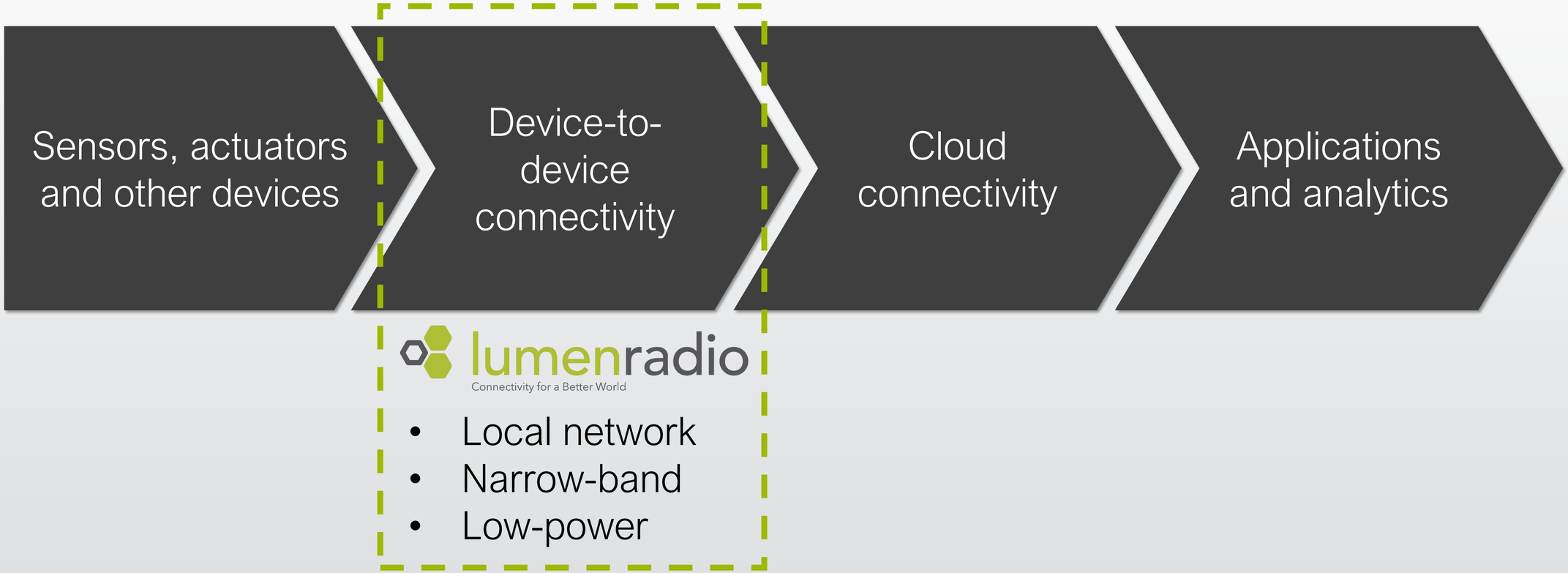
Our position in the IoT value chain



Our Offer

End-user Devices — Low-threshold products for easy integration – “wireless cables”

Wireless Modules — Powerful, certified wireless radio modules optimized for our OS

Operating System — Mesh networks, low power mode, easy FW updates and commissioning

