



## **A New Era of Hybrid Connectivity - WiFi HaLow**

June 5th 2024

Frank Lin

VP of Global Sales & Marketing

- NEWRACOM Corporate History
- 802.11ah HaLow Standard
- Technology Utilization & Value Proposition
- NRC7394 SoC Solution – Proven Performance
- Commercialized / Market Proven Applications

# Corporate Timeline



**2014**



Wi-Fi Team Spun off  
from ETRI

Established  
NEWRACOM in  
California, US

**2016**



Established leadership  
in IEEE 802.11 (Wi-Fi)  
Standardization

World's-first successful  
802.11ah field test

**2019**



Received 802.11n WFA  
Certificate

Introduced world-first  
production 802.11ah  
SoC NRC7292

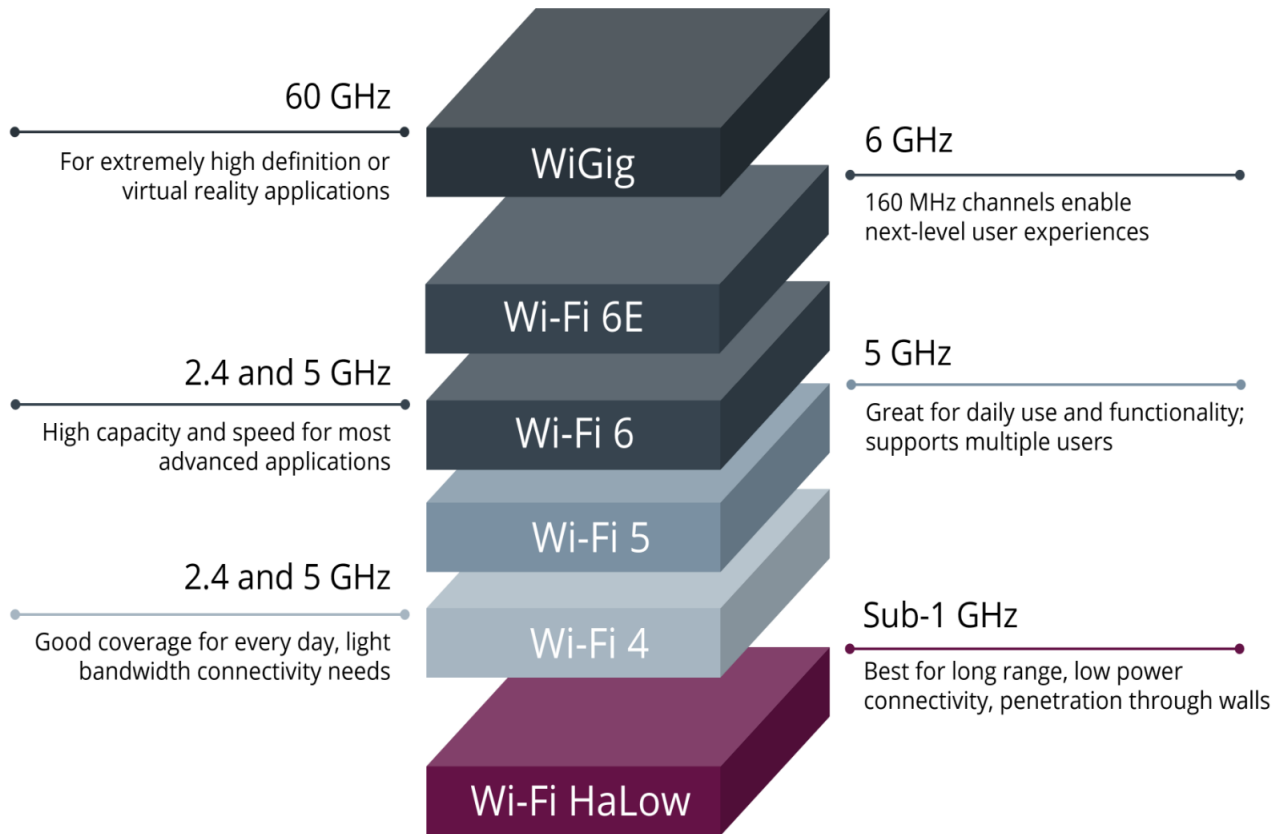
**2021**



First 802.11ah  
commercial products  
launched

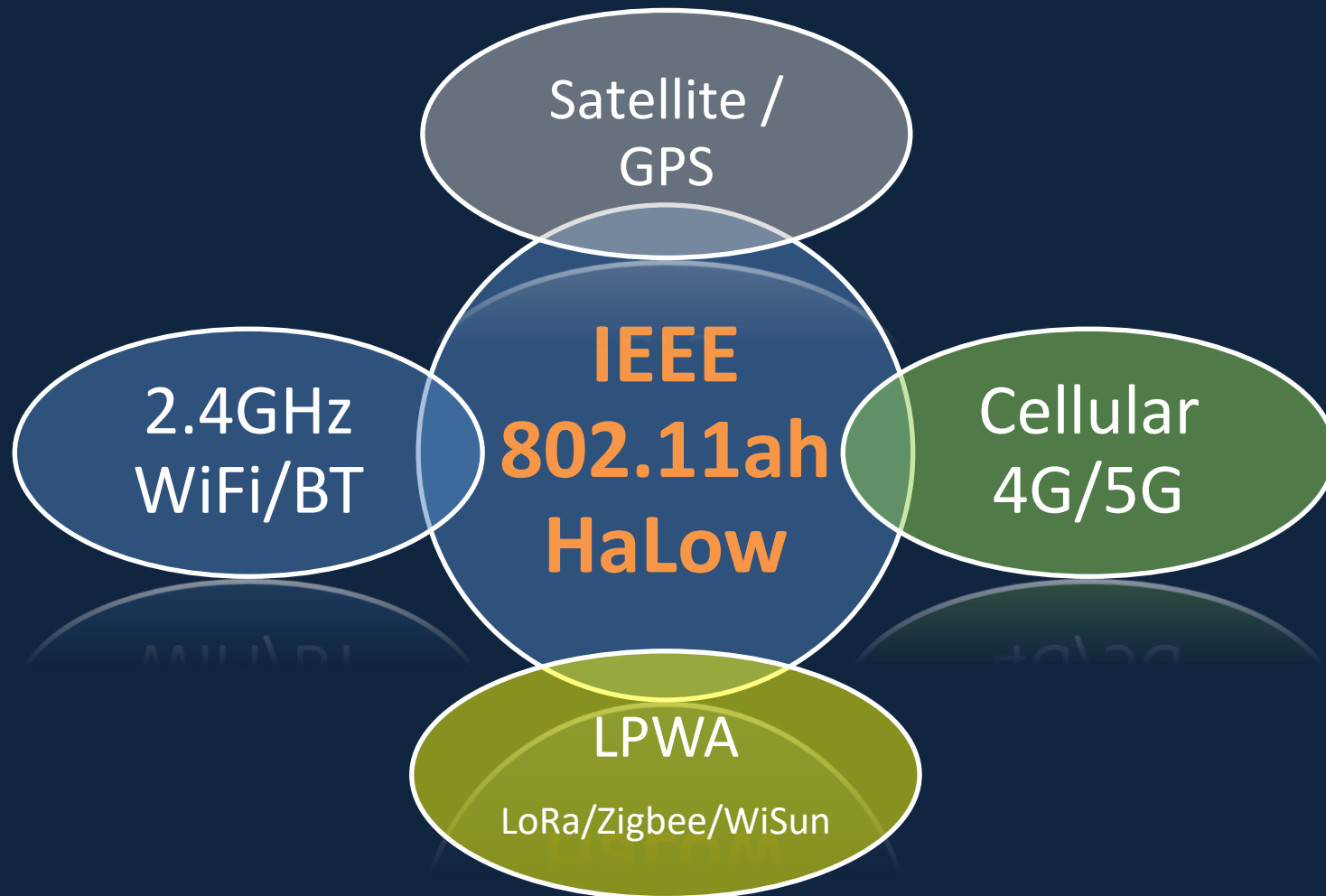
Introduced world's first  
FCC certified solution

# Will WiFi HaLow makes a difference?



- **Complementary** to existing WiFi network
- **Cost and power sufficient** for MASS-DEPLOYMENT
- **Full IEEE global compliance**
- **Time to Market**
- **Increase usage ratio**

# Seamless Connectivity (Value Proposition)



## Cellular:

Alternative **cost effective** network coverage expansion (SIM-less). Increase ARPU & applications

