CK-RX65N

SIM activation, Creating the trial account and using Dashboard with RYZ014A or Ethernet Application for AWS - Getting Started Guide

Introduction

This document describes a system that uses the CK-RX65N Cloud Kit board from Renesas. This system incorporates the CK-RX65N running Amazon FreeRTOS and via Ethernet/Cellular connection. It visualizes HS3001, ZMOD4410, ZMOD4510, OB1203, ICP10101 and ICM20948 sensor information on Amazon Web Services (AWS) and controls LEDs on the board.

There are two methods of connectivity for CK-RX65N. One is the Ethernet, second is the Cellular CAT M1 using RYZ014A.This document shows both connectivity methods.

In addition, this document describes the following:

- How to activate the SIM card that is contained the CK-RX65N
- How to create the 10 USD of free trial account for AWS
- How to operate and install the information of certification for cloud
- How to see and run the sensor data on the dashboard

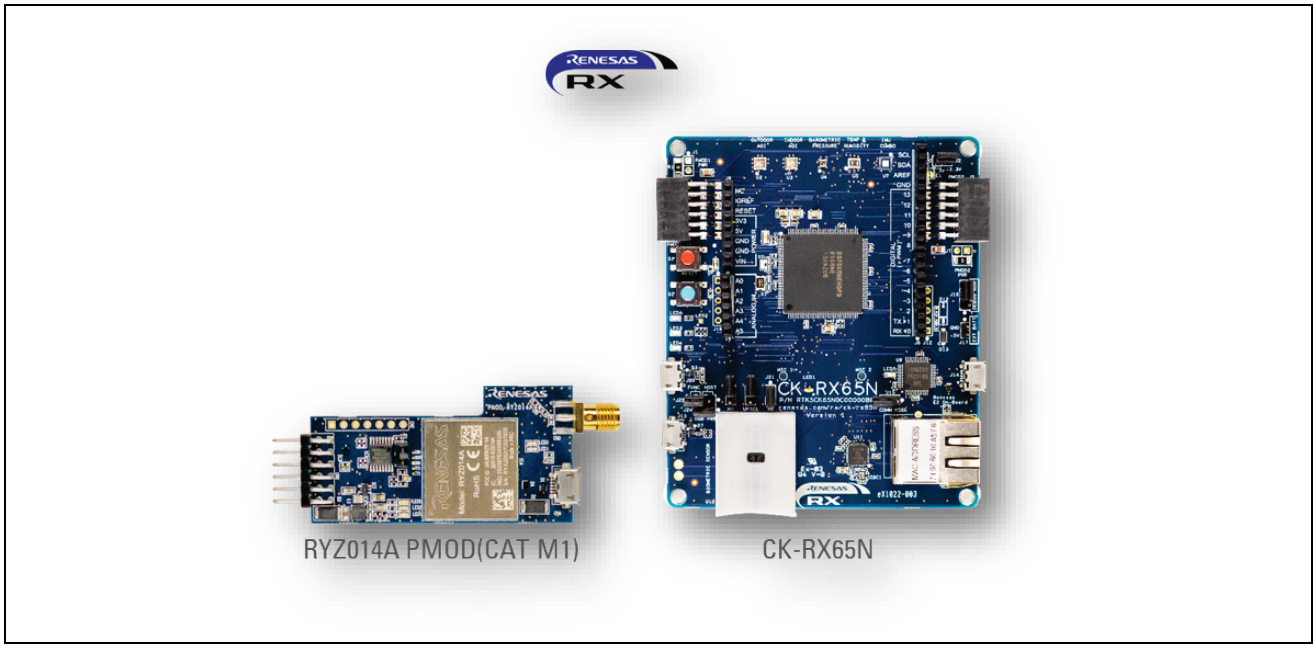


Figure 1. CK-RX65N (with RYZ014A Pmod)

Contents

1. Terms 3

2. Preparation 3

2.1 Hardware Configuration 3

2.2 Software Configuration 3

2.3 Tera term Setting 3

3. System Diagram 4

4. Connection to AWS 4
4.1 Common Users: To Import the Project, Activate SIM Card 4
4.1.1 Importing the Project 4
4.1.2 Data Publishing Interval Settings (Optional) 11
4.1.3 Running the Application Project 12
4.1.4 Running the Application and Activation of SIM Card Included in CK-RX65N 14
4.1.5 Activating SIM Card 15
4.2 For Users Using the Provided Dashboard and Kit AWS Account 18
4.2.1 Getting the Board UUID Information 18
4.2.2 Getting the Account 10 USD for Trial of AWS 18
4.3 Hardware Preparation 21
4.4 Software Preparation - Running Project from IDE 21
4.4.1 Storing the Device Certificate, Key, MQTT Broker Endpoint and IoT Thing Name 21
4.5 For Users Using their Own AWS Account 26
4.5.1 Installing the Credentials 32
4.6 Connecting to AWS IoT 32
4.7 Verifying the Application Project using AWS Dashboard and Renesas Dashboard 33
4.8 LED Alerts 34

5. Restrictions 35
5.1 Communication Time (Cellular Version of Project) 35
5.2 Automatic Alert Feature from Renesas Dashboard 36

6. Note and Troubleshooting 36
6.1 Sensor Stabilization Time 36
6.2 Connection Issue When Using Ethernet (Wired cable) 36
6.3 Current Supply Short Issue When Using RYZ014A 36
6.4 When Build Errors Occur 37
6.5 When Unable to Log in to the Dashboard (Grafana Account) 37
6.6 Notes on Performing Firmware Update Over-The-Air on AWS FreeRTOS 37
6.7 When the Trial 10 USD is Used Up 37
6.8 How to Enable/Disable EC2 Instance 40

Revision History 43

1. Terms

Terms used in this document are explained below.

Table 1. Terms

Term	Meaning
AWS	AWS Amazon Web Service

2. Preparation

2.1 Hardware Configuration

The hardware configuration of the demo project is listed in the table below.

Item	Content	Description
CK-RX65N Cloud Kit	Target board for CK-RX65N	Please see detail https://www.renesas.com/rx/ck-rx65n
RYZ014A Cellular Pmod module	SIM card	This Pmod is contained with CK-RX65N of kit with SIM card
PC	Windows® 10 Google chrome	Recommended OS. Web browser used.

2.2 Software Configuration

The software configuration of the demo project is listed in the table below.

Item	Content	Version
Integrated development environment	e2 studio	2022-01
Complier	CC-RX GCC (Planning)	V3.03 -
Communication Software	Tera term	Version 4.106
Emulator	E2 emulator Lite (on-board)	-
RTOS	AWS FreeRTOS	V202107.00

2.3 Tera term Setting

Item	Settings
Baud rate	115200
Data length	8
Parity	none
Stop bits	1
Flow Control	none

3. System Diagram

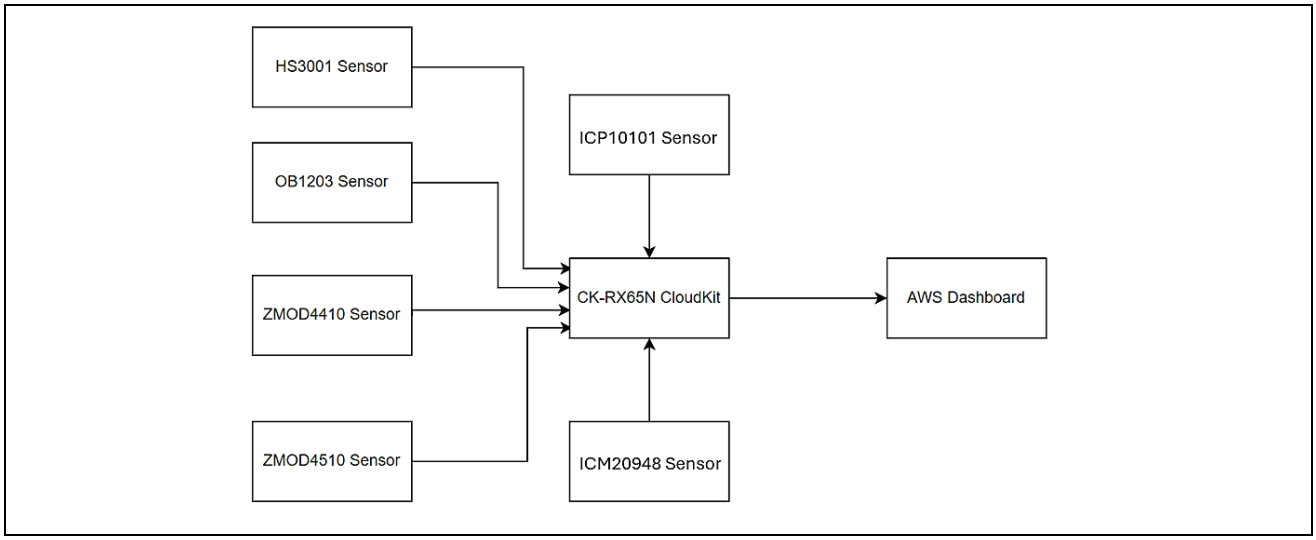


Figure 2. System Diagram

4. Connection to AWS

AWS account is necessary to connect CK-RX65N Cloud Kit to AWS.

Note: Renesas provides the 10 USD of AWS account credit to users who buy the CK-RX65N and this 10 USD credit cannot be used for an existing account.

This document covers two ways of connecting to the AWS account:

- **Case 1:** For users who want to use trial AWS account with 10 USD credits and Renesas Dashboard, please refer to section **4.2 For Users Using the Provided Dashboard and Kit AWS Account** to get this AWS account**.**
- **Case 2:** For users who already have an AWS account and want to use it instead of trial account, please skip section **4.2 For Users Using the Provided Dashboard and Kit AWS Account** and refer to section **4.5 For Users Using their Own AWS Account** to use account with application.

