# Product Specification

***Product Name: IoT Edge Computer Gateway***
***Model Name: DSGW-210***

***Revision History***

| Specification | | Sect. | Update Description | By |
|---|---|---|---|---|
| Rev | Date | | | |
| 1.0 | 2021-03-22 | | New version release | |
| 2.0 | 2021-05-21 | | Add LoRaWAN Protocol | |
| 3.0 | 2021-06-08 | | Add SD card | |
| 4.0 | 2021-07-12 | | Add new -2, USB/LTE | |
| 5.0 | 2021-08-10 | | Add different RAM and eMMC | |
| 6.0 | 2021-08-17 | | Add the new type -6 | |
| 7.0 | 2021-08-18 | | Add the security module ECC608 | |
| 8.0 | 2021-09-07 | | Add LTE CAT1 | |
| 9.0 | 2021-10-11 | | Add new type -8 | |
| 10.0 | 2021-11-16 | | Add new gateway model | |
| 11.0 | 2021-12-16 | | Add new Type-10 and Type-11 | |
| 12.0 | 2021-12-21 | | Add new Type-12 and Type-13 | |
| 13.0 | 2021-12-23 | | Add new Type-14 | |
| 14.0 | 2022.01.11 | | Merging the LoRaWan Gateway | |
| 15.0 | 2022-01-17 | | Add the new Type-15 and 16 | |
| 16.0 | 2022-01-19 | | Add the new Type-17 | |
| 17.0 | 2022-03-04 | | Add the new Type-18 | |
| 18.0 | 2022-04-22 | | Add the new Type-19 | |
| 19.0 | 2022-04-27 | | Add the new Type 20 | |
| 20.0 | 2022-8-4 | | Add the new Type 21 | |

***Approvals***

| *Organization* | *Name* | *Title* | *Date* |
|---|---|---|---|
| | | | |
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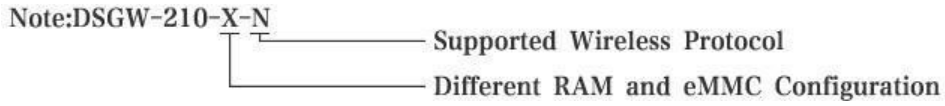
# Model List

| Feature / Mode | Wi-Fi 2.4G/5G | Blueto oth5.2 | Zigbee3.0 | Z-Wave | Lora | LTE CatM1 | LTE Cat1 | Li battery | Matter & Thread | LTE Cat 4 | GPS | ECC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DSGW-210-X-1 | ● | ● | ● | ● | | ● | | ● | | | | |
| DSGW-210-X-2 | ● | ● | | | | ● | | | | | | |
| DSGW-210-X-3 | | | | | | ● | | | | | | |
| DSGW-210-X-4 | ● | ● | | | ● | | | | | | ● | |
| DSGW-210-X-5 | ● | ● | ● | | | | | | | | | |
| DSGW-210-X-6 | ● | ● | | | ● | | | ● | | | | |
| DSGW-210-X-7 | | ● | | | ● | | | ● | | | | |
| DSGW-210-X-8 | ● | ● | | | | | | ● | | | | |
| DSGW-210-X-9 | ● | | ● | | | ● | | | ● | | | |
| DSGW-210-X-10 | ● | ● | | | | | | | | | | |
| DSGW-210-X-11 | ● | ● | | | | | ● | | | | | |
| DSGW-210-X-12 | ● | | ● | ● | | | | ● | | | | |
| DSGW-210-X-13 | ● | | ● | ● | | | | | | | | |
| DSGW-210-X-14 | ● | ● | | | | | | | | ● | | |
| DSGW-210-X-15 | ● | ● | [1*] | ● | | | | | | | | |
| DSGW-210-X-16 | ● | [2*]● | [1*]● | ● | | ● | | ● | | | | |
| DSGW-210-X-17 | | ● | ● | | | | | ● | | | | |
| DSGW-210-F-18 | | | ● | ● | | | | | | | | |
| DSGW-210-F-19 | ● | | | | ● | ● | | ● | | | | |
| DSGW-210-F-20 | ● | ● | | | | ● | | ● | | | | |
| DSGW-210-X-21 | ● | ● | | | | | ● | | | | | ● |
| DSGW-210-X-22 | ● | | ● | | | | | | | | | |
| DSGW-210-X-23 | ● | | | ● | | | | | | | | |

**NOTE:** [1] represents EFR32MG21F768. [2] represents EFR32MG21F768

| Configuration | RAM | eMMC |
|---|---|---|
| -A | 1GB | 8GB |
| -B | 2GB | 8GB |
| -C | 1GB | 16GB |
| -D | 2GB | 16GB |
| -E | 512MB | 4GB |
| -F | 2GB | 32GB |




**Sample:**

In order to ensure customers can quickly test samples, Dusun prepares 2 models, DSGW-210-F-1, DSGW-210-F-18. If customers need other models, he can test on 2 models first, and can be customized after batching.