## WiFi/BT:

**Improve** signal penetration under noisy & weak signal environments – remote data access

## LPWA:

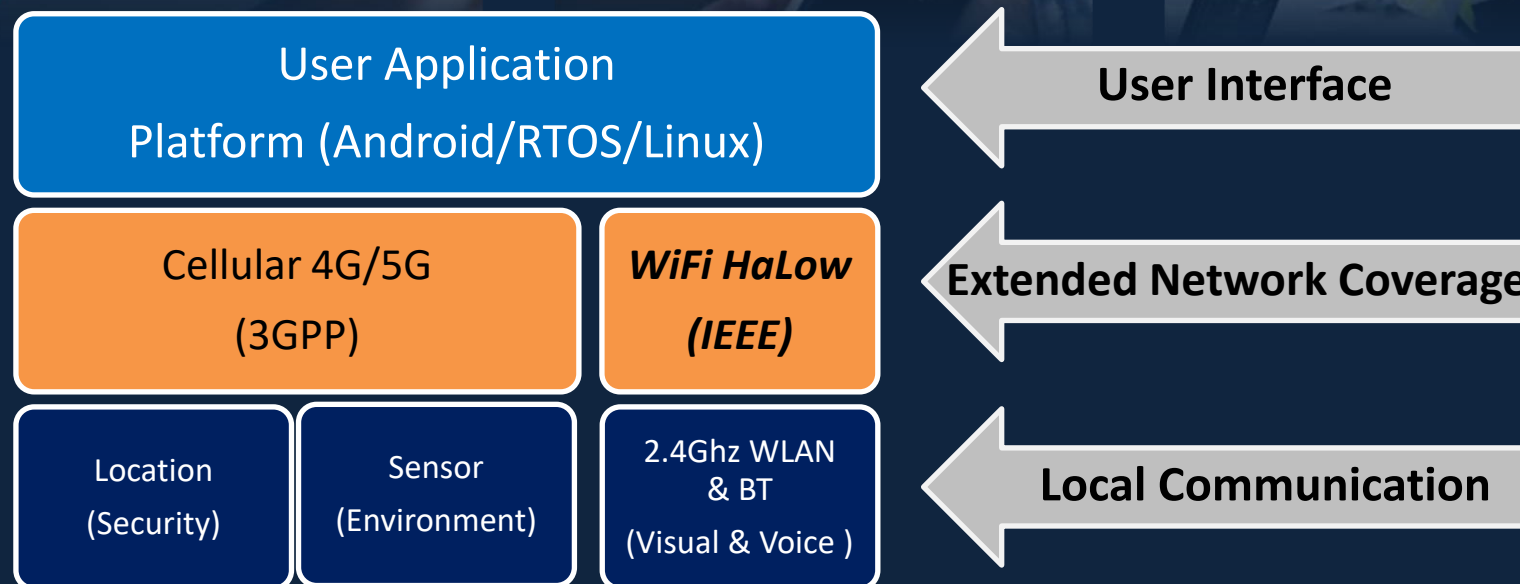
**Increase throughput & data capacity** with real-time notification

## Satellite & GPS:

Location **sharing** in rural areas ground level local wireless network with mobility

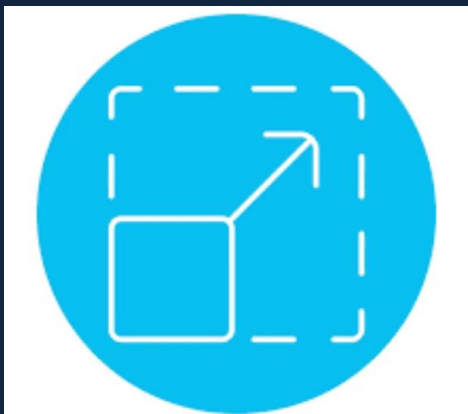


# Seamless Connectivity (User Scenario)

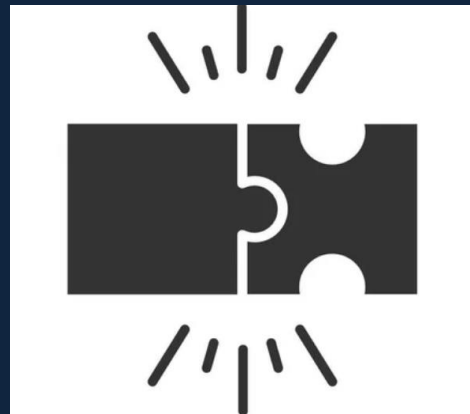


- Paradigm shift to **“IoT for Individual”**
- Work, leisure or on the move!
- Always connected – **Anywhere Anytime**
- **Ultra low power & small size** are two essential factors
- **Powered by NEWRACOM NRC7394**