4.1 Common Users: To Import the Project, Activate SIM Card

4.1.1 Importing the Project

Use the following steps to prepare the software for the demo program:

1. Extract the project files from the archive and copy them to the C drive.
   Please unzip it the project file to **the short path of your PC**.
   If the path is deep, a build error may occur due to the file path length issue.
2. Launch e² studio and specify a workspace directory and click **Launch.**

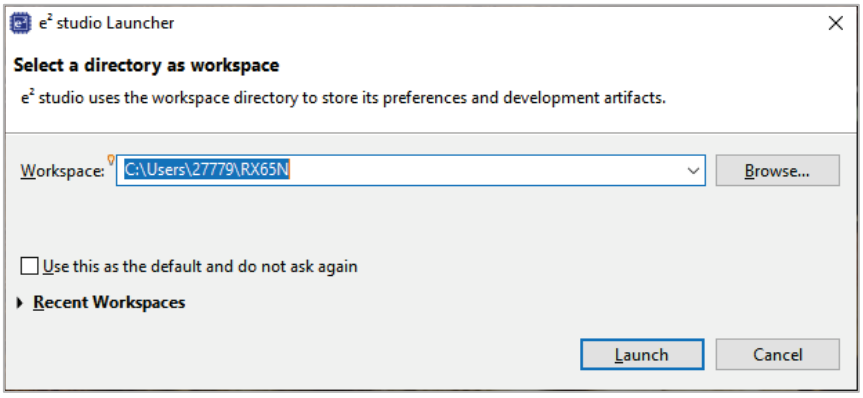


Figure 3. Launch e² studio

3. Select **File** > **Import**….

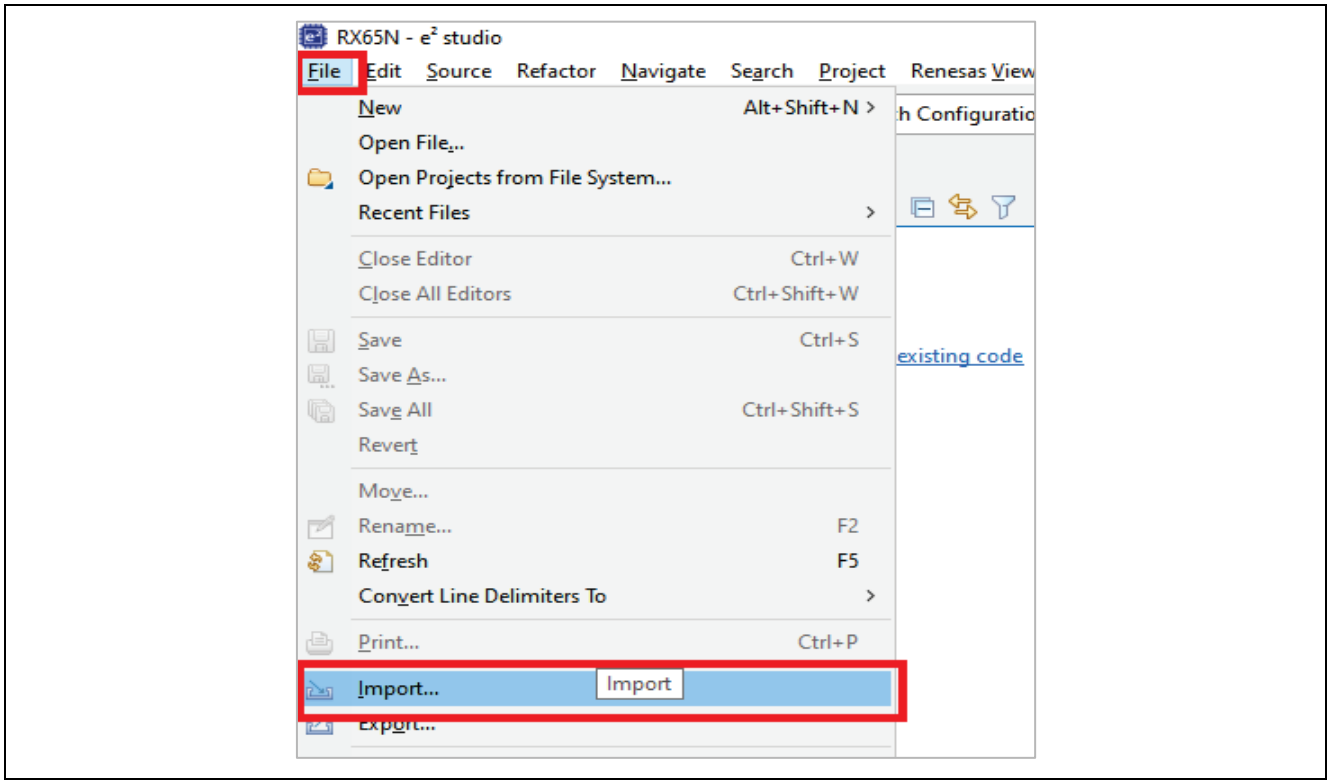


Figure 4. Select Import

4. Click **General > Existing Projects into Workspace > Next**.

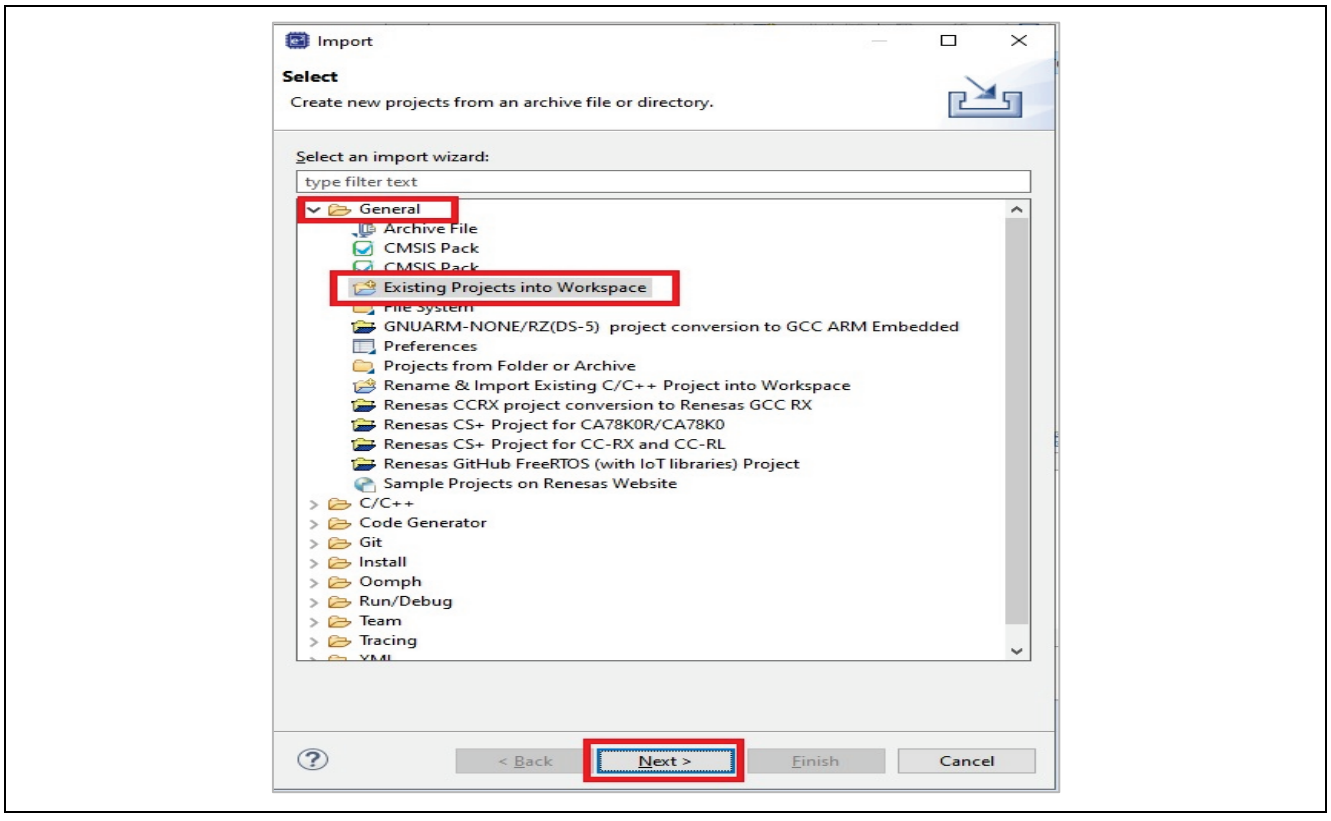


Figure 5. Select Existing Projects into Workspace

5. Click **Browse**…, then specify the root directory as described later in this section.

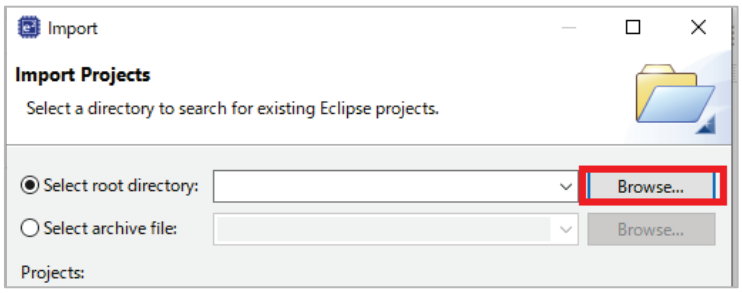


Figure 6. Find the Project

You can choose two types of connectivity and compiler when importing the project.
Please go to "`[Project Root folder]\projects\renesas\`" folder.

Table 2. Details of Each Project

Project Name	Compiler	Connectivity
rx65n-new-ck in the "source-rx-eth" zip	CC-RX	Ether
rx65n-new-ck-cellular in the "source-rx-cell" zip		Cellular
rx65n-new-ck-gcc (**Planning**)	GCC	Ether
rx65n-new-ck-cellular-gcc (**Planning**)		Cellular

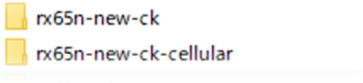


Figure 7. Project Files

This example uses "**rx65n-new-ck-cellular**" as the cellular project.
Open the "`[Project Root folder]\projects\renesas\rx65n-new-ck-cellular\e2studio\aws_demos`" folder.
If you use another project, please open "`\aws_demos`" folder of your selected project.