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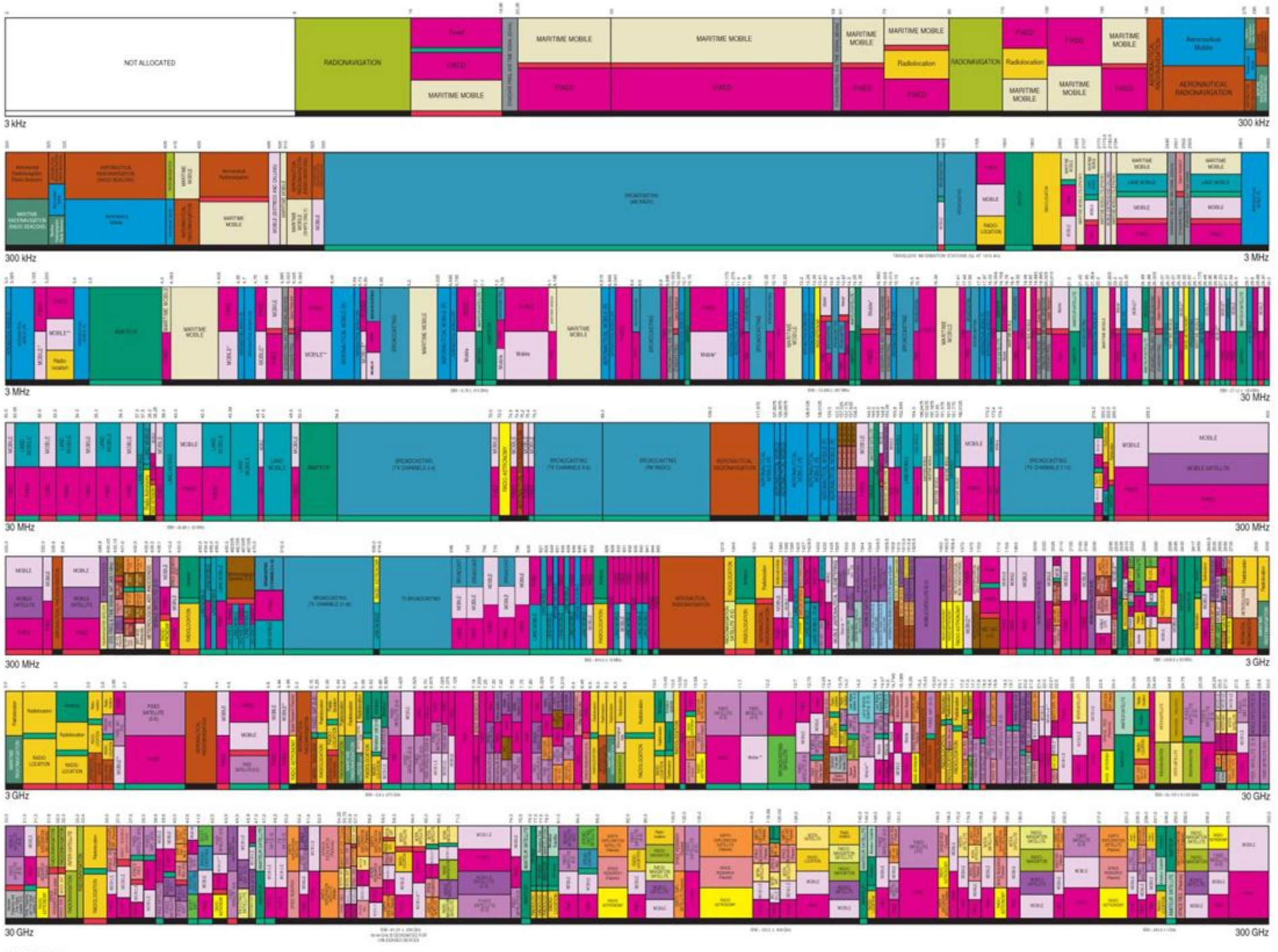
COGNITIVE COEXISTENCE

UNITED STATES FREQUENCY ALLOCATIONS

THE RADIO SPECTRUM



RADIO SERVICES COLOR LEGEND

- AERONAUTICAL MOBILE
- AERONAUTICAL MOBILE SATELLITE
- AERONAUTICAL RADIONAVIGATION
- AMATEUR
- AMATEUR SATELLITE
- BROADCASTING
- BROADCASTING SATELLITE
- EARTH EXPLORATION SATELLITE
- FIXED
- FIXED SATELLITE
- INTER-SATELLITE
- LAND MOBILE
- LAND MOBILE SATELLITE
- MARITIME MOBILE
- MARITIME MOBILE SATELLITE
- MARITIME RADIONAVIGATION
- METEOROLOGICAL AIDS
- METEOROLOGICAL SATELLITE
- MOBILE
- MOBILE SATELLITE
- RADIO ASTRONOMY
- RADIODETERMINATION SATELLITE
- RADIOLOCATION
- RADIOLOCATION SATELLITE
- RADIONAVIGATION
- RADIONAVIGATION SATELLITE
- SPACE OPERATION
- SPACE RESEARCH
- STANDARD FREQUENCY AND TIME SIGNAL
- STANDARD FREQUENCY AND TIME SIGNAL SATELLITE

ACTIVITY CODE

- GOVERNMENT EXCLUSIVE
- GOVERNMENT/NON-GOVERNMENT SHARED
- NON-GOVERNMENT EXCLUSIVE

ALLOCATION USAGE DESIGNATION

SERVICE	EXAMPLE	DESCRIPTION
Primary	FIXED	Capital Letters
Secondary	Mobile	1st Capital with lower case letters