# Key Challenges for “Mass IoT Deployment”



**Scalability**



**Compatibility**



**Implementation**



**Usability**

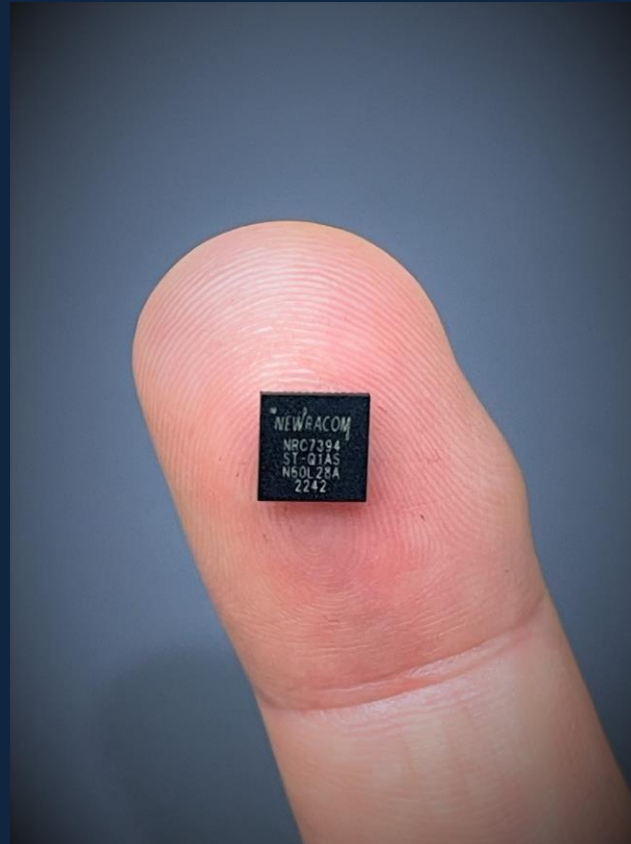


- 3GPP compliance required operator network infrastructure support.
- Complicated product development and commercialization.
- Lack of global unified standard for Mass-market adaption.
- Lack of personal IOT applications and user scenarios.
- Technical limitations on data rate and low utilization – limited applications
- Low usage rate = low profitability.

# NRC7394 802.11ah WiFi HaLow SoC



## World Smallest Production SoC (since 2018) and SoM (System on Module)



**arm** Cortex-3

Linux and RTOS support  
Device or AP Mode (software)