目录

# 1. Introduction

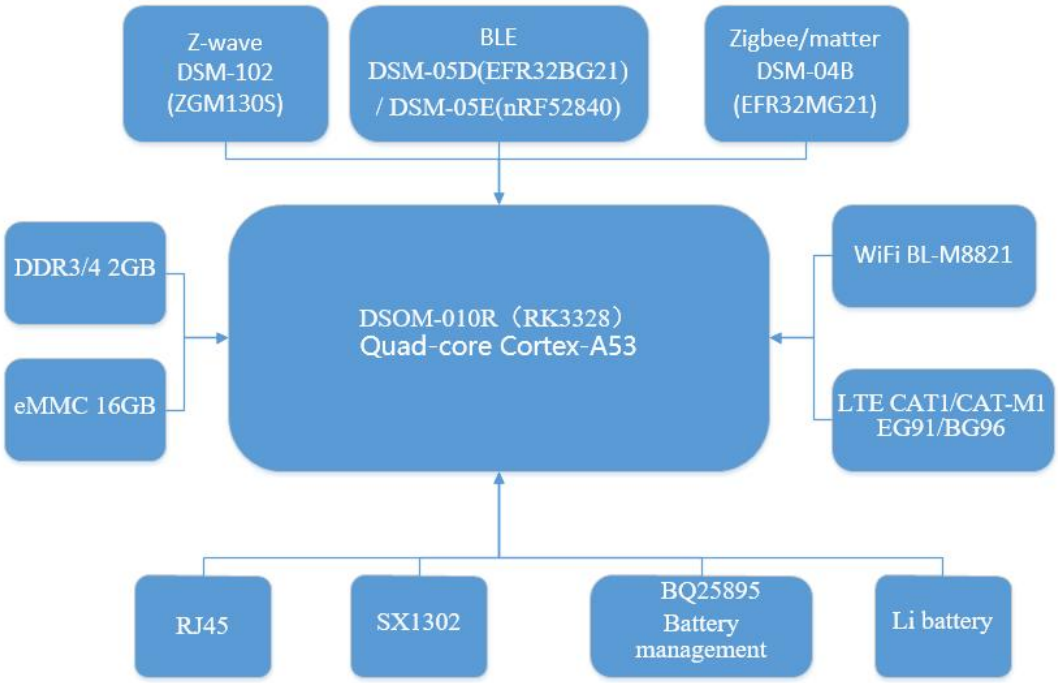
## 1.1 Purpose& Description

DSGW-210 is an IoT gateway with multiple protocols and edge computing functions. It provides reliable connectivity for a wide range of wireless IoT devices. The gateway's modular architecture provides the ability to customize many gateway features providing an off-the-shelf solution that meets your exact needs. Options include Cellular, Bluetooth, Wi-Fi, Ethernet, USB, ZigBee, Z-wave, Lora, and Li battery backup.

