

Product Specification

Product Name: Smart Gateway L-Serial

Product Model: DSGW-041

Revision History

Specification		Sect.	Update Description	By
Rev.	Date			
1.0	2020-01-30		New version release	Tiny
2.0	2020-05-29		Added Cat1 version, updated Bluetooth to version 5.2	Tiny
3.0	2020-06-02		Added Li battery	Tiny
4.0	2020-06-20		Added application select table	Tiny
5.0	2020-07-09		Included different Z-WAVE frequencies for different countries	Tiny
6.0	2020-07-13		Changed the Z-wave default frequency to 916M	Tiny
7.0	2020-09-09		Added a new type DSGW-041-9	Tiny
8.0	2020-09-16		Corrected some errors	Tiny
9.0	2020-09-21		Added a new type DSGW-041-11	Tiny
10	2020-10-19		Added free space	Tiny
11	2020-11-19		Added a new type DSGW-041-13	Tiny
12	2020-12-03		Added BQB Certification	Tiny
13	2021-01-22		Added a new Type DSGW-14	Tiny
14	2021.04.16		Added a new Type DSGW-15	Tiny
15	2021-11-09		Added Healthcare Application	Tiny
16	2022-5-27		Added a description of the self-destruction function of products with lithium battery	Tiny
17	2022-8-25		Adjusted temperature parameter and LTE Modem for China	Tiny
18	2022-11-25		Added a new type	Tiny
19	2023-07-05		Major update to Version	Hubert
19.01	2023-07-25		Delete WI-FI and Bluetooth Scanner	Hubert
19.02	2024-01-09		Added a new type DSGW-041-18	Yu

Approvals

Organization	Name	Title	Date

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Model List

Category A (In Stock, Lead Time: 1~2 Weeks)

Feature Model	Wi-Fi 2.4G	Bluetooth 5.2	Zigbee3.0	LTE Cat M1
DSGW-041-1	•	•		
DSGW-041-2	•	•		•

Category B (Built by Order, Lead Time: 3~4 Weeks)

Feature Model	Wi-Fi 2.4G	Bluetooth 5.2	Zigbee3.0	LTE Cat M1
DSGW-041-3	•		•	

Category C (Built by Order , Lead Time More Than 8 Weeks , MOQ: 500)

Feature Model	Wi-Fi 2.4G	Bluetooth 5.2	Zigbee3.0	Z-Wave	LTE Cat M1	LTE Cat1	Li Battery
DSGW-041-4	•		•		•		
DSGW-041-5	•			•			
DSGW-041-6	•			•	•		
DSGW-041-7	•	•	•	•	•		
DSGW-041-8	•	•				•	
DSGW-041-9	•	•	•		•		
DSGW-041-10	•	•	•		•		
DSGW-041-11	•	•	•	•	•		•
DSGW-041-12	•	•			•		•
DSGW-041-13	•	•		•	•		•
DSGW-041-14	•	•	•	•			
DSGW-041-15	•		•			•	
DSGW-041-16	•		•			•	•
DSGW-041-17	•	•	•		•		•
DSGW-041-18	•	•				•	•