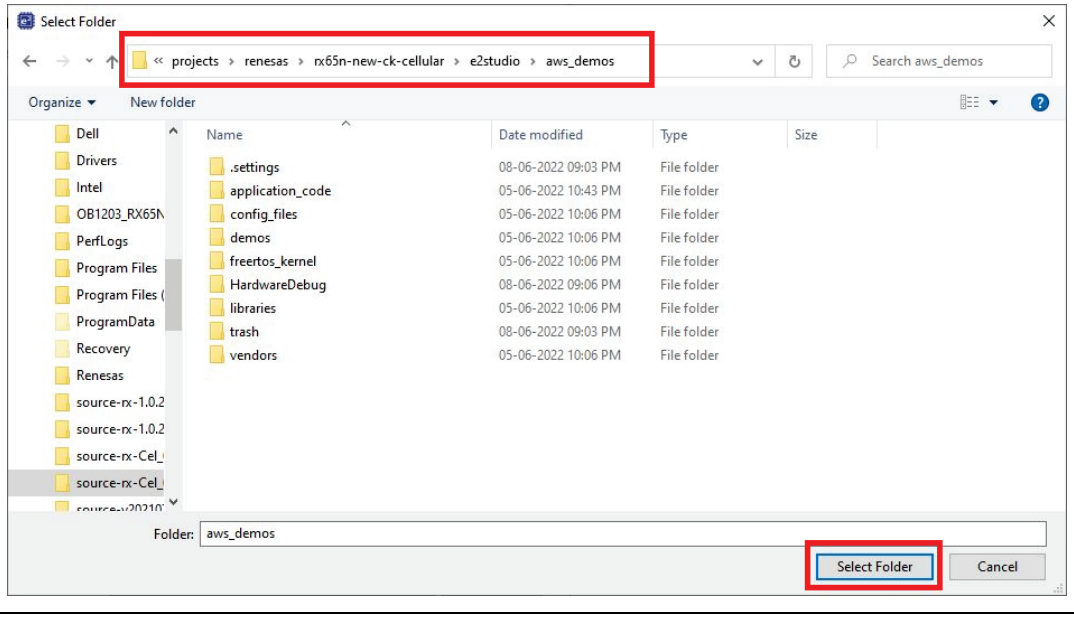


Figure 8. Select the Project Folder

Finally, click **Finish**.
Note: Make sure that the **Copy projects into workspace** option is unchecked.

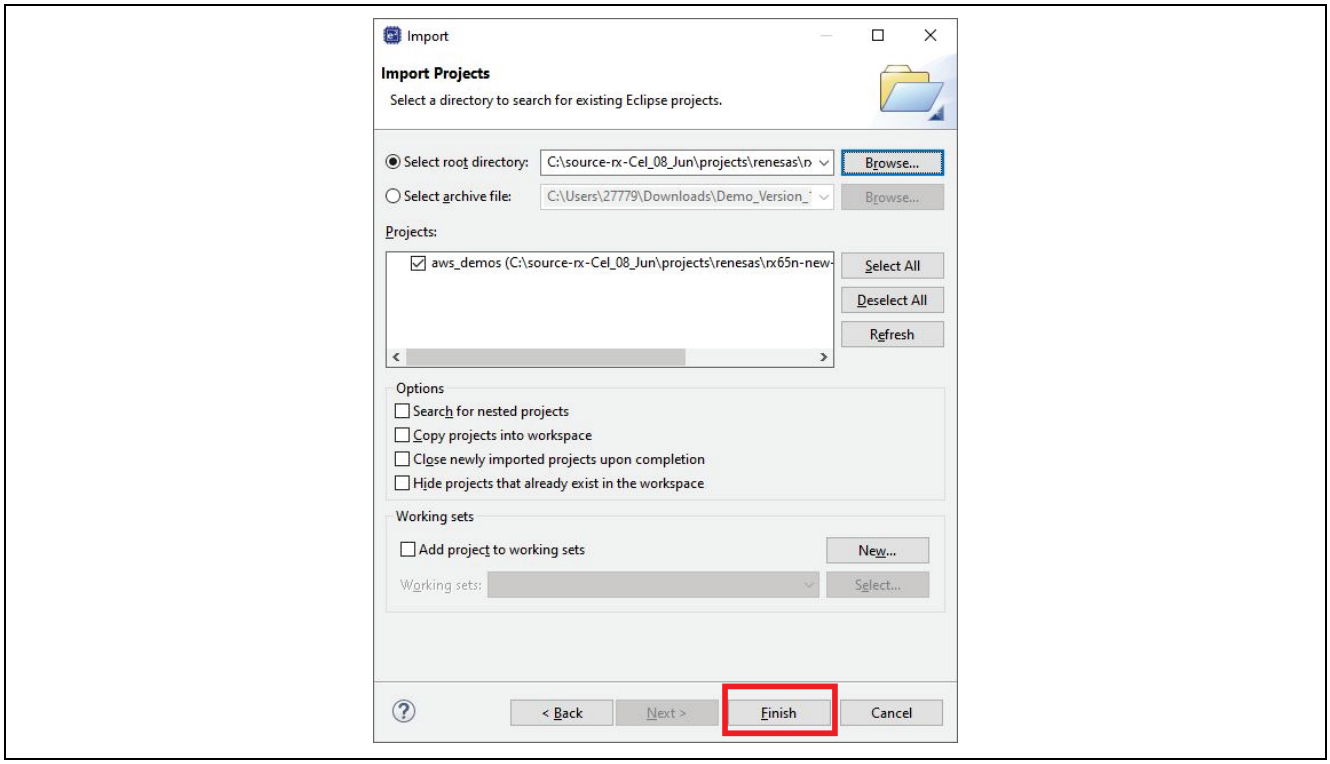


Figure 9. Finish Importing the Project

6. Check and set the SIM card information.
   Double click the "`aws_demos.scfg`" to open the smart configurator.

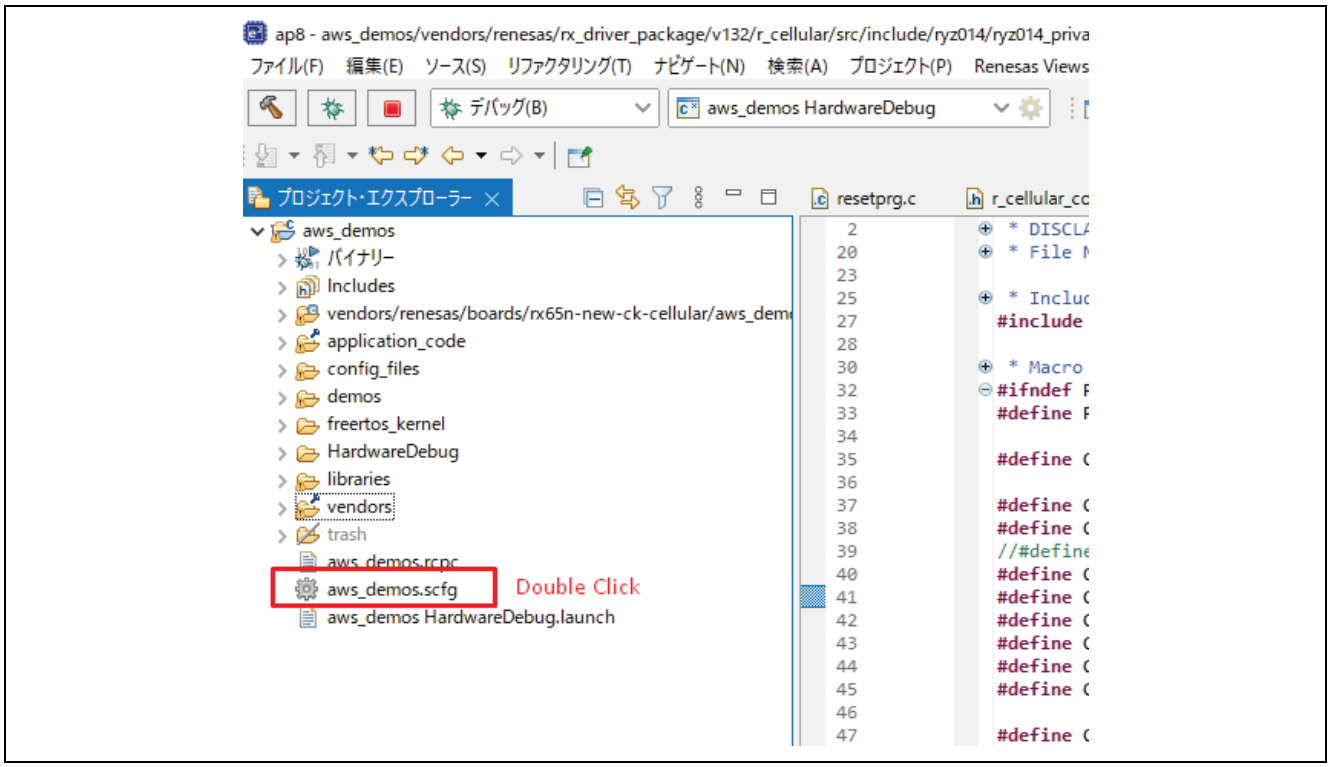


Figure 10. Open the Smart Configurator

Table 3. Information for Setting SIM of Cellular Driver When Using Truphone SIM Card in the Kit

Items	Truphone
APN (Access point name)	iot.truphone.com
UserID (Access point login ID)	(Null)
Password (Access point password)	(Null)
SIM card PIN code	(Null)
Authentication protocol type	1 (PAP)

Note: Please use the configuration of the included SIM card.

Set the above configuration values when using the SIM contained the kits.

If you are using a different SIM card, please set the value provided by the SIM provider.