Global-version

17dBm – Power amplifier

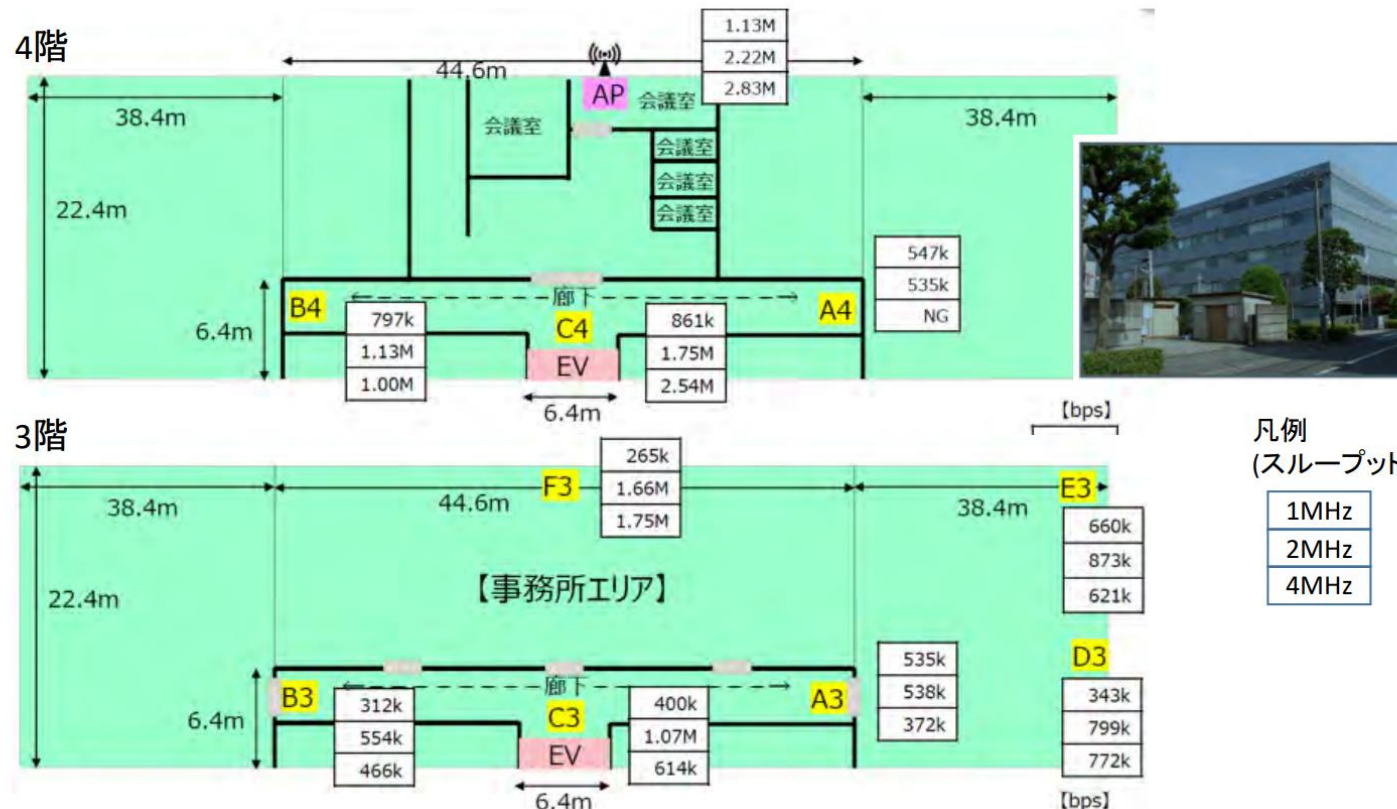
6x6mm QFN - TSMC 40nm

3rd Generation SoC



## ① 屋内・オフィス環境での伝送特性

### 1 台のAPで複数のフロアをカバー

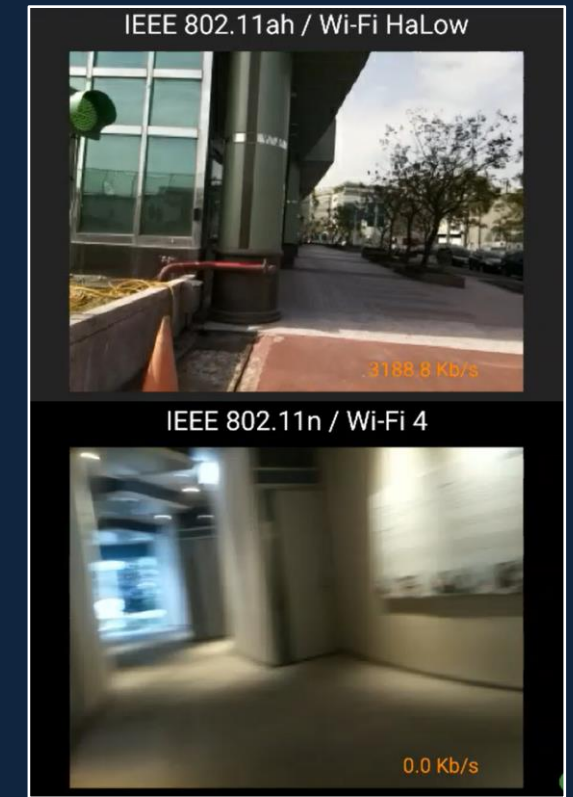
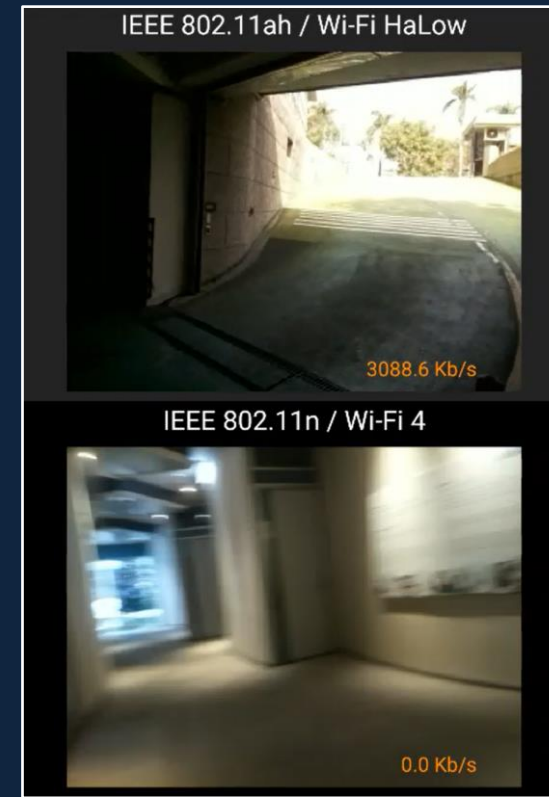
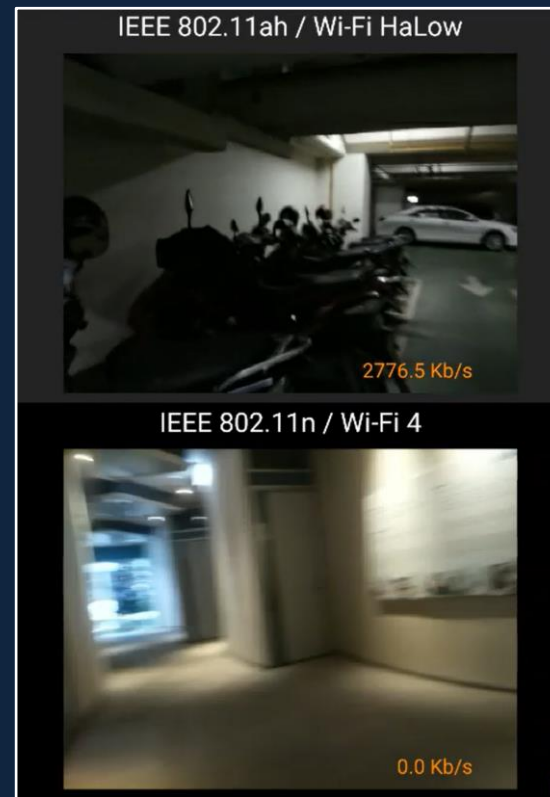


- In-building signal penetration
- Real user environment verifying multi-path and signal interference
- Device mobility and signal stability test

# Underground Parking Test Challenge - Taipei



- Left to right indoor/underground image/video test (AP inside 1<sup>st</sup> floor meeting room)
- Superior signal and data penetration in underground parking.
- Building walk-around test & external wall signal penetration.