1. Product Description

1.1. Purpose and Description

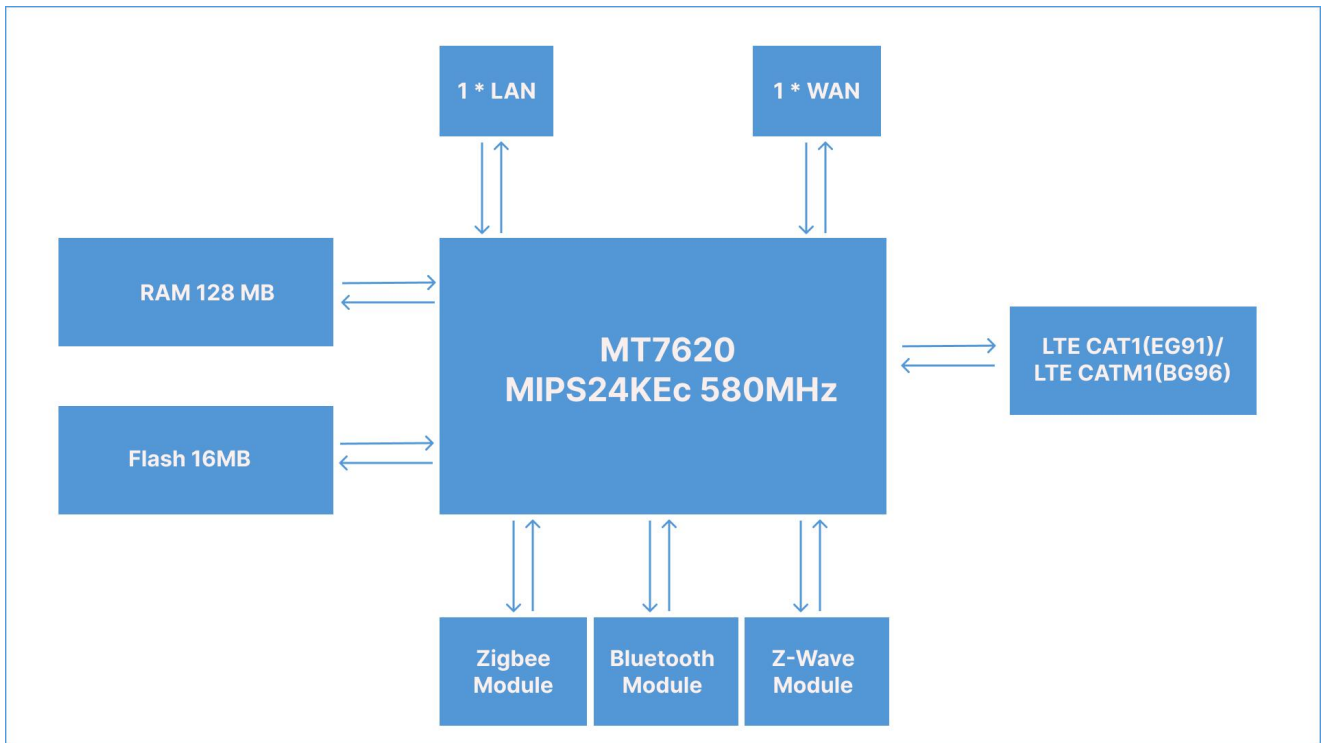
The DSGW-041 Smart Gateway L Series, developed specifically for IoT Gateway developers, is tailored to serve a variety of industries, such as smart homes, intelligent security, and pension services. As a central device, it incorporates multiple wireless protocols like Wi-Fi2.4G, Zigbee 3.0, BLE5.2, and LTE Cat M1.

DSGW-041 is specifically designed for the IoT gateway developer to customize the firmware logic. The IoT gateway developer can build custom firmware from the bottom layer of the hardware. It aims to accelerate IoT Gateway development with pre-integrated, comprehensive, and fully documented out-of-the-box guidance and support.

1.2. Product Feature Summary

- CPU: MT7620A 580MHz MIPS® 24KEc™
- Operating System (OS): OpenWrt
- DC 5V power supply
- IEEE802.11n, IEEE802.11g, IEEE 802.11b protocols
- Supports Wi-Fi2.4G, BLE5.2, Zigbee3.0 and LTE CAT M1
- RAM: 128MB (Free Space 80MB)
- Flash: 16MB. Free Space: 8MB (Development space for users)
- One LAN, One WAN network port