Our Technology

Cognitive Coexistence – LumenRadio's unique, patented technology

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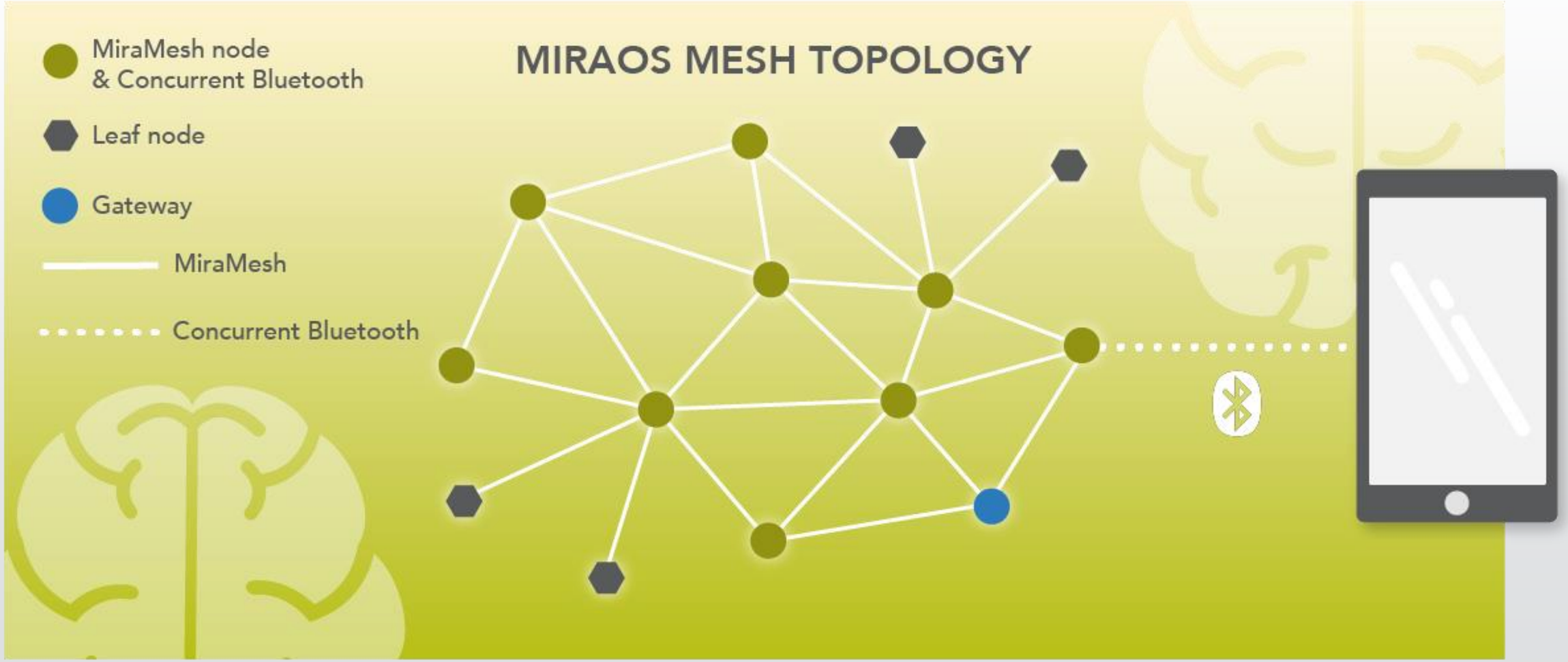
Benefits of Cognitive Coexistence

1. Reliable also under the worst conditions
2. Immune to future interference introduced by devices outside your control
3. Unparalleled range thanks to higher output power (100 mW)
4. More responsive network thanks to much fewer re-transmissions needed (PDR: +99,5%)
5. Tolerant to others, providing a “CIO insurance”

CONCURRENT BLUETOOTH

Our meshing networks



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How does it work?

- Time-sharing the radio between the MiraMesh stack and the Nordic BLE stack
  - The BLE stack has priority in the time-slicing – MiraMesh will ask permission for accessing the radio
- Built on the off-the-shelf version of the Nordic SoftDevice
- Nordic's QDID's can be referenced for Bluetooth listings
- BLE connections should be configured with low-to-medium data rates

What are the possibilities?

