



Presentation by Megachips at Computex Taipei

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MegaChips Confidential

Preliminary



<Products and BackGround>

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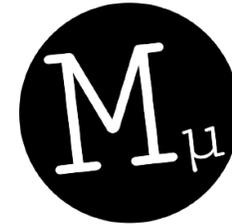
Wi-Fi HaLow



◆ MegaChips and Morse Micro

MegaChips

- Japan’s first semiconductor fabless company.
- Providing total solutions from LSI design and development to production based on our unique analog and digital technologies.
- Manufacture IC and module products using a network of manufacturing partners.



Morse Micro

reaching farther™

- Founded in 2016, in Australia by engineers from a major U.S. telecommunications company.
- Sales globally with offices in the U.S., Taiwan, U.K., India, and China.
- One of only two Wi-Fi HaLow™ RF IC manufactures.

We are [the only manufacturing and sales partner in Japan](#) for ICs manufactured by Morse Micro.

We invested in Morse Micro in September 2022, and have entered into [a strategic partnership](#) for supply and sales activities of semiconductor and module products.

We use Morse Micro’s transceiver IC in our module products, and together with Morse Micro, we are proposing high value-added products and solutions for the Japan

◆ Wi-Fi HaLow RF module

RF modules for easily implement Wi-Fi HaLow™ communication.

1. Supports for access point and station roles

Available as either an access point(AP) and station(STA).

2. Simple specifications

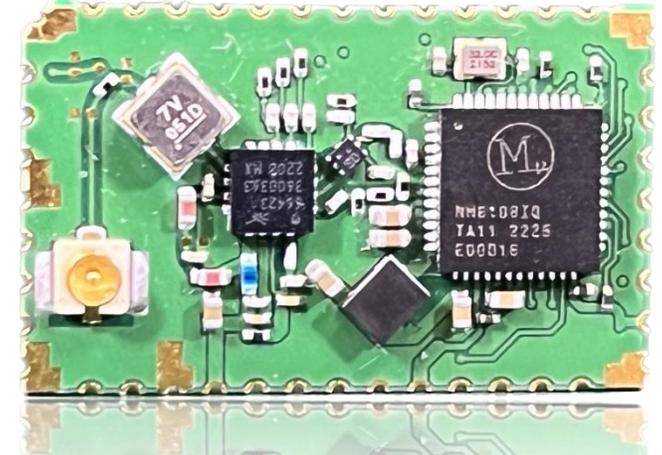
Can be implemented at appropriate cost by installing the minimum functions required for Wi-Fi HaLow communication.

3. Technical Standards Conformity Certified

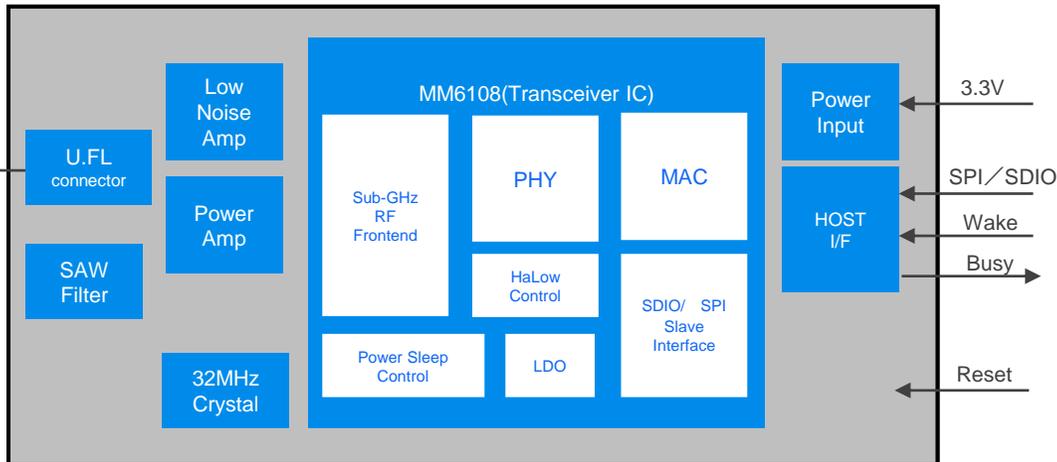
Not required to obtain technical qualification for the final product embedded the module. (ARIB and FCC version available)