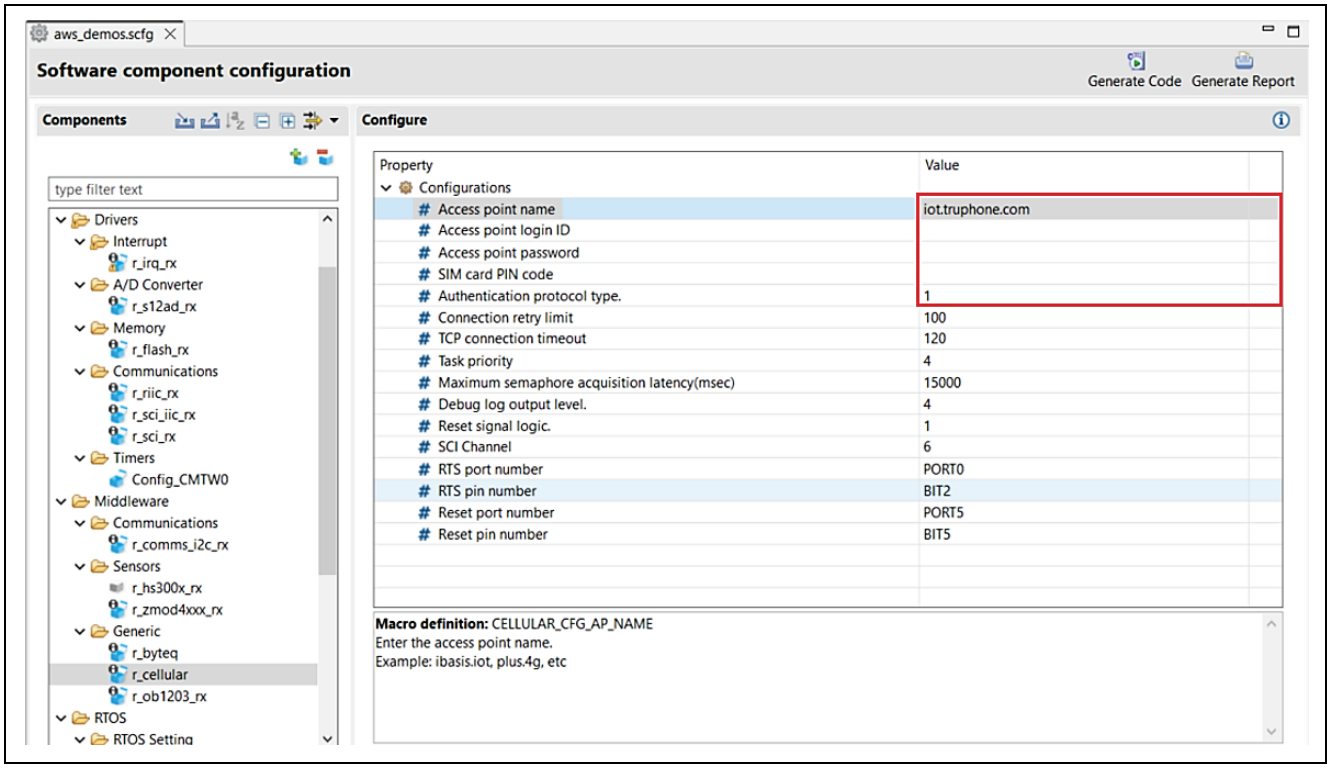


Figure 11. Set the SIM Information when Using Contained SIM Card in the Kit

7. Execute code generation.
   If you have changed the Smart Configurator settings, click **Generate Code**.

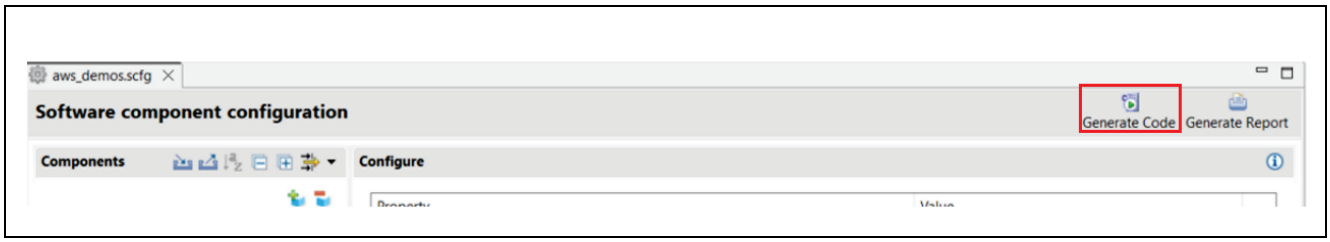


Figure 12. Generate Code

8. Apply patch files.
   This project must be patched after code generation. When running code generation, the source code will be overwritten by code generator. For this reason, please apply the patch each time after running code generation.
   Refer to "`[Project Root folder]\readme-path-memo.txt`" for how to apply the patch.
   The patch sources are located in "`[Project Root folder]\sorce_patch`" folder.



Figure 13. readme-path-memo.txt and sorce_patch folder

9. Select **Project** > **Build All** and confirm that 0 errors are reported.

Note: Make sure to clean the project before building it for the first time. If a demo build error occurs after the initial build, clean the project again and then rebuild it.