# Highspeed & In-Vehicle Test Challenge - Taiwan



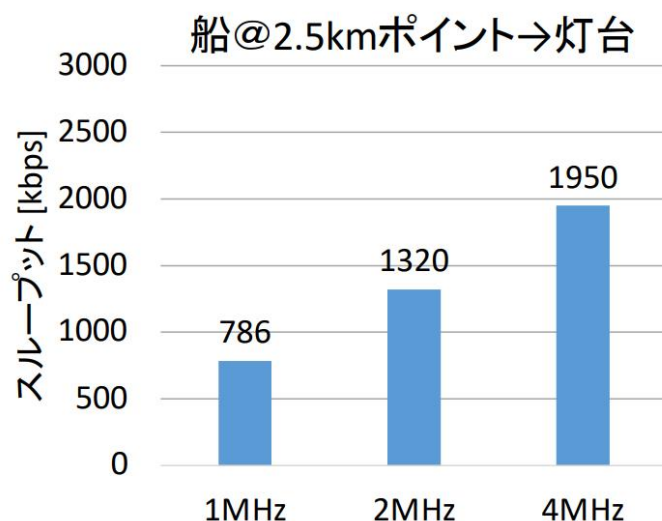
- Live field test in Taiwan both highway and local traffic condition
- Image/video transmission under harsh environments- Multipath, vibration and wind and static noise
- Velocity test under high-speed and dynamic environments.
- Signal penetration and stability validation.





## ③屋外ルーラルの測定結果： 海面反射波の影響

- 海面反射のある沿岸部において、既存の2波モデルをベースとした伝搬モデルによって伝搬損失が推定できることを確認
- 2.5km離れた場所でも、2MHz伝送で1.3Mbps、4MHz伝送で約2Mbpsのスループットを確認



調査船位置: N 35 12.990, E 139 8.785

- Maximum line of sight distance over 2.5km and close to 2Mbps.
- Lowest cost local area network for emergency communication & remote data access.
- Drone/UAV, UGV and other smart transportation data management network.

# SUNMI Hyper WiFi Business-IoT Solution



- Common problems for retailer, factory/building automation and large arenas
- Poor and no cellular coverage. Short-range wireless connection is unusable and traditional LPWA solutions with very limited data capacity, i.e. real-time notification for security monitoring applications





# SUNMI Hyper WiFi Business-IoT Solution



Smart Mobile Terminal

## SUNMI V3 MIX

MIX, the all-in-one enterprise tablet.



## SUNMI Hyper Wi-Fi Module

Compatible with  
SUNMI Hyper Wi-Fi

- Seamless Wireless Connectivity
- Multi-radio Hybrid Network Solution
- World First All-band 802.11ah Total Solution
- **Powered by NEWRACOM NRC7394 SoC**



## SUNMI 80mm Kitchen Cloud Printer

One printer for online and offline orders.

Compatible with  
SUNMI Hyper Wi-Fi

Multiple languages supported



## SUNMI MINI AP

Mini in size, powerful in communication.

Powered by  
SUNMI Hyper Wi-Fi

Plug and play to get Hyper Wi-Fi ready for use.  
No need to change how your device is connected.

# SUNMI Hyper WiFi Business-IoT Solution



SUNMI Hyper Wi-Fi

Purchase inquiry

**SUNMI**  
HYPER WI-FI

**SUNMI Hyper Wi-Fi**

Stay connected wherever your business takes you.

- Significant network cost saving
- Increase Productivity
- Sufficient data capacity and real-time notification

**10X+**

**The Distance Other Wi-Fi  
Can Travel**

Better Wall Penetration

**1km**

**Maximum Range**

**90%↓**

**Roaming Times**

Prevent Devices From Being Stuck,  
Latency and Disconnection

## SUNMI Home (Xiaomi ecosystem chain focuses in the field of smart business)

It is located on the 3rd floor of Taipei Sanchuang Living Park. "Sunmi Home" is a shared experience space operated by Sunmi Technology, which provides experience in application scenarios created by different industries, as well as a variety of Android smart retail solutions. Introducing the advantages of the Internet into the chain franchise industry Merchants, such as the self-service check-in machine of the hotel system, only need to check in through facial recognition when checking into the hotel, and the payment system can directly complete the purchase through facial recognition. A variety of application scenarios are displayed on site to experience POS machines and demonstrate the catering industry.

In the store, consumers can pay directly and quickly through facial recognition.







On March 1<sup>st</sup> 2024, AcSiP and NEWRACOM signed a global strategic agreement (MoU) to jointly develop new application 802.11ah markets. AcSiP's latest NRC7394 system module with industry leading ultra-low power and small footprint for battery powered devices.