## 1.2 Product Feature Summary

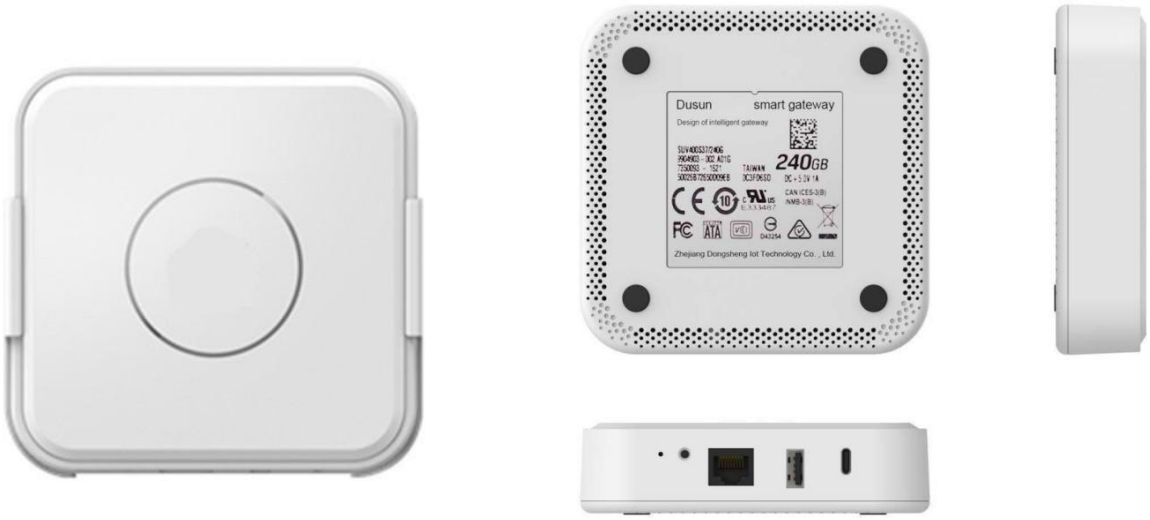
- Support 5V USB type-c power supply
- Support IEEE802.11ac, IEEE802.11a, IEEE802.11n, IEEE802.11g, IEEE 802.11b Protocol
- Support 4G LTE CAT M1, CAT1
- Support Bluetooth 5.2
- Support ZigBee3.0
- Support Z-WAVE
- Support LoRaWAN
- Support Thread and Matter protocol
- One WAN/LAN variable network port
- Support USB2.0
- Backup Li-battery
- Supporting LoRaWAN CLASS A/B/C standard
- Compatible with mainstream network servers like The Things Industries, AWS, etc.

## 1.3 Hardware block diagram

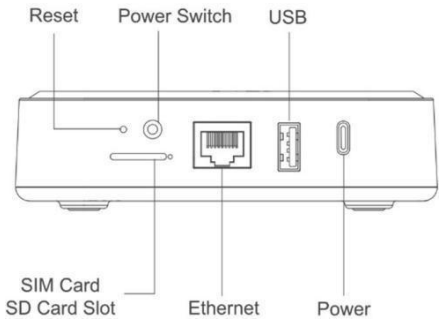


# 2. Mechanical Requirement

## 2.1 Drawings




## 2.2 Interface and Dimension




Interface


Dimension

# 3. Specifications

## 3.1 Technical Specification

| Category | Specifications |
|---|---|
| Power Supply | USB Type-C 5V/3A |
| Reset button | The reset button is a hole button, After pressing the reset button for more than 5 seconds, the Locator will be restored to the factorysettings. |
| Switch | On/Off power |
| Network Interface | WAN/LAN variable. |
| USB | USB2.0 |
| SIM card | Micro SIM card |
| SD card | 1 |
| Indicator LEDs(RGB) | 1).Power &battery LED 2). Wireless LED 3） LTE indicator |
| Wireless protocol | Zigbee, Z-WAVE, BLE ,Wi-Fi, LoRaWAN |
| Antenna | Zigbee/BLE PCB Antenna, Z-WAVE/Wi-Fi FPC Antenna |
| Li battery | 6000mAH |
| Installation method | Flat, Ceiling, DIN |
| RTC | Real-Time Clock operated from an onboard battery |
| Hardware encryption | ECC608 |
| Operating Temperature | -10℃~60℃ |
| Storage Temperature | -40℃~85℃ |
| Operating humidity | 10%~90% |
| IP rating | IP22 |
| Cooling | Heat dissipation silicone/aluminum |
| Current | 500mA@5V |