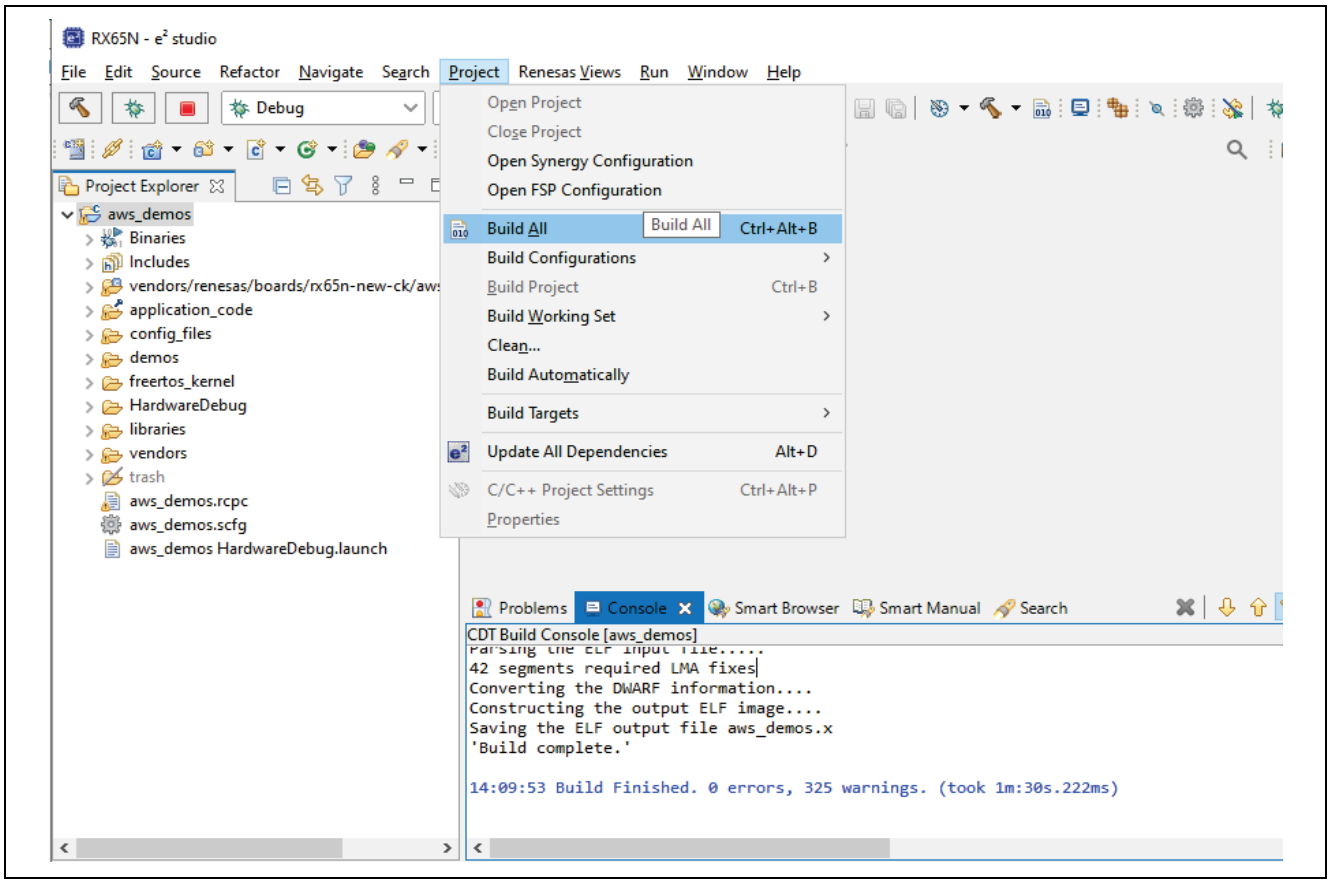


Figure 14. Build the Project

10. Debug Configuration

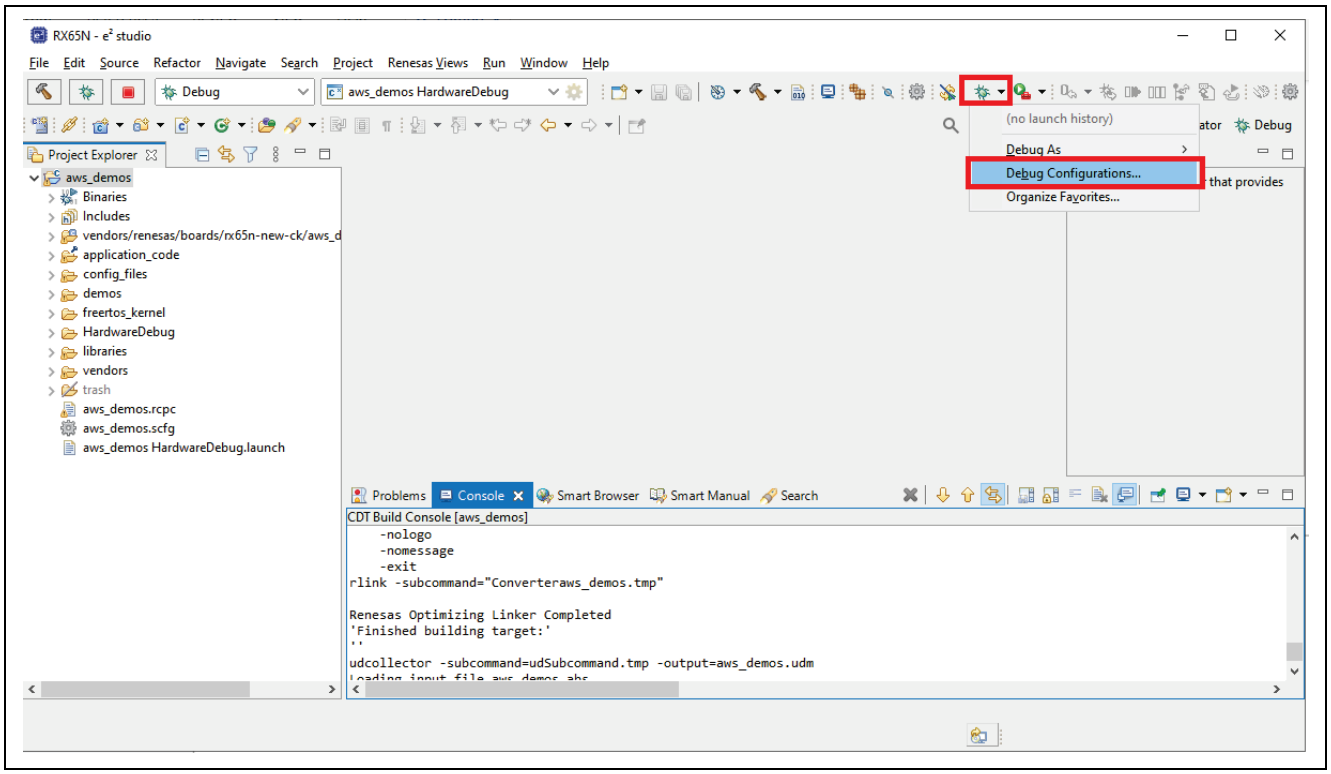


Figure 15. Configuration Debugger 1/2

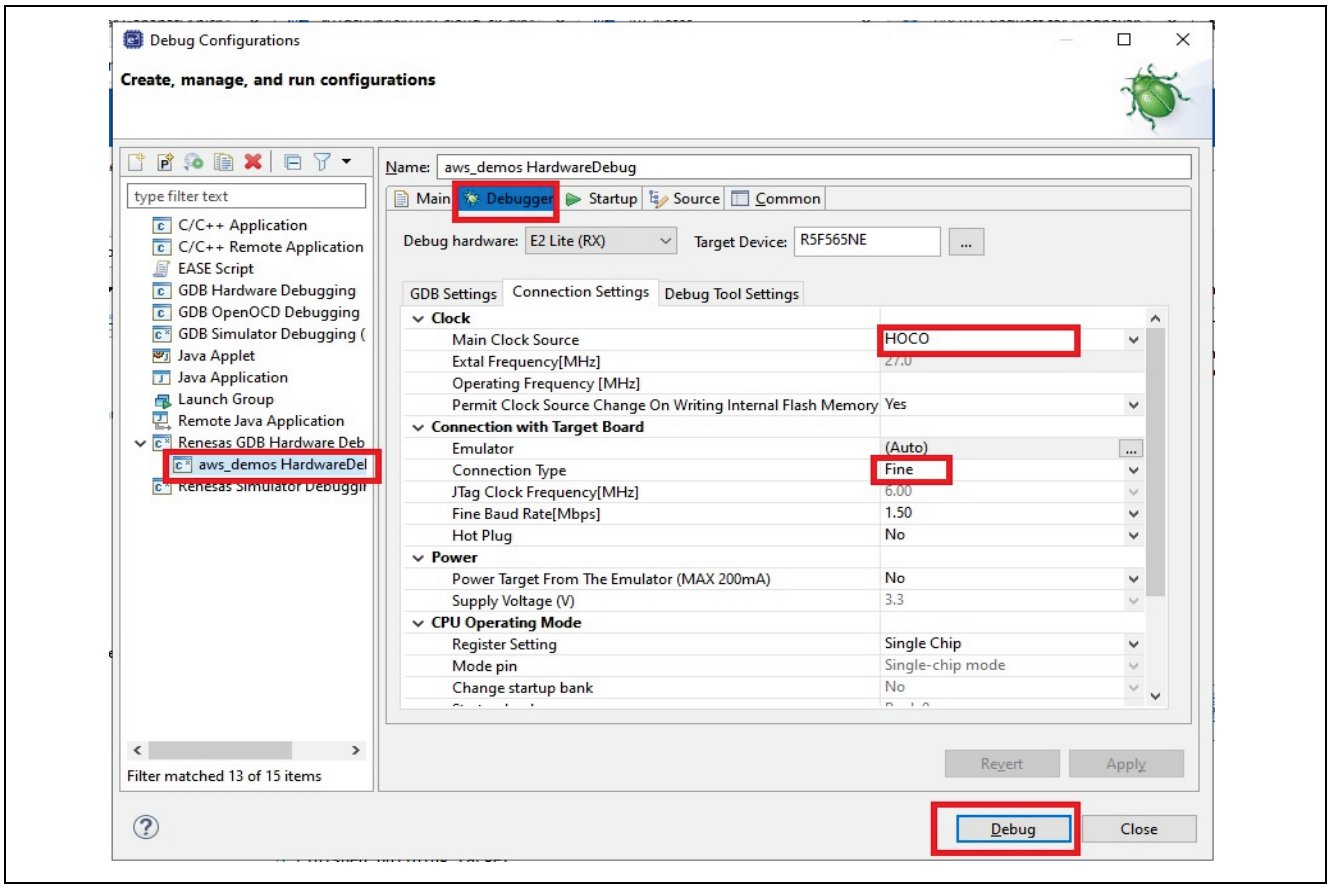


Figure 16. Configuration Debugger 2/2

4.1.2 Data Publishing Interval Settings (Optional)

Data publish interval can be set by the user. Default publish interval time is 10 seconds.

"`mqtt_demo_mutual_auth.c`" file has the macro to change the publish time interval.

```
#define DATA_PUBLISH_INTERVAL_IN_SEC 10U
```

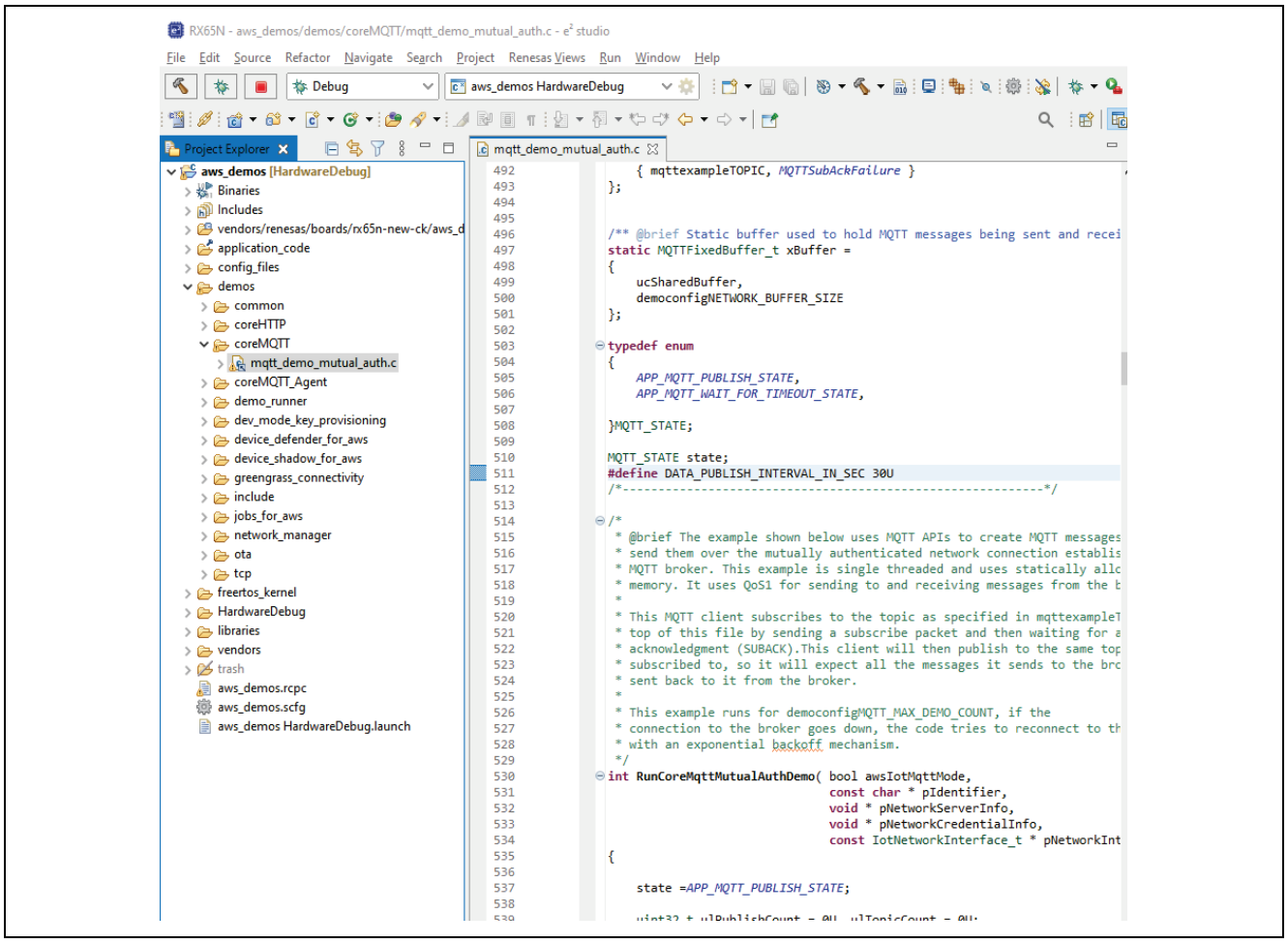


Figure 17. Data Publishing Interval Settings (Optional)

4.1.3 Running the Application Project

To run the Application project, use the instructions in the following section to set up the board.

4.1.3.1 Connecting the Board to the Serial Port Console of the PC

1. On the host PC, open Windows Device Manager. Expand **Ports (COM & LPT)**, locate **USB Serial Device (COMxx)** and note down the COM port number for reference in the next step.

   Note: USB Serial Device drivers are required to communicate between the CK-RX65N board and the

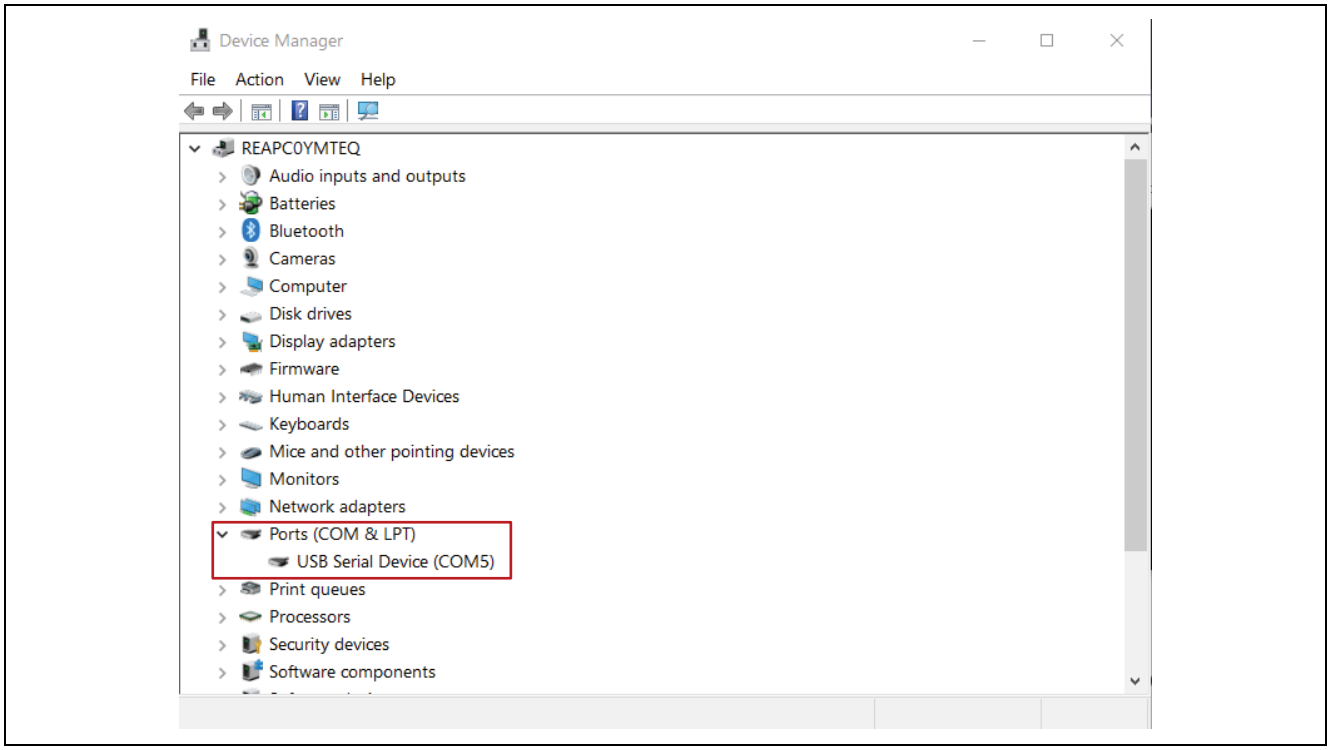


Figure 18. USB Serial Device in Windows Device Manager

2. Open Tera Term select **New connection** and select **Serial** and **COMxx: USB Serial Device (COMxx)** and click **OK**.