- **arm** Cortex M3
- Integrated PA
- 12 x 12mm SoM
- E Ink Partnership
- World-First WiFi HaLow Logistic Tag
- Solution available Q3 2024

# SONY

## SPRESENSE用 WiFi HaLow 拡張ボード(VIZMONET)




**Contact**  
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Email: [enquiry@vizmonet.com](mailto:enquiry@vizmonet.com)

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Vizmonet Pte Ltd  
21, Woodlands Close  
#03-01, Primz Biz Hub  
Singapore 737 854

**ahSP1**

**IEEE 802.11 ah**  
High-Performance,  
World's first Wi-Fi-  
HaLow module  
available for SONY  
SPRESENSE

**Sub GHz ISM Band**  
902 MHz to 928 MHz  
operating Frequency in  
license-free Band, 1/2/4  
MHz Channel Bandwidths

**Industrial grade**  
-40 deg C to +85 deg C  
operation temperature



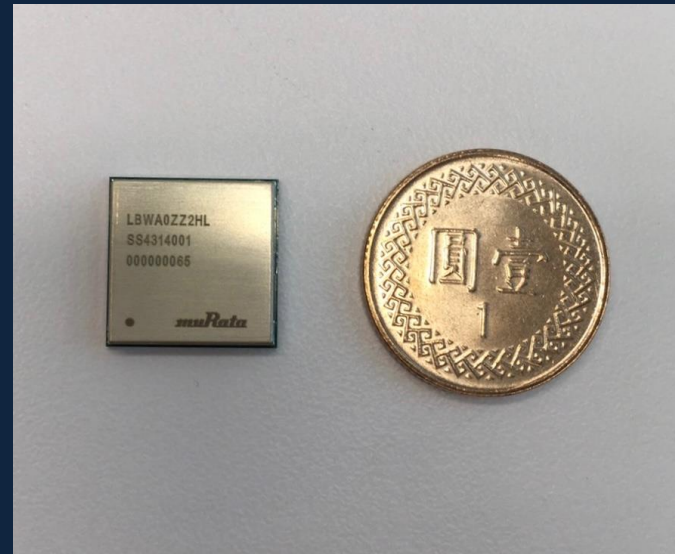
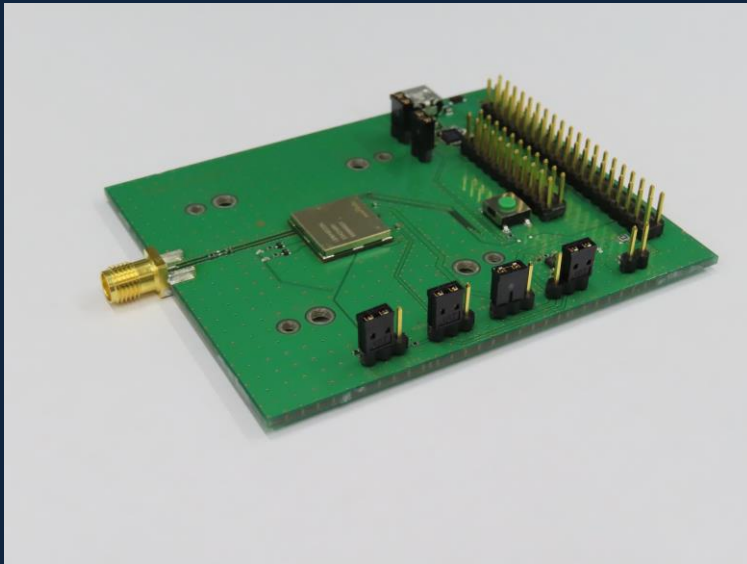




Murata's first 802.11ah HaLow System on Module

Powered by **NEWRACOM NRC7394 SoC**

Global Strategic Partnership for World-wide promotion



**arm** Cortex-M3

Linux and RTOS support

Client or AP Mode (software)

Support 850 to 950MHz

13 x 13mm SoM

"参考出展" 製品化未定につき予告なく製品化中止になる可能性があります

"Reference exhibit." Commercialization is undecided and may be discontinued without notice.

- Joint development with Tier-1 automotive system solution
- Seamless network expansion and reduce operating cost by 75%

## 検討例④

### EV充電器

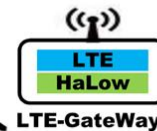
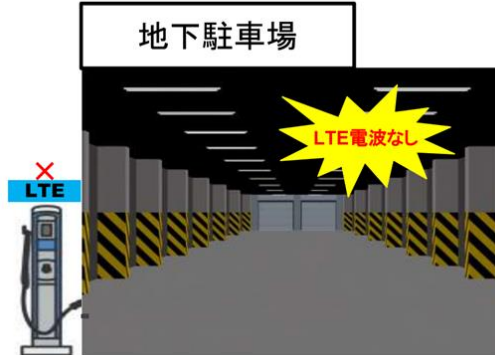
地下駐車場対応  
LTE契約数削減