Item No. : MRF61_A or MRF61_F

< Product Appearance >



< Block diagram >



< Module Specification >

Wireless specification	IEEE802.11ah standard	External size	W:23mm x D:14mm x H:2.25mm	
On-board RF IC	Morse Micro MM6108	Wireless certification	For Japan	
		Antenna terminal	U.FL connector	
Interface	SDIO or SPI mode	Maximum signal strength	13dbm	
		Power-supply voltage	3.3V D	
Physical data rate	150k ~ 15Mbps	Power consumption	When transmitting 15Mbps	118mA
			When receiving	45mA
			PNM Sleep DTIM10	102µA
Range	Approx. 1km of visibility	Operating Temperature	-40°C ~ 85°C	
Mounting Method	Surface mount			

◆ Wi-Fi HaLow MCU on-board module

Item No. : MRF61_A_MCU

RF module with MCU(microcontroller) for Wi-Fi HaLow™.

1. For station specification

Easy to construct by simply connecting sensor devices to this module.

2. Supports cloud service

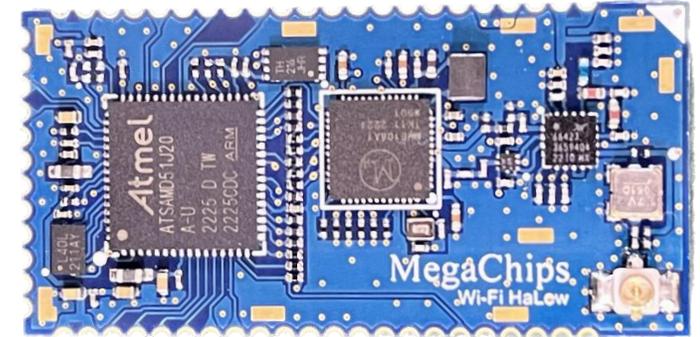
Since Secure Element IC is equipped for cloud connectivity, provisioning is not required when connecting to AWS, etc.

3. Development board supported

A development board for on-board MCU is also available.

4. Technical Standards Conformity Certified

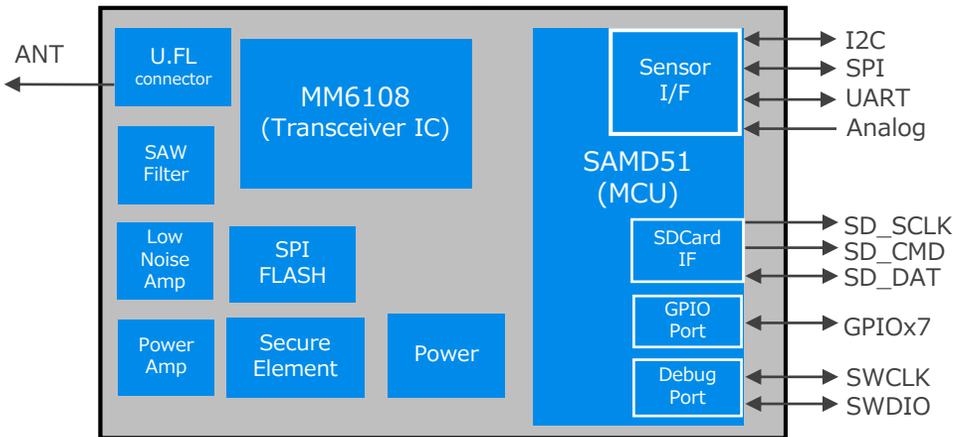
Not required for customers to obtain technical standards compliance. (FCC version available)



< Module Specification >

Wireless specification	IEEE802.11ah standard		External size	W: 20mm x D: 40mm x H: 1.9mm
On-board IC	Transceiver IC	MM6108 Morse Micro	Wireless certification	For Japan
	MCU	SAMD51 Micro Chips		
Interface	SDIO, SPI, I2C, I2S, UART, GPIO, ADC, DAC, PWM, COUNTER TCC, USB2.0		Antenna terminal	U.FL connector
			Secure Element IC	On-board/Off-board selectable
Physical data rate	150k~15Mbps		Maximum signal strength	13dbm
Range	Approx. 1km of visibility		Power-supply voltage	3.3V D
Mounting method	Surface mount		Power consumption	(TBD)
OS of on-board MCU	Amazon Free RTOS		Operating temperature	-40°C~85°C