### 3.2 Performance Requirement

| | |
|---|---|
| CPU | Quad-core Cortex A53 |
| System | Linux Debian 9 |
| RAM | Up to 2GB |
| eMMC | Up to 32GB |
| SD card | Up to128GB |
| Wi-Fi Performance | • IEEE wireless LAN standard:<br>IEEE802.11ac; IEEE 802.11a; IEEE802.11n; IEEE802.11g; IEEE 802.11b<br>• Data Rate:<br>IEEE 802.11b Standard Mode:1,2,5.5,11Mbps<br>IEEE 802.11g Standard Mode:6,9,12,18,24,36,48,54 MbpsIEEE 802.11n:<br>MCS0~MCS7 @ HT20/ 2.4GHz band<br>MCS0~MCS7 @ HT40/ 2.4GHz band<br>MCS0~MCS9 @ HT40/ 5GHz band<br>IEEE 802.11ac: MCS0~MCS9 @ VHT80/ 5GHz band<br>• Sensitivity:<br>VHT80 MCS9 : -60dBm@10% PER(MCS9) /5GHz bandHT40 MCS9 : -63dBm@10% PER(MCS9) /5GHz band HT40 MCS7 : -70dBm@10% PER(MCS7) /2.4GHz bandHT20 MCS7 : -71dBm@10% PER(MCS7) /2.4GHz band<br>• Transmit Power:<br>IEEE 802.11ac: 13dBm @HT80 MCS9 /5GHz band<br>IEEE 802.11ac: 16dBm @HT80 MCS0 /5GHz band IEEE 802.11n: 14dBm @HT20/40 MCS7 /5GHz band IEEE 802.11n: 16dBm @HT20/40 MCS0 /5GHz band IEEE 802.11n: 16dBm @HT20/40 MCS7 /2.4GHz bandIEEE 802.11g: 16dBm @54MHz<br>IEEE 802.11b: 18dBm @11MHz<br>• Wireless Security: WPA/WPA2, WEP, TKIP, and AES<br>• Working mode : Bridge、Gateway、AP Client<br>• Range: 50 meters minimum, open field<br>• Transmit Power:17dBm<br>• Highest Transmission Rate:300Mbps<br>• Frequency offset: +/- 50KHZ<br>• Frequency Range (MHz): 2412.0~2483.5<br>• Low Frequency (MHz):2400<br>• High Frequency (MHz):2483.5<br>• E.i.r.p (Equivalent Isotopically Radiated power) (mW) <100mW<br>• Bandwidth (MHz):20MHz/40MHz<br>• Modulation: BPSK/QPSK, FHSSCCK/DSSS, 64QAM/OFDM |

| | |
|---|---|
| Bluetooth-Performance | • TX Power: 19.5dBm<br>• Range: 150 meters minimum, open filed<br>• Receiving Sensibility: -80dBm@0.1%BER<br>• Frequency offset: +/-20KHZ<br>• Frequency Range (MHz):2401.0~2483.5<br>• Low Frequency (MHz):2400<br>• High Frequency (MHz):2483.5<br>• E.i.r.p (Equivalent Isotopically Radiated power) (mW)<10mW<br>• Bandwidth (MHz):2MHz<br>• Modulation: GFSK |
| Zigbee(Thread) Performance | • TX Power: 17.5dBm<br>• Range: 100 meters minimum, open filed<br>• Receiving Sensibility:-94dBm<br>• Frequency offset: +/-20KHZ<br>• Frequency Range (MHz):2400.0~2483.5<br>• Low Frequency (MHz):2400<br>• High Frequency (MHz):2483.5<br>• E.i.r.p (Equivalent Isotopically Radiated power) (mW)<100mW<br>• Bandwidth (MHz):5MHz<br>• Modulation: OQPSK |
| Z-wave Performance | • TX power up to13dBm (20mW)<br>• RX sensitivity: @100kbps-97.5dBm<br>• Range: 100 meters minimum, open filed<br>• Default Frequency: 916MHz(Different country with different<br>• frequency) |
| LoRaWAN | • Frequency band support: RU864, IN865, EU868, US915, AU915, KR920, AS923<br>• TX power up to 27dBm, RX sensitivity down to -139dBm @SF12, BW125kHz<br>• Range: 10KM maximum, open field<br>• Protocol: V1.0 Class A/Class B/Class C and V1.0.2 Class A/Class B/Class C<br>• LoRa antenna gain： 3/5dBi optional<br>• Lora Antenna Type： Omnidirectional<br>• Lora working mode： Full/half-duplex (optional) |

| | |
|---|---|
| LTE Cat M1 | Operation Frequency Band: 850/900/1800/1900MHZ |
| | • Global:LTE:FDD:B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B26/B28<br>• North America: LTETDD:B2/B4/B12/B13<br>• LTE TDD:B39(for cat.M1 only) |
| LTE Cat1 | • LTE FDD: B2/B4/B5/B12/B13<br>• WCDMA:B2/B4/B5<br>• LTE FDD Data rate:10(DL)/5(DL) |
| WAN/LAN | 10/100M bps |