1. BLE-based commissioning using a smartphone or tablet
2. Additional UX possibilities – changing set-points, triggering events, etc.
3. Integration of third-party devices
4. Streaming new firmware
5. Beacons for (local) data visualization
6. Beacons for indoor positioning
7. Cost reductions – eliminating the display or other UI components

WHY WIRELESS PRODUCTS IN BUILDINGS?

Indoor climate is key to having high a good workplace

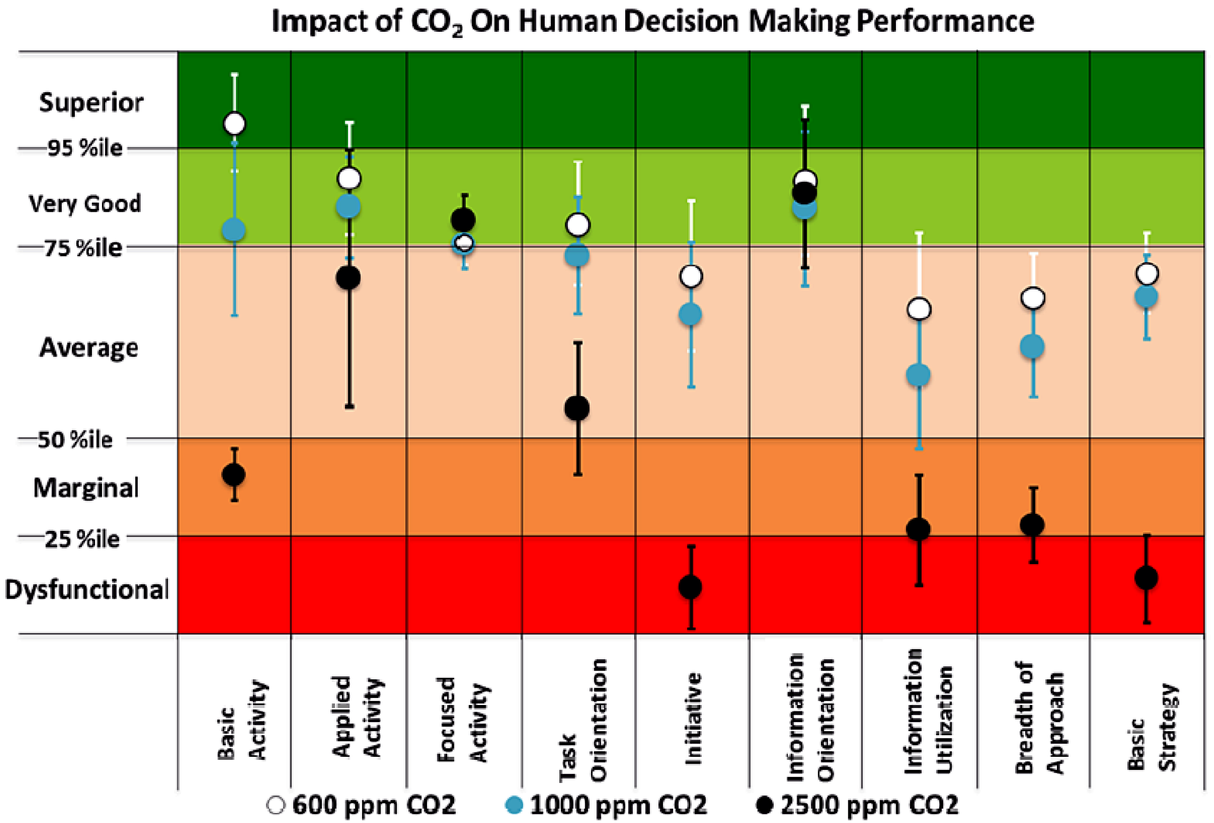

Figure 3. Impact of CO_2 on Human Decision-Making Performance. Error bars indicate one standard deviation. [3].

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The European Green Deal

#EUGreenDeal

W-MODBUS – A PRODUCT FROM LUMENRADIO

Protocol segmentation in Building Automation

Data rates and latency requirements within MiraMesh capabilities.