1.3. Hardware Block Diagram

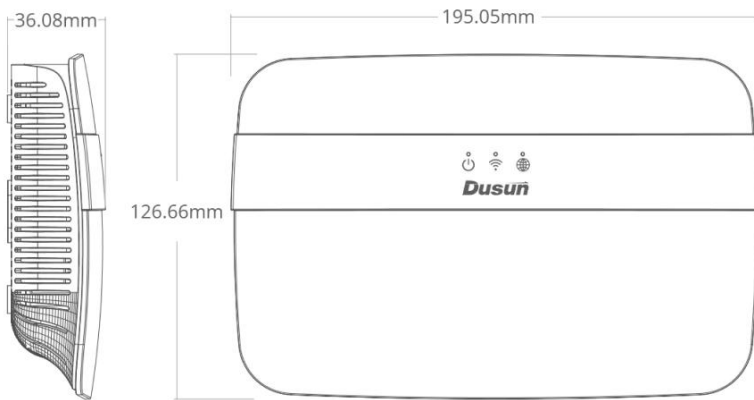


2. Mechanical Requirement

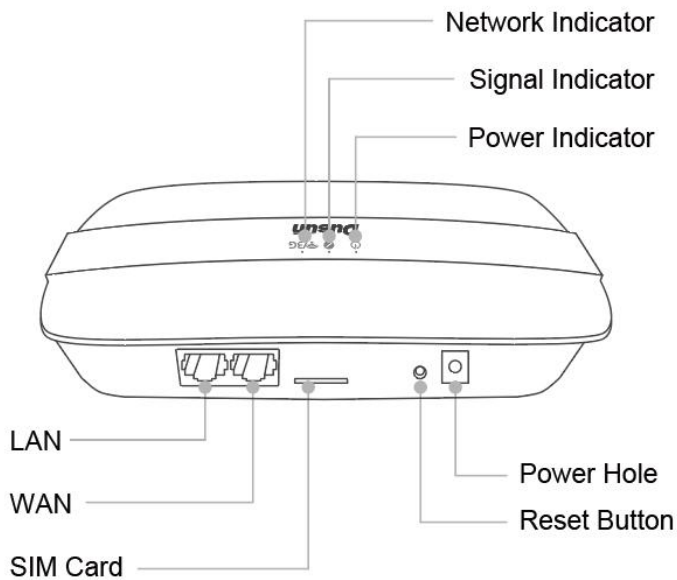
2.1. Drawings



2.2. Dimension



2.3. Interface



2.4. What' s in the Box

Item	Quantity	Note
Gayeway	1 X	
Network Cable	1 X	
Adapter	1 X	

3. Specification

3.1. Technical Specification

Category	Specifications
CPU	MT7620A
System	OpenWrt
RAM	128MB
Flash	16MB
Network Interface	1 * 10/100 Mbps LAN port, 1 * 10/100 Mbps WAN port
Indicator LEDs	<ul style="list-style-type: none">The Zigbee/BLE LED flashes when a signal is received.The Network LED indicates RED when no establishing a network connection.The Network LED indicates GREEN when a network connection is established.
Power Supply	DC Input, input voltage range is 4.5V to 5V. The power seat aperture is 3.5mm. The needle diameter is 1.35mm and is positive. The power adapter: 100-240V 50/60HZ. Output is 5V/2A.
Reset	Factory reset button. To reset the Gateway to its original factory settings, press and hold it for more than 10 seconds
Installation	Flat, Ceiling
Weight	TBD
Operating Temperature	-10°C~55°C
Storage Temperature	-40°C~65°C
Operating humidity	10%~90%
IP Rating	IP 22

Performance Requirement	
Wi-Fi Performance	<ul style="list-style-type: none"> • IEEE Wireless LAN standard: IEEE802.11n, IEEE802.11g, IEEE802.11b • Data Rate: IEEE 802.11b Standard Mode:1,2,5.5,11Mbps IEEE 802.11g Standard Mode:6,9,12,18,24,36,48,54 Mbps IEEE 802.11n: MCS0~MCS7 @ HT20/ 2.4GHz band MCS0~MCS7 @ HT40/ 2.4GHz band • Sensitivity: HT40 MCS7: -70dBm@10% PER(MCS7) /2.4GHz band HT20 MCS7 :-71dBm@10% PER(MCS7) /2.4GHz band • Transmit Power: IEEE 802.11n: 16dBm @HT20/40 MCS7 /2.4GHzband IEEE 802.11g: 16dBm @54MHz IEEE 802.11b: 18dBm@11MHz • Wireless Security: WPA/WPA2, WEP, TKIP, and AES • Working mode: Bridge, AP Client • Range: 50 meters maximum, open field • Transmit Power:17dBm • Highest Transmission Rate: 300Mbps • Frequency offset: +/- 50KHZ • Frequency Range (MHz): 2412.0~2483.5 • Low Frequency (MHz):2400 • High Frequency (MHz):2483.5 • E.i.r.p (Equivalent Isotopically Radiated power) (mW)<100mW • Bandwidth (MHz):20MHz/40MHz • Modulation: BPSK/QPSK, FHSSCCK/DSSS, 64QAM/OFDM
Bluetooth 5.2 Performance	<ul style="list-style-type: none"> • TX Power: 19.5dBm • Range: 150 meters maximum, open filed • Receiving Sensibility: <u>-92dBm@0.1%BER</u>, 1Mbps • Frequency offset: +/-20KHZ • Frequency Range (MHz):2401.0~2483.5 • Low Frequency (MHz):2400 • High Frequency (MHz):2483.5 • E.i.r.p (Equivalent Isotopically Radiated power) (mW)<10mW • Bandwidth (MHz):2MHz • Modulation: GFSK
Zigbee 3.0 Performance	<ul style="list-style-type: none"> • Range: 100 meters minimum, open field • Transmit Power:17.5dBm • Highest Transmission Rate: 250Kbps • Frequency offset: +/- 20KHZ • Receiving Sensibility:-94dBm • Frequency Range (MHz):2401.0~2483.5

	<ul style="list-style-type: none"> • Low Frequency (MHz):2400 • High Frequency (MHz):2483.5 • E.i.r.p (Equivalent Isotopically Radiated power) (mW)<100mW • Bandwidth (MHz):5MHz • Modulation: OQPSK
LTE CAT M1	<ul style="list-style-type: none"> • Operating Frequency Band: 850/900/1800/1900MHZ • Global: LTE: FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B26/B28 • North America: LTE TDD: B2/B4/B12/B13 • LTE TDD: B39 (for Cat.M1 only)
WAN/LAN	10/100 Mbps

4. QA Requirements

Information Description	Standard(Yes) custom(No)
ESD Testing	Yes
RF Antenna Analysis	Yes
Environmental Testing	Yes
Reliability Testing	Yes
Certification	FCC, CE, Zigbee Certification, BQB, RoHS

5. Software Requirements

This software is built on the MTK platform and runs on the OpenWrt system. It supports features such as Wi-Fi, Zigbee3.0, OTA, and MQTT.