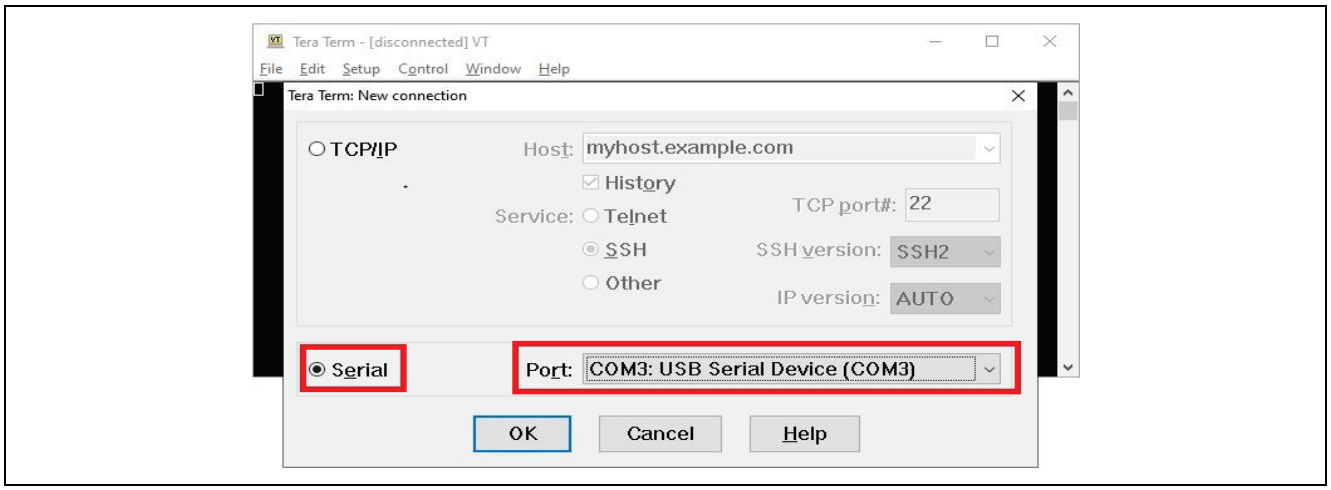


Figure 19. Selecting the Serial Port on Tera Term

3. Using the Setup menu, select **Setup** > **Terminal…** and select "**AUTO**" as Receive and check the **Local echo** box, as shown below.

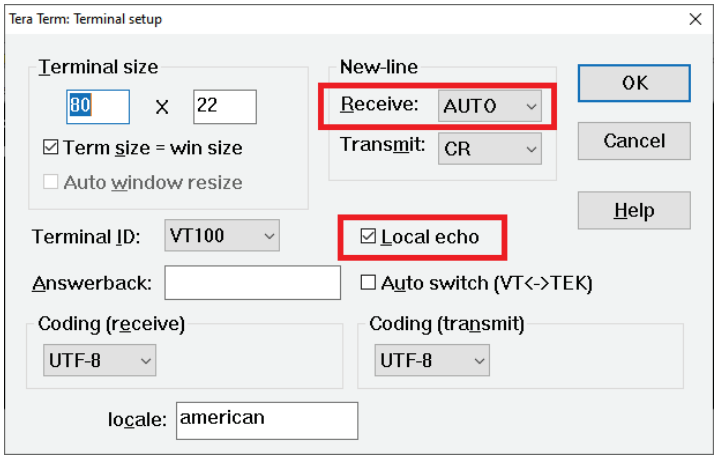


Figure 20. Select Receive: "Auto" and Enable "Local echo" on the Terminal Setting

4. Using the **Setup** menu pull-down, select **Serial port…** and ensure that the speed is set to 115200, as shown below.

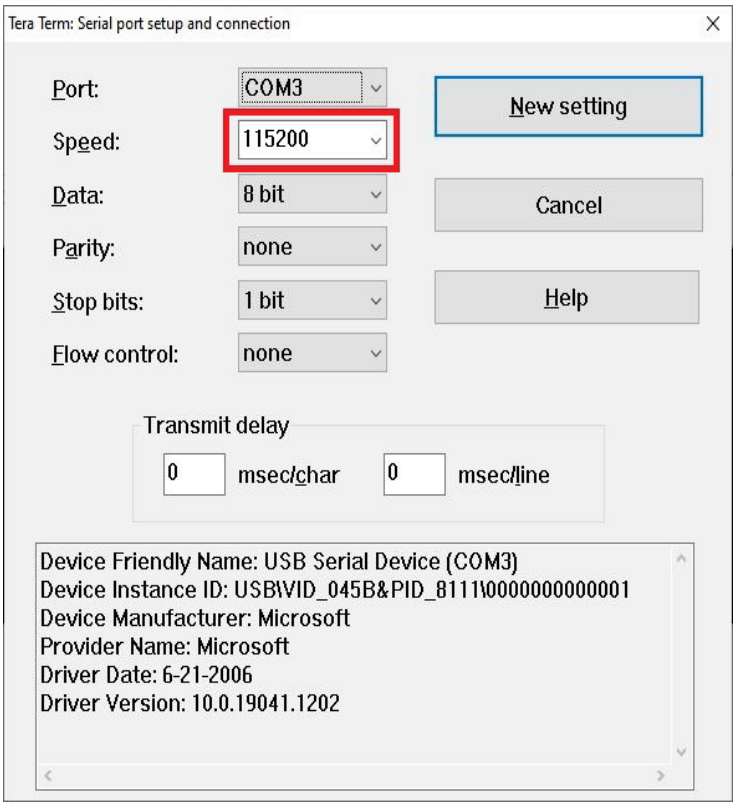


Figure 21. Select 115200 on the Speed Pulldown

5. Complete the connection. The Configuration CLI Menu will be displayed on the console as shown below.

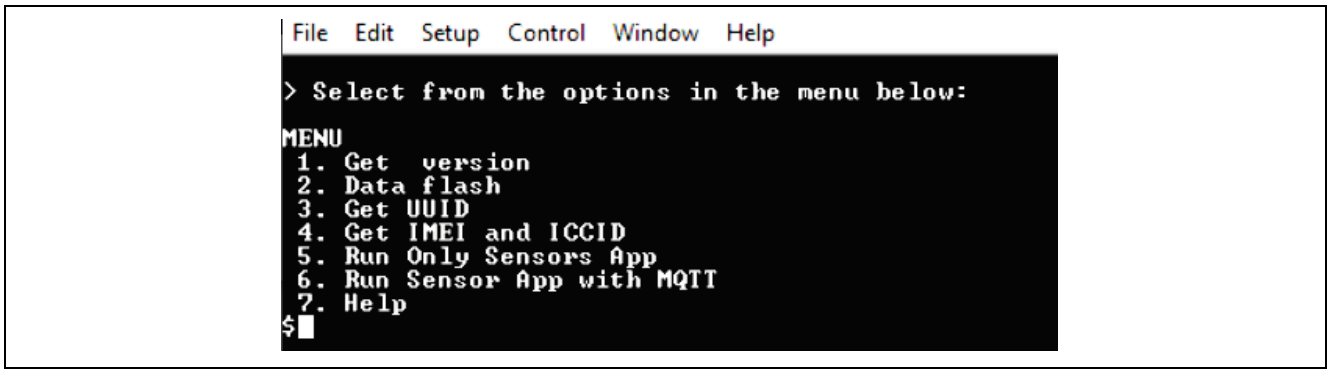


Figure 22. Main Menu

6. In the CLI shown in the above screenshot, choose the number to select the commands. For example, when you press '**1**' the firmware version of the application is displayed as shown below. To return to the main menu press "space bar" key.

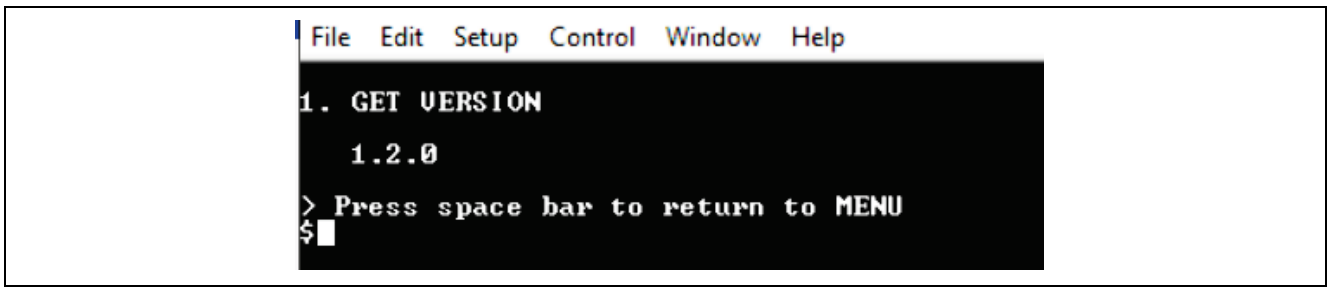


Figure 23. Get Version Information

4.1.4 Running the Application and Activation of SIM Card Included in CK-RX65N

This section explains how to activate the SIM card that is contained in CK-RX65N. If you use ethernet, you can skip this step.