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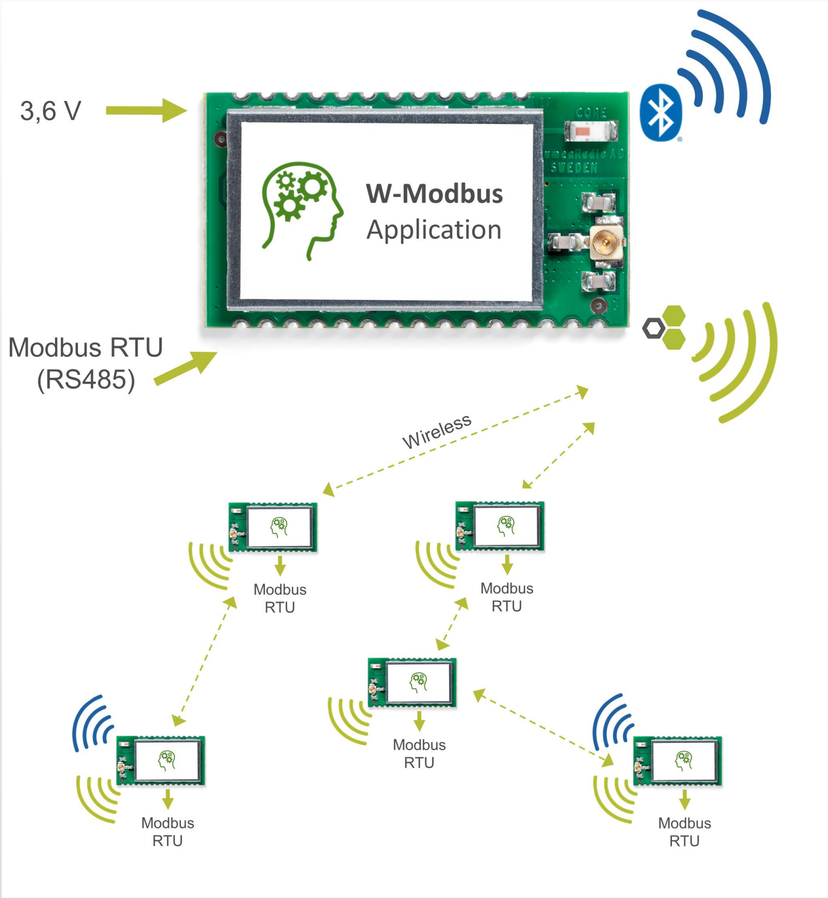
W-Modbus – end-user product or pre-programmed radio module

Sending traditional protocols such as Modbus over MiraOS



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CUSTOMER CASE FROM FINLAND

Produal – a Finnish sensor company for Building Automation

- Working with to LumenRadio for 4 years
- HQ in Helsinki
- Biggest sensor manufacturer for Building Automation in the Nordics
- First fully wireless meshing battery-powered CO_2 sensor on the market in Q1 2021