5.1 Definition

5.1.1. Boot Up

Upon power insertion, both the green and yellow LEDs light up. Once the yellow LED turns off and the green LED starts blinking, and then remains lit, the gateway has successfully booted up.

5.1.2. Reset

Press and hold the button for 10 seconds to perform a reset function. This will erase all matched information.

5.1.3. LED Indicators

Green LED: Indicates system startup.

Yellow LED: Signals operation of Zigbee. When the gateway communicates with a sensor, this LED blinks. If the gateway enters pairing mode, the LED will blink as well.

Red LED: Used to indicate connectivity with the cloud. If the gateway connects successfully, the Red LED turns off. If the connection fails, it remains lit.

5.1.4. Wi-Fi Configuration

The Wi-Fi supports both AP and client modes, which can be switched as needed. The name of the AP: xxxxxxx. Password: xxxxxxx.

5.1.5. Zigbee Configuration

The Zigbee stack, version 3.0, supports ZHA, GreenPower, ZLL, and more. It is compatible with most clusters of ZigBee devices, such as door sensors, leak sensors, motion sensors, temperature and humidity sensors, smart plugs, smart lamps, smoke sensors, curtains, and so on. Devices can be added via the web or command.

5.1.6. BLE Configuration

The gateway supports iBeacon, Eddystone, BLE sensors, and the SIG mesh function.

5.1.7. OTA

The gateway's firmware can be upgraded over the network.

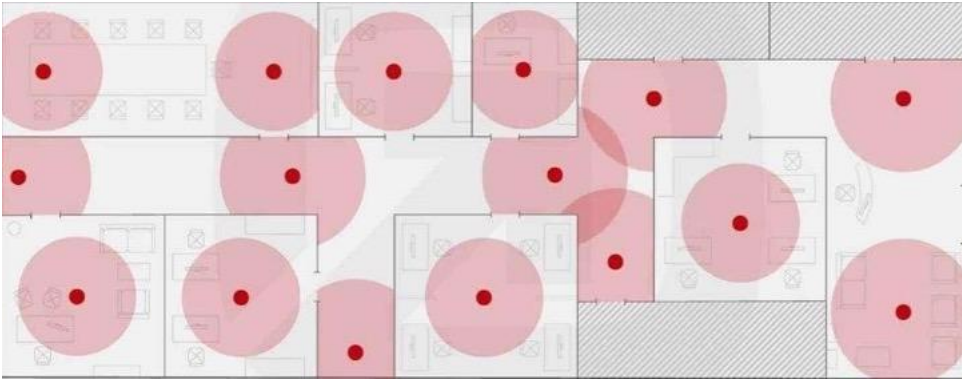
5.1.8. MQTT

The gateway supports the MQTT protocol for integration

6. Application

Application NO	Function Introduction
AP-02	Work with Beacon for Indoor Positioning
AP-03	Smart Home IoT
AP-04	Bluetooth Roaming

6.1. AP-01 Beacons for Indoor Guidance and Location



Beacons attached to the assets to be tracked emit BLE signals, which the Smart Gateway receives installed within the building. The Gateway processes this data and sends it to a server via Wi-Fi or Ethernet. The positions of the assets are then displayed on a map, and motion statistics can be retrieved.

6.2. AP-02 Smart Home IoT



The Smart Gateway serves as the smart home's brain, connecting wirelessly with a wide range of smart devices and enabling them to work together seamlessly.

Key features of the Smart Gateway include:

- Control lights, electronics, and small appliances from anywhere, providing convenient remote access.

- Schedule devices to turn on and off at different times of the day, automating routines and enhancing energy efficiency.
- Receive alerts when there is unexpected activity in your home, ensuring you stay informed and aware of any potential security concerns.
- Set connected lights to turn on and off based on people's presence, creating a more responsive and intuitive lighting experience.
- Monitor moisture and temperature levels, allowing you to keep track of environmental conditions within your home.

With its versatile functionality, the Smart Gateway empowers you to manage your smart home effortlessly and enjoy a more connected and comfortable living environment.

6.3. AP-03 Smart Healthcare



Health and medical equipment can be connected to the cloud platform through the gateway, enabling the remote transmission of health and medical data. This allows doctors to provide medication guidance to patients with chronic diseases remotely.

Additionally, the gateway is equipped with Bluetooth roaming functionality. In large areas, the device can seamlessly switch its connection from gateway A to gateway B through Bluetooth roaming.

FCC Statement

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Body-worn Operation

RF Exposure Compliance

To comply with RF exposure requirements, a minimum separation distance of 20 cm must be maintained between the user' s body and the device, including the antenna during normal operations.