1. Press '**4**' to display CAT-M Information (IMEI &ICCID). This menu will communicate with the CAT-M module to obtain the IMEI and ICCID values needed for activating the SIM card. Upon success, the IMEI and ICCID values will be displayed on the terminal screen. The program will continue to attempt to communicate with the CAT-M module until it has successfully connected or timed out. The IMEI and ICCID values are used to activate the SIM card.

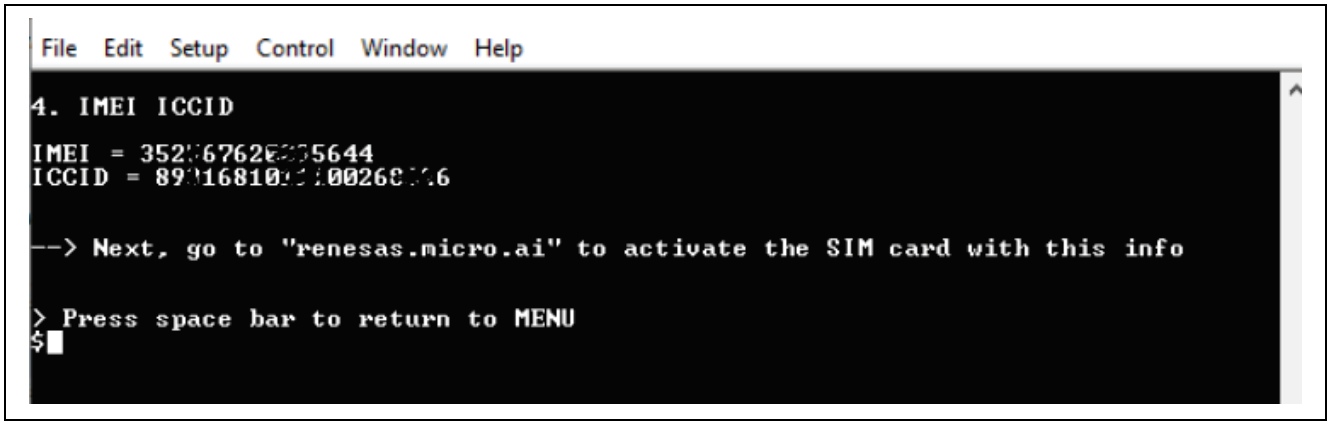


Figure 24. CAT-M Information

Note: Activation instructions are provided in section 4.1.5 that follows.

4.1.5 Activating SIM Card

A Truphone or MicroAI SIM card is included in this kit.

Note: The MicroAI SIM card discontinued support of CK-RX65N. If a MicroAI SIM card was included in the kit, please contact Renesas support to request a replacement to a Truphone SIM card. To identify a MicroAI SIM card, it is the card where the manufacturer's name is not printed on the SIM card.

Please activate the SIM card using the following steps:

To activate the included Truphone SIM card, please visit the Truphone SIM Activation platform at truphone.com/connectit and use the following steps:

1. On the Business page, click **Start activation** button under **IoT SIM Activation.**

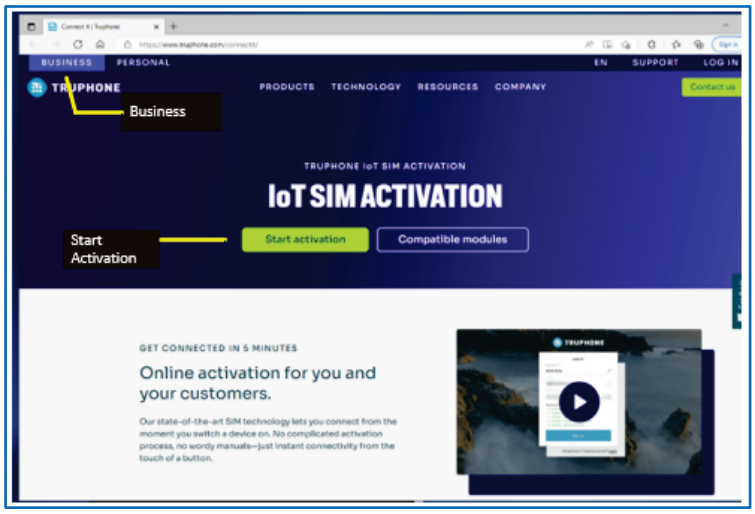


Figure 25. Activating the SIM Card on Truphone

2. Create a new Truphone Account by selecting **Sign up** (next to **Don't have an account yet?**) and fill-in your full name, Email, and a password. Then click **Sign up** to create a new account.

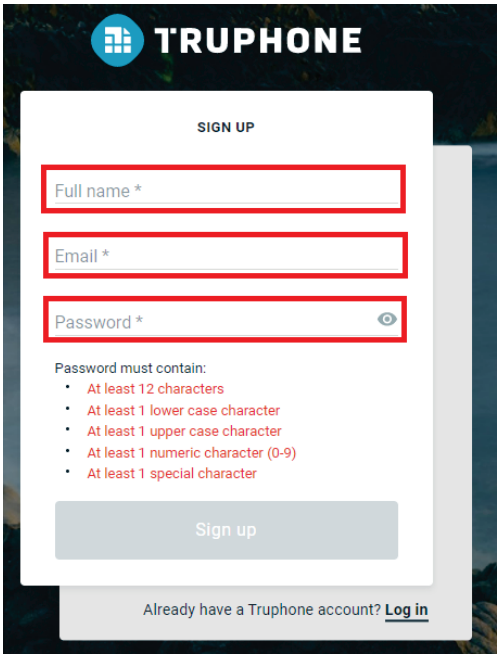


Figure 26. Signing In

3. Select **Personal** as the account type and press **Get Started**.

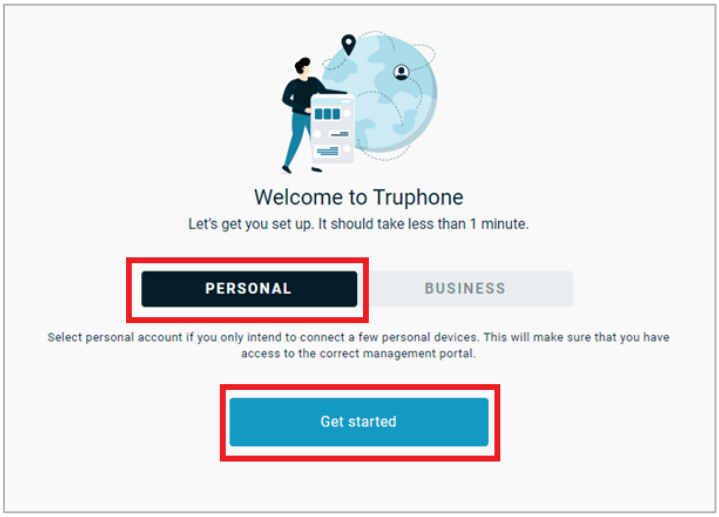


Figure 27. Selecting the Account Type

4. Verify your email by entering the activation code sent to your email account.

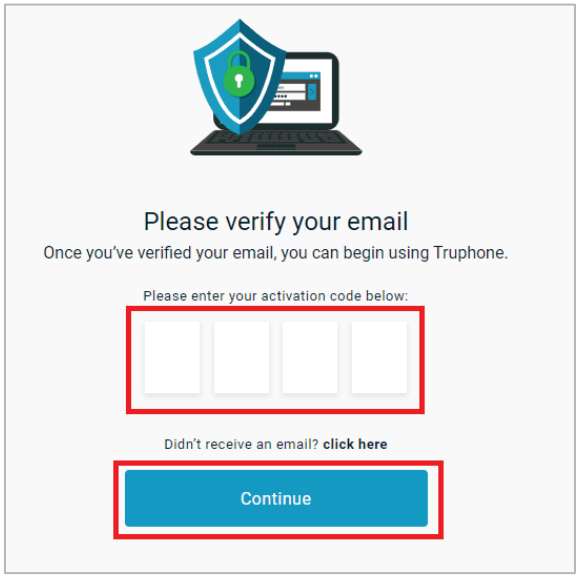


Figure 28. Verifying the Email

5. Complete the **Profile information** form – then select **Create account**.

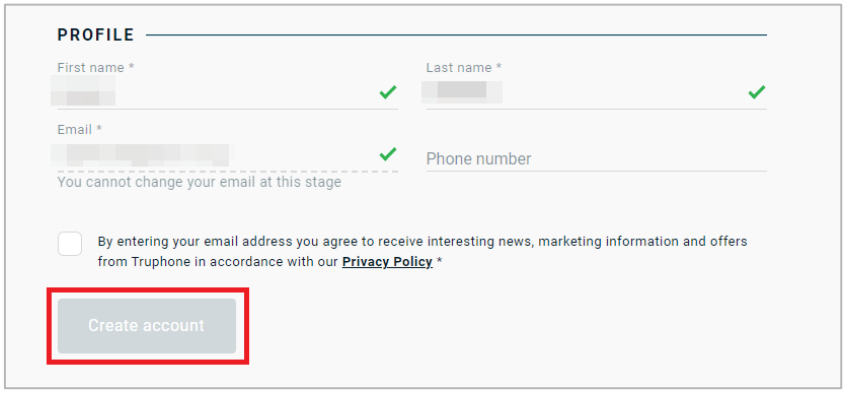


Figure 29. Completing the Profile Information

6. Select **Activate SIMs** to activate your individual SIM by **ICCID**.



Figure 30. Activating SIM

7. Enter the **ICCID** value.

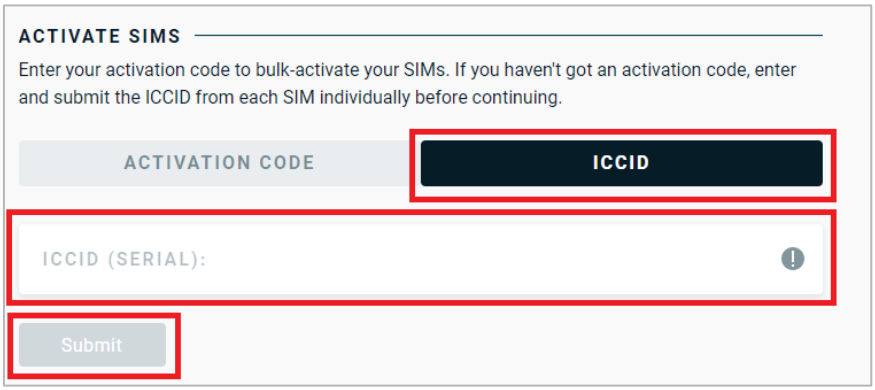


Figure 31. Entering the ICCID

8. You will receive email confirmation when the SIM card activation is complete.
   The **CK-RX65N** kit and SIM card should be activated and can be validated on the Tera Term terminal.