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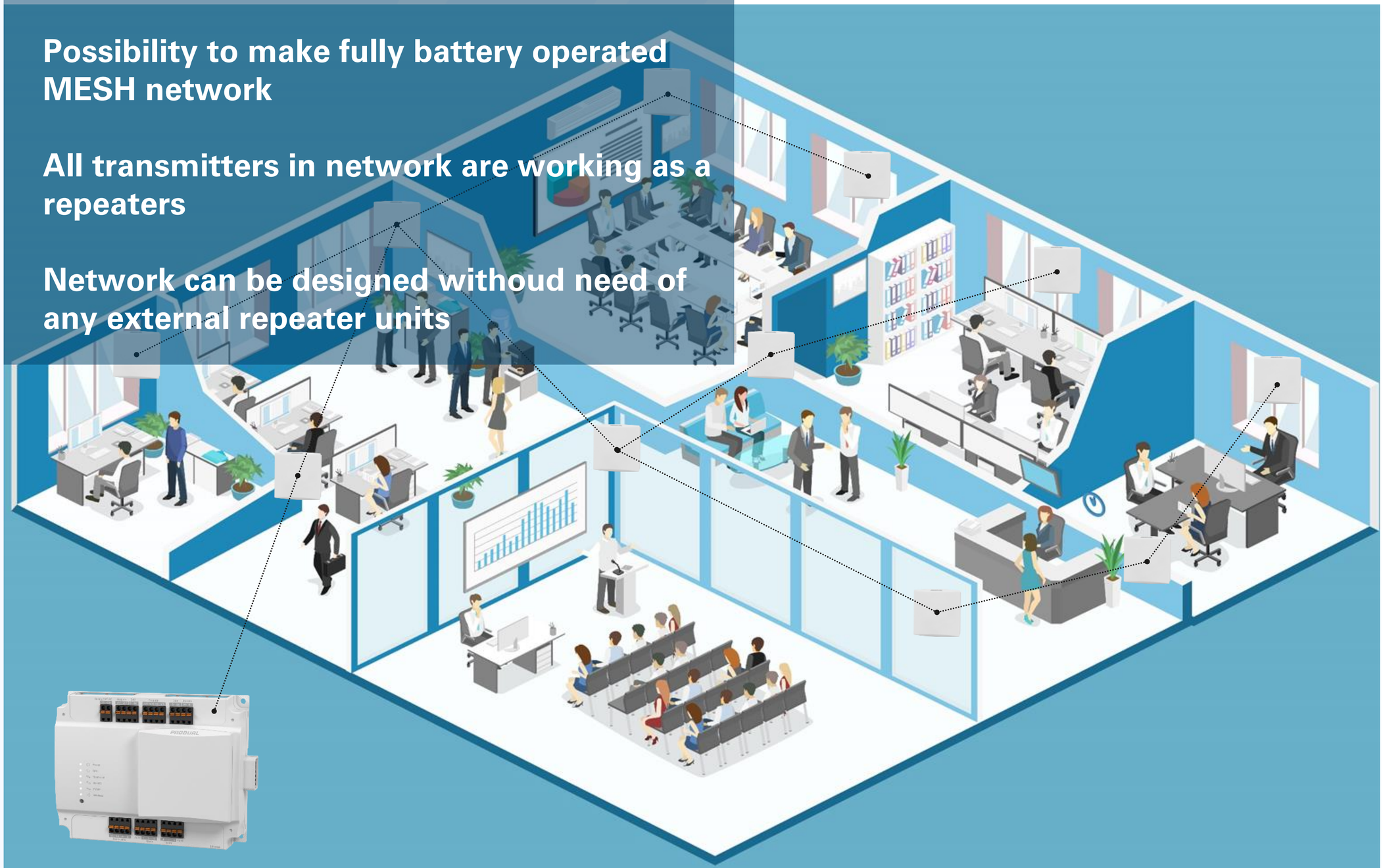
Produal Proxima Wireless

Possibility to make fully battery operated MESH network