< Block diagram >

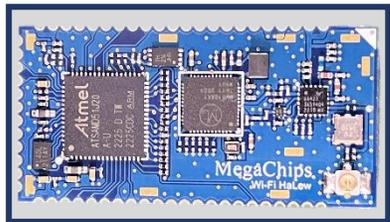


◆ Hardware Products

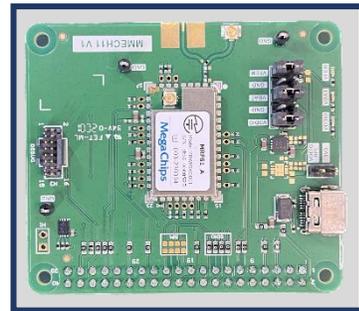
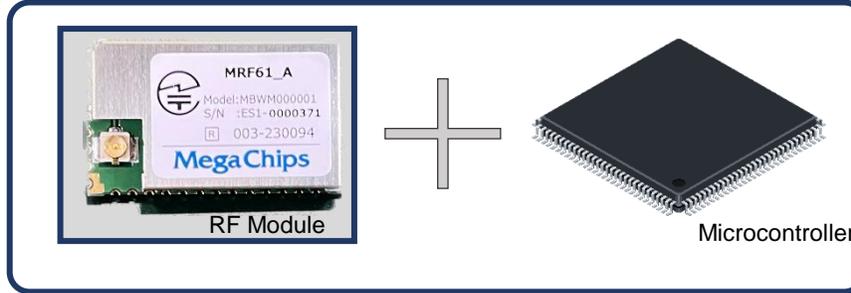
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Development Module



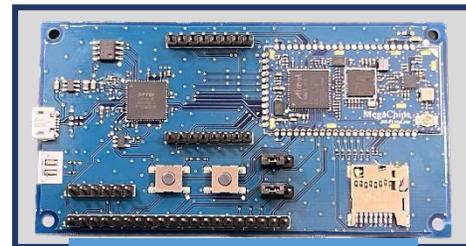
RF Module



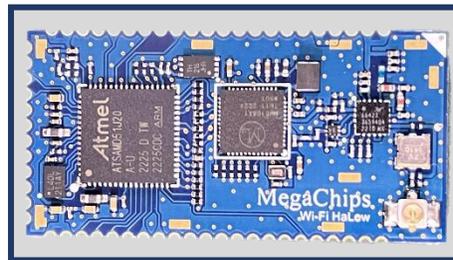
RF + MCU Module



Raspberry Pi HAT



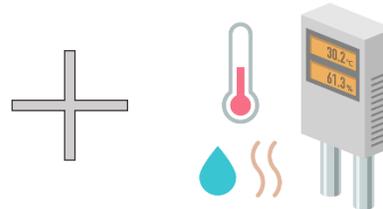
Development Board



Raspberry Pi



Development Kit



Available to build stations easily by connecting sensors, etc.



Available to build stations by connecting Microcontroller and cameras, etc.



Evaluation Kit

For development



< Usecase in Japan >

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◆ Use case example ①

② Complement unreachable distance of 2.4GHz Wi-Fi

By utilizing Wi-Fi HaLow...

Since Wi-Fi HaLow can reach approximately 1km, repeaters are not required, and it has high diffraction performance against walls and obstacles, it **can supplement blind spots in the factory** that other communications, including 2.4GHz Wi-Fi, cannot reach.

Expanding the communication range by using Wi-Fi HaLow.

→ **Cost reduction** by reducing the number of repeaters.



◆ Use case example ②

① Replacement of LTE with HaLow

By utilizing Wi-Fi HaLow...