# 4. QA Requirements

## 4.1 Quality and Testing Information

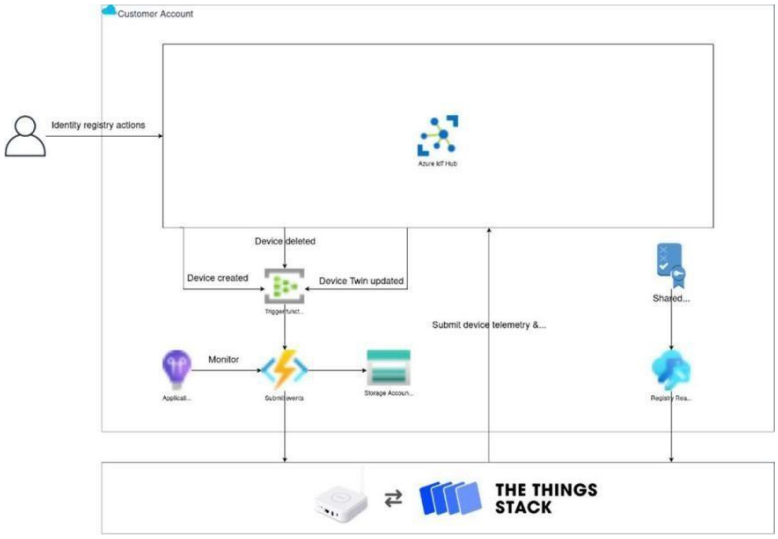
| Information Description | Standard(Yes) custom(No) |
|---|---|
| ESD Testing | Yes |
| RF Antenna Analysis | Yes |
| Environmental Testing | Yes |
| Reliability Testing | Yes |
| Certification | FCC, CE, Bluetooth(BQB), PTCRB, RoHs |

# 5. The Application Scenarios

The DSGW-210-X-4 supports integrating with AWS or Azure IoT by the pre-installed Things Stack, which is an enterprise-grade LoRaWAN network server. The Things Stack as an open-source LoRaWAN network server provides a better communication solution between the devices. The users can connect the existing LoRaWAN devices and manage the communication between them via utilizing the existing infrastructure from the Azure IoT or AWS. Such as managing their LoRaWAN devices to understand the status of devices and gateways, updating the device reported characteristics, and proposing downlinks based on the device's desired attributes, and sending end-to-end encrypted

## 5.1 The Architecture between DSGW-210 and Azure IoT

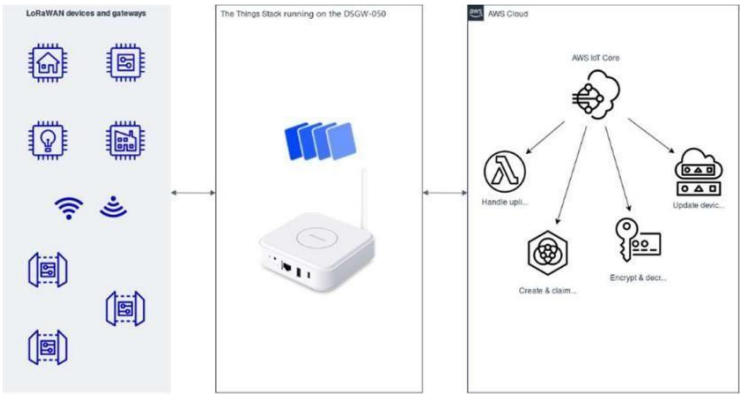
**The following diagram describes the architecture of the integration it details the uplink and downlink data flows between the DSGW-210 and Azure IoT.**




The integration between Azure IoT Hub and DSGW-210B includes three features as the following:

- Handling uplink messages: The DSGW-210B publishes uplink messages to the Azure IOT Hub of theusers
- Creating and deleting devices: The users can manage the LoRaWAN devices in the Azure IoT
- Updating state in device twin: The users can update the properties coming from the LoRaWAN devices. At the same time, the users can propose the downlinks according to the device desired properties

## 5.2 The Architecture between DSGW-210 and AWS




The DSGW-210 saves integration time and headache with the AWS IoT. The users can integrate directly with AWS IoT via the things stack deployed on the LoRaWAN Gateway. This is a simple operation. The user just to integrate with the AWS IOT via a default integration.
The Integrating between DSGW-210B and AWS IoT core is mainly related to the downlink and uplink data flows between them. Besides that, the users can claim and create a new device in AWS IoT, which can be synchronized in the DSGW-210B. The most important thing is that this integrating is implemented via end-to-end encryption on the LoRaWAN level.