All transmitters in network are working as a repeaters

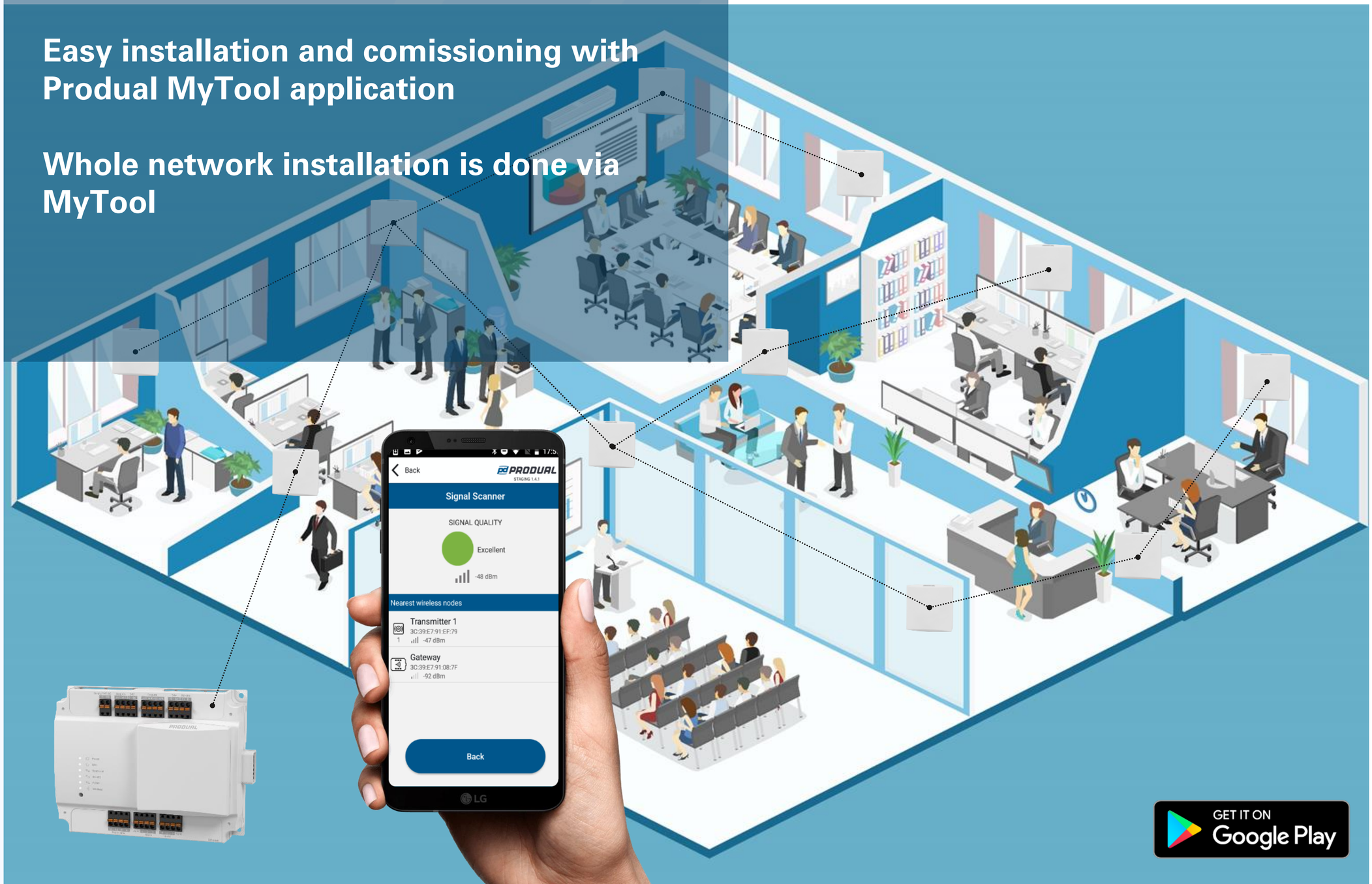
Network can be designed withoud need of any external repeater units