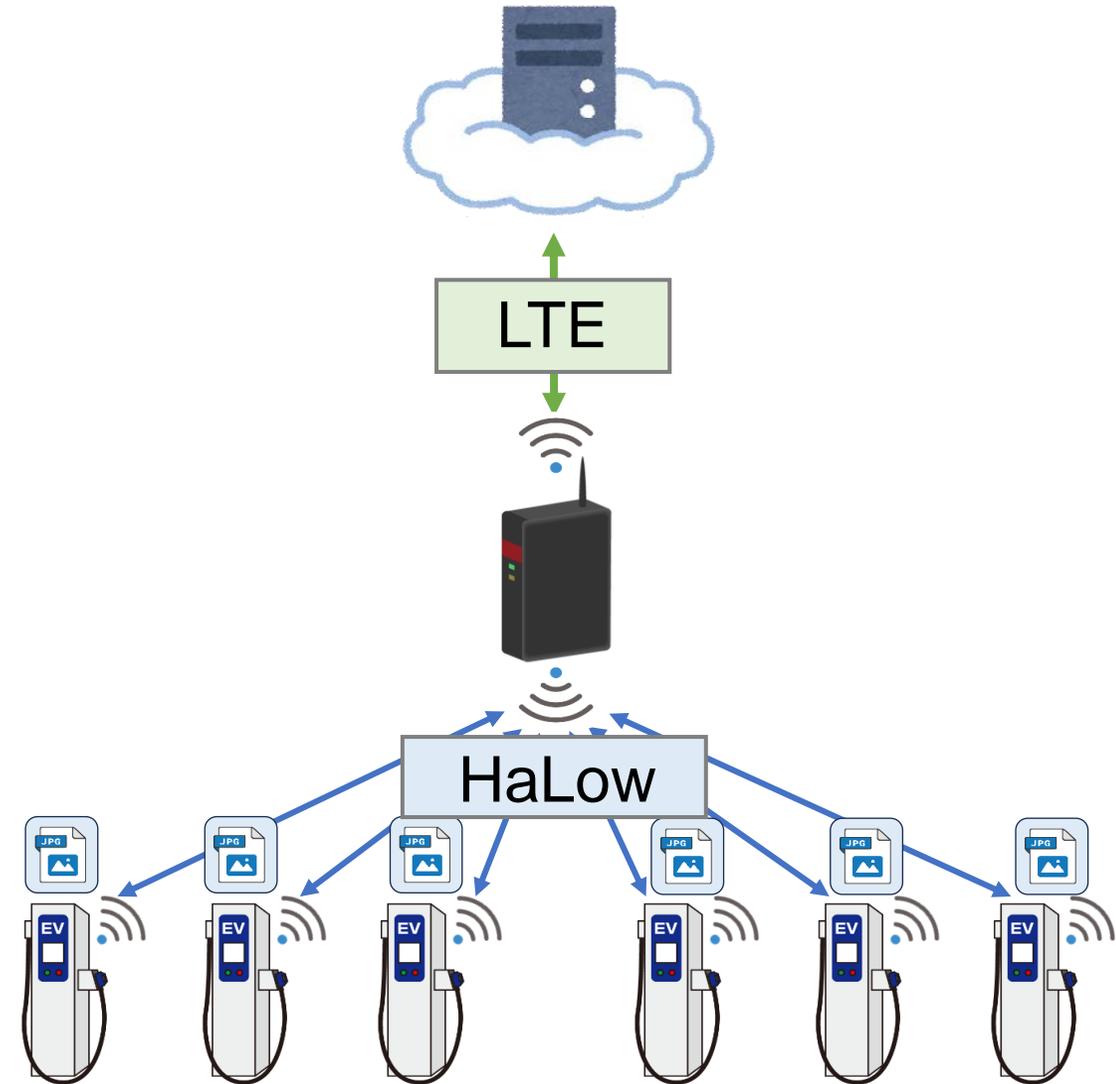
It is possible to **reduce running costs** by **replacing communication** with devices within a certain range **with Wi-Fi HaLow** and uploading data to the cloud, etc. in batches by using LTE.

No need to contract with provider.

→ **Reduction of fixed fees.**

Extended communication range in mountains, tunnels, underground and etc.

→ **Usable even outside of LTE service area.**



◆ Use case example ③

③ Long-distance image transmission · remote control

By utilizing Wi-Fi HaLow...

Work instruction can be sent remotely not directly going to the sites if it is in communication range. Multiple heavy machineries perform automated construction, and the situation of the sites can be checked with images from office.

Long-distance image transmission and remote control for monitoring from remote locations.

→ Reduce labor costs and system costs.





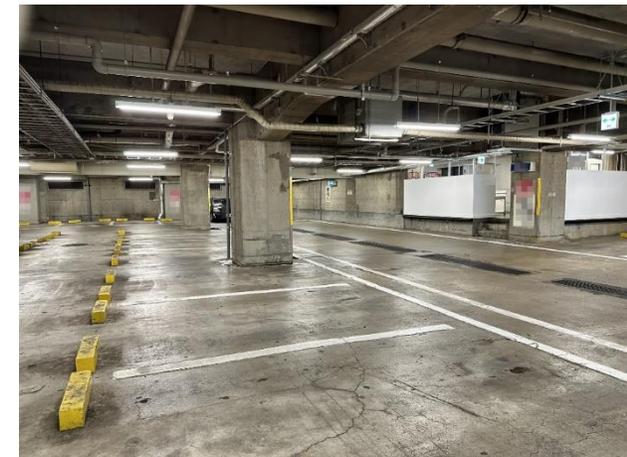
◆ Use case example ④

④ Communication through voice and image

By utilizing Wi-Fi HaLow...