LTE搭載

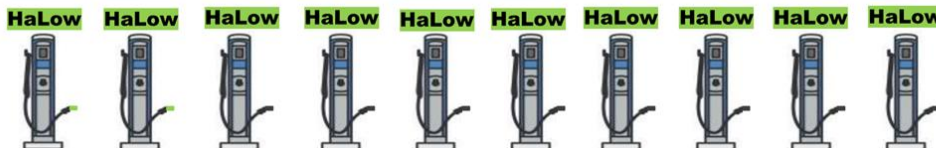


#### LTE通信情報

- ・ 充電有無
- ・ 充電電力状況
- ・ EV車両充電%
- ・ VPP法に適合した充電制御



LTE-GateWay

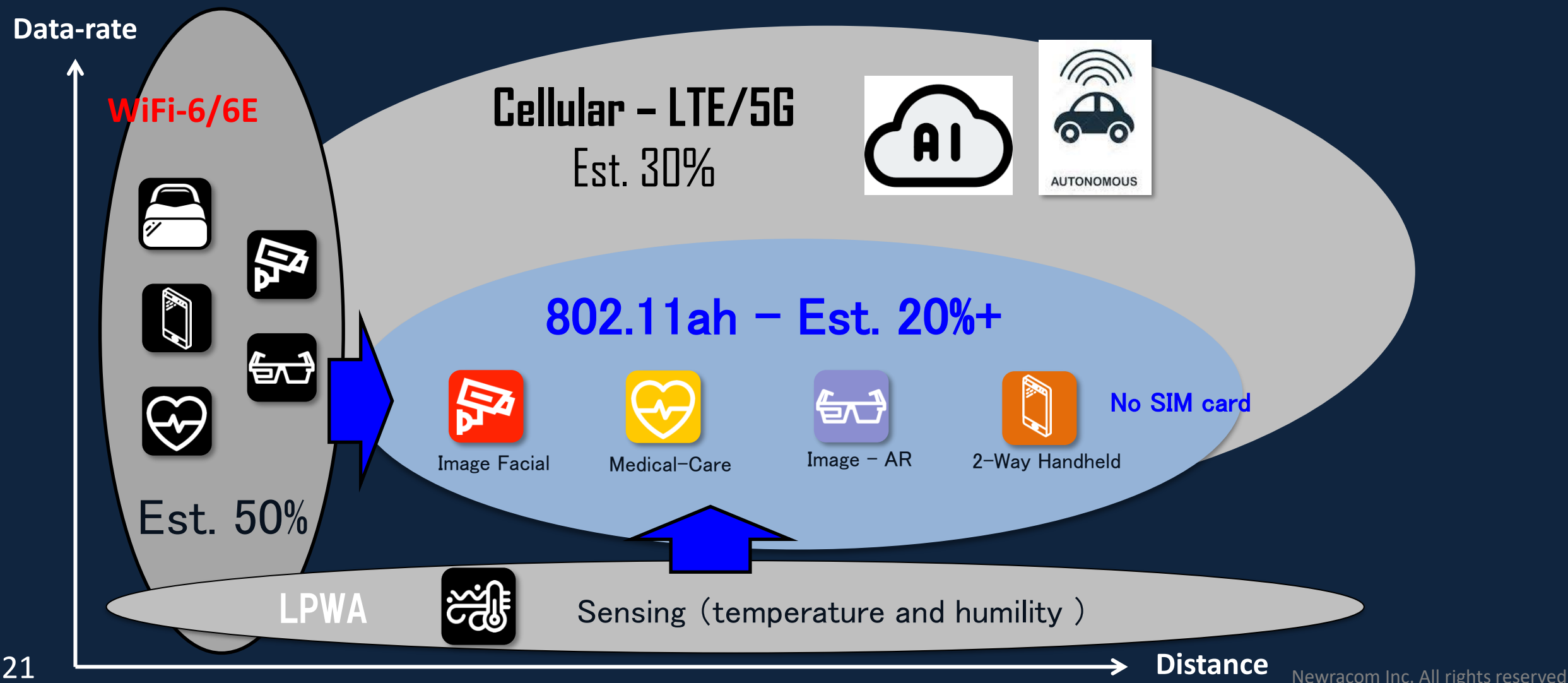


EV充電駐車場  
大規模/地下駐車場

## Key Scenarios:

- V2V (Vehicle-to-Vehicle) safety and collision prevention
- V2I (Vehicle-to-Infrastructure)
- Vehicle smart & connected diagnostic
- Smart transportation networking
- Vehicle remote access & automation
- Route guidance and fleet management

## Market Size and User Penetration



# Global Eco-system Partners



## Client Device



## Network Infrastructure



## Hybrid Solution



**Thank  
You**

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