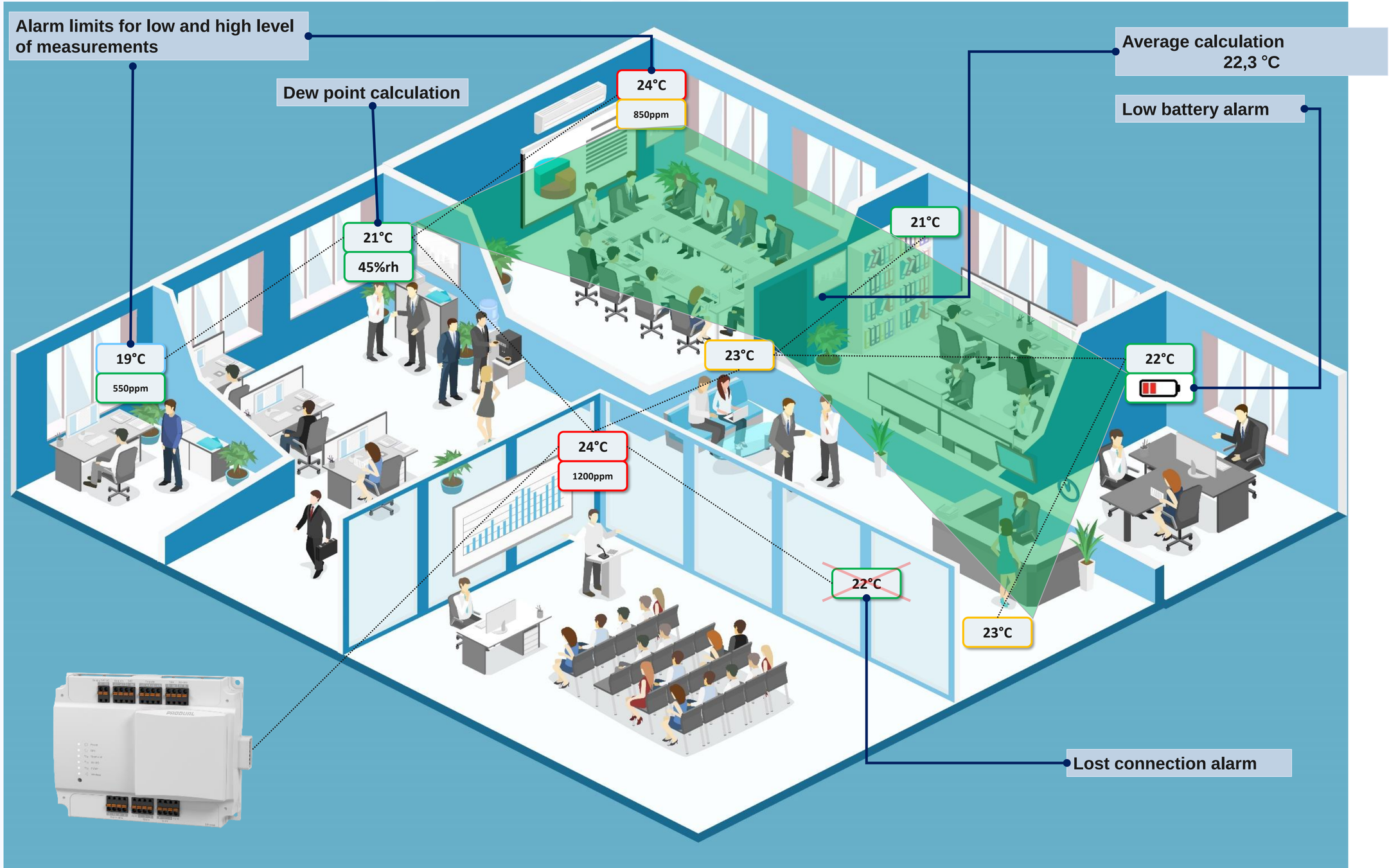


Produal Proxima Wireless

Easy installation and comissioning with Produal MyTool application

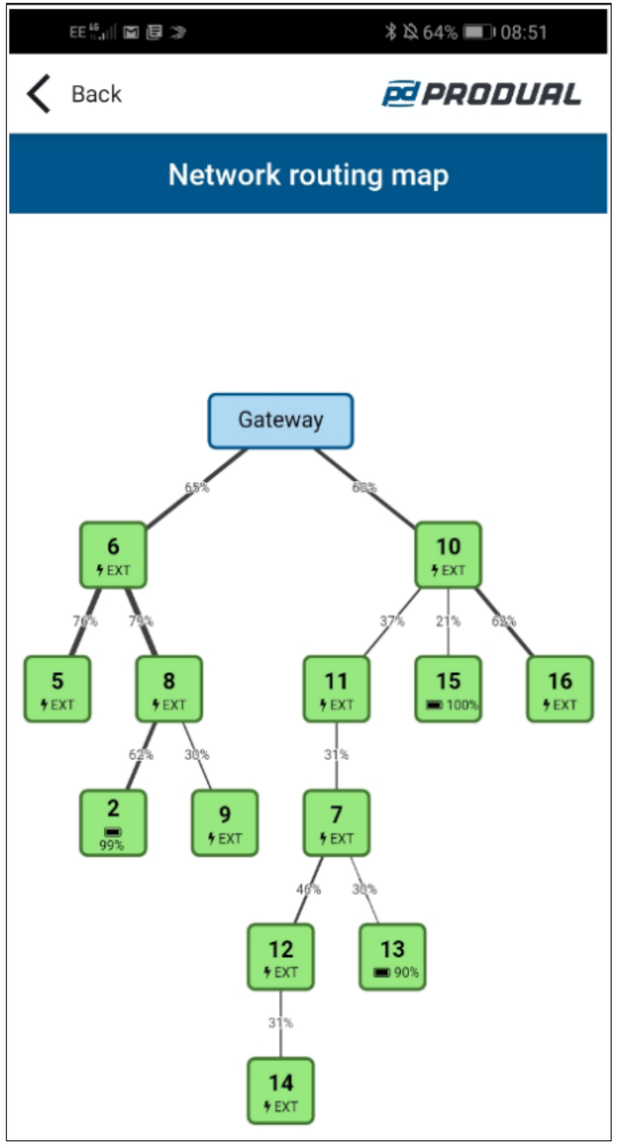
Whole network installation is done via MyTool




Alarm limits for low and high level of measurements
Dew point calculation
Average calculation
22,3 °C
Low battery alarm
24°C
850ppm
21°C
45%rh
21°C
19°C
550ppm
23°C
22°C
24°C
1200ppm
22°C
23°C
Lost connection alarm

Shopping mall Silverburn in Glasgow, UK
Wireless MESH network with 1x WBU and 9x WTR24-CO2 and 2x WTR. Network is covering 450m wide area.

WBU
WTR24-CO2



QUESTIONS & ANSWERS