It enables communication in places where **LTE cannot be used**, such as **tunnels** and **underground parking**.

This is intended for use by workers during construction and maintenance.



Using Wi-Fi HaLow communication devices at tunnels and underground parking.

- Increased worker efficiency.
- Introducing automated robots.



< Experiment Introduction >

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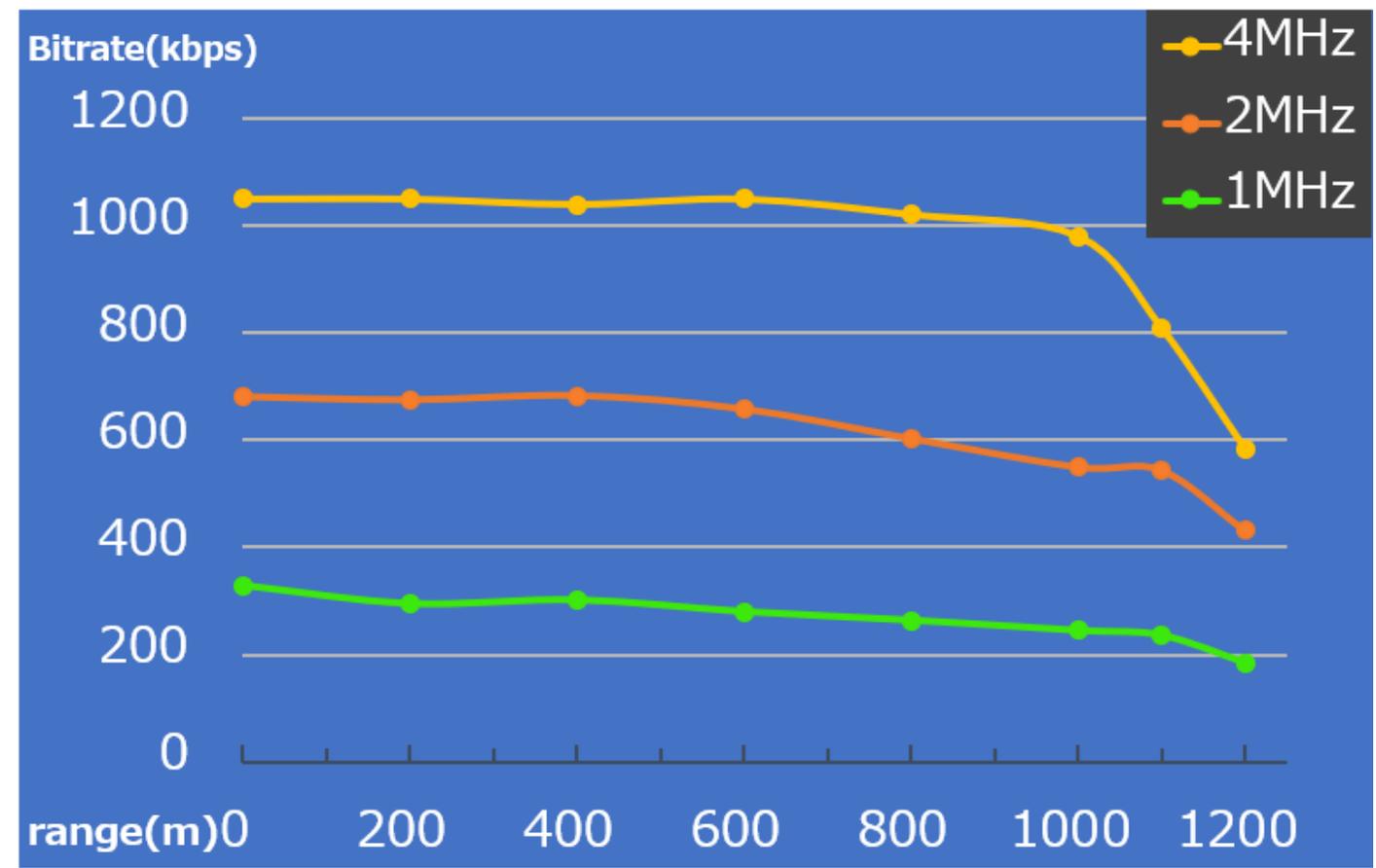
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◆ Measurement results at Riverside



Bitrate change by distance



Antenna Height : 4m
Distance : 10~1000m
Communication protocol : UDP

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