Note: The SIM card includes free credit for the first 90 days / 50 MB. After the free data charge is used up, communication charges will be incurred.

Disclaimer

The activation steps above are provided by the SIM provider, Truphone. They are the most current at the time of publishing this application note. If you need help activating your SIM card, contact Truphone support iot.truphone.com or Contact Support | Truphone.

If you have a SIM card from any other provider then contact the technical support for that provider.

For any other issue that cannot be resolved please contact Renesas Support at Technical Support.

Note: The SIM card provider for the Quick Start Guide example project is Truphone. If you use any other SIM card provider, you must change the Access Point Name required for the SIM card provider in your global region. Failure to do so could result in the RYZ014A not connecting to the cellular network.

4.2 For Users Using the Provided Dashboard and Kit AWS Account

This section explains account registration, accessing the dashboard, and getting the board “UUID” information.

4.2.1 Getting the Board UUID Information

1. Press ‘**3**’ from the **Main Menu** to display board UUID. This displays the board UUID information on the console as shown in the screenshot below. You will need this information to register on the Cloud Dashboard.

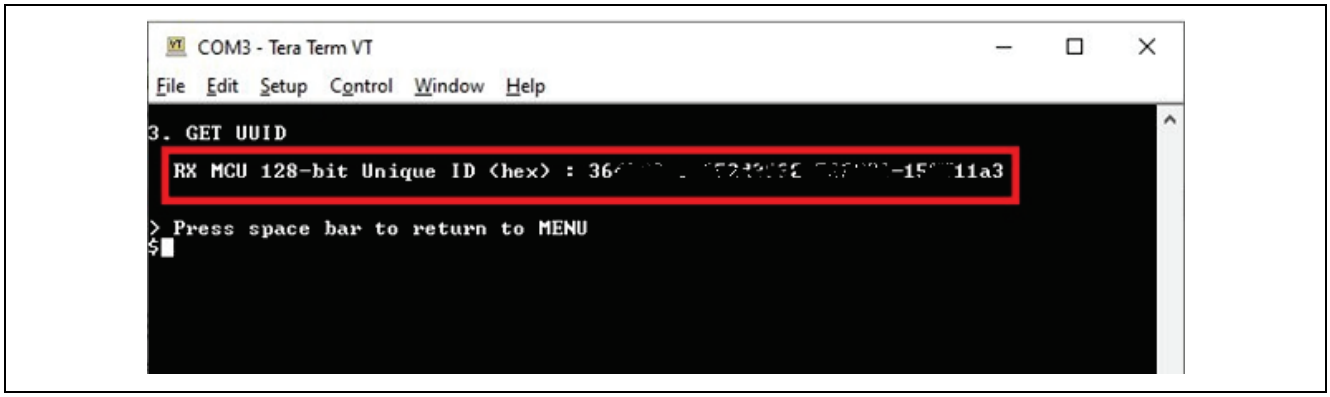


Figure 32. Getting Board UUID Information

4.2.2 Getting the Account 10 USD for Trial of AWS

1. Register/sign up at “https://renesas.cloud-ra-rx.com/” with **an email account that was not used previously for signing up to an AWS account.**

   Note: The provided free credit starts being used when users register their email and UUID on this system. Renesas recommends disabling the AWS EC2 service when users do not use this system.

   Please refer to section 6.8, How to Enable/Disable EC2 Instance**.**

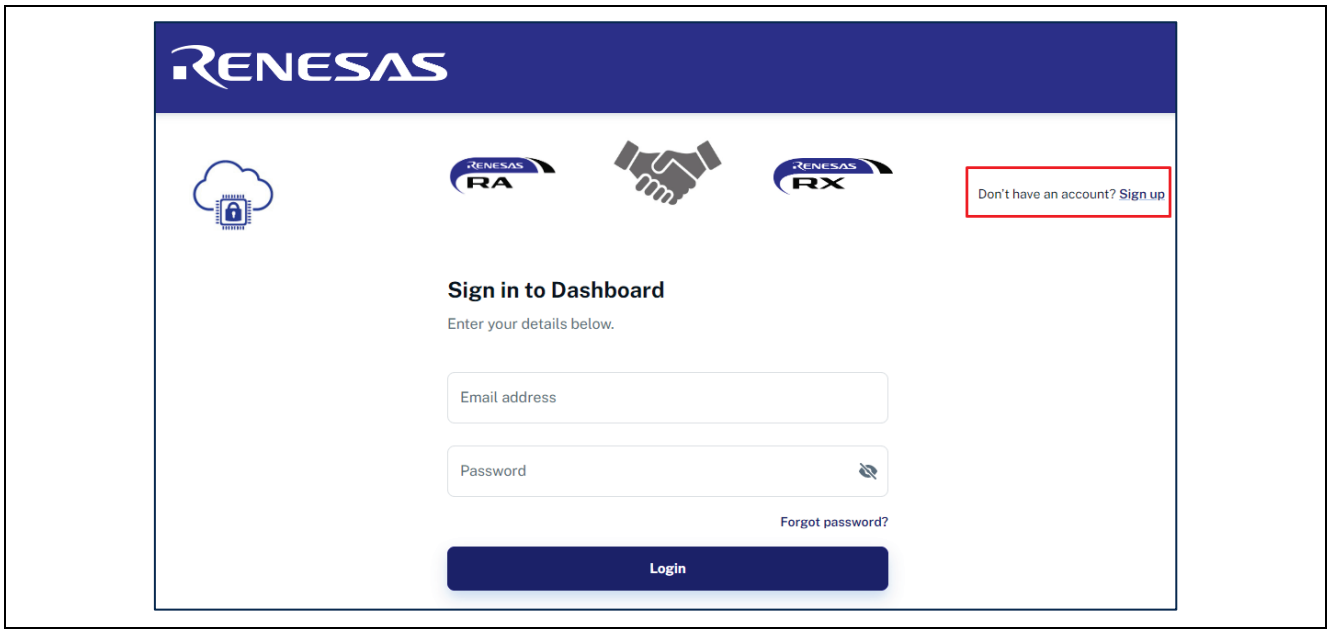


Figure 33. Get the Account 10 USD for Trial of AWS (1/2)



Figure 34. Get the Account 10 USD of Trial of AWS (2/2)

2. Wait for AWS verification email (it may take up to 10 min). Then, enter the email and UUID to register the kit as shown in the following window. You can get the UUID from section **4.2.1 Getting the Board UUID Information**

   Note: Only 1 device will be assigned to an account.

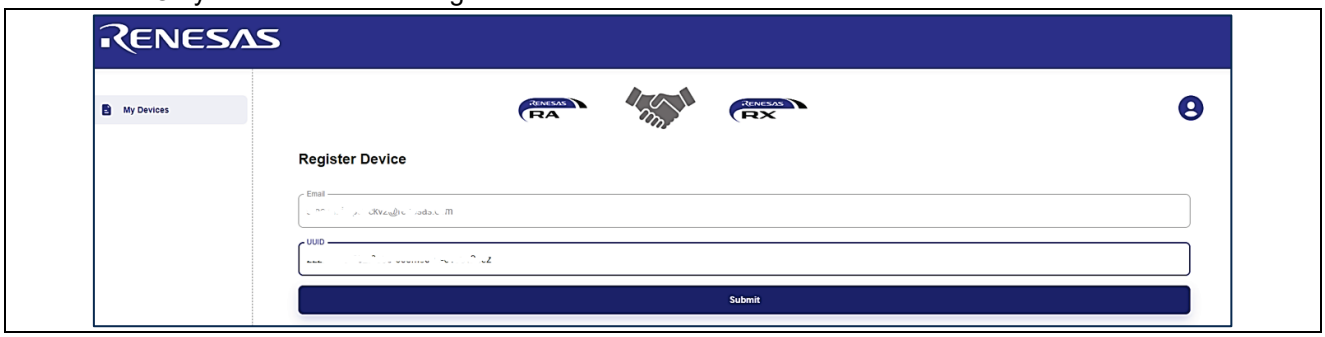


Figure 35. Register Device

3. **Verify the AWS account** in your email that you registered.
4. Wait for the status change on the registration page or wait for provisioning to complete. Please refresh the page in case the “Registration in progress” screen still shows up.

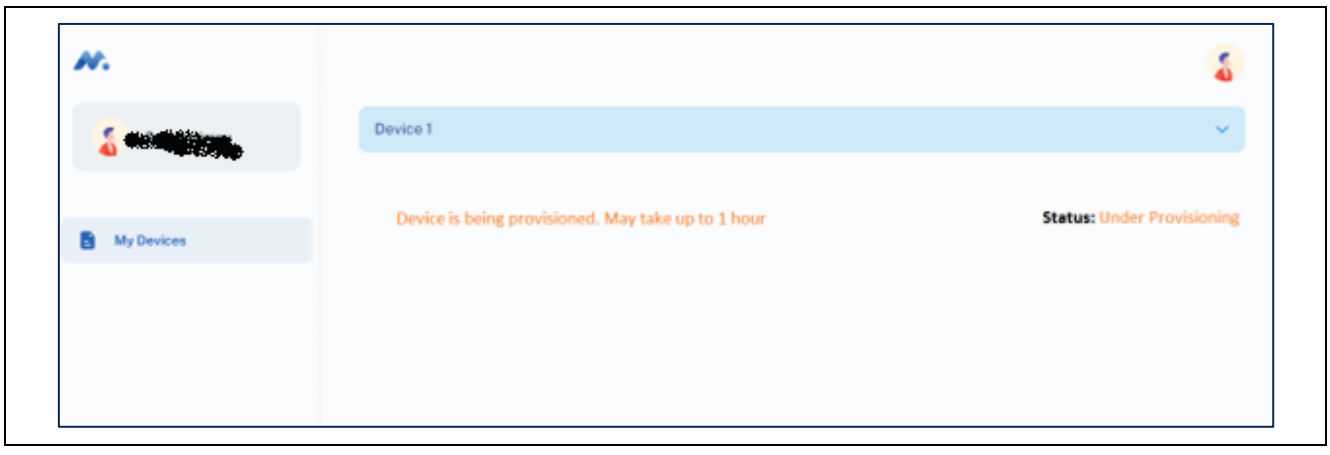


Figure 36. Dashboard Build In Progress

5. Once the account status shows up as active in the registration page, click on the device to see device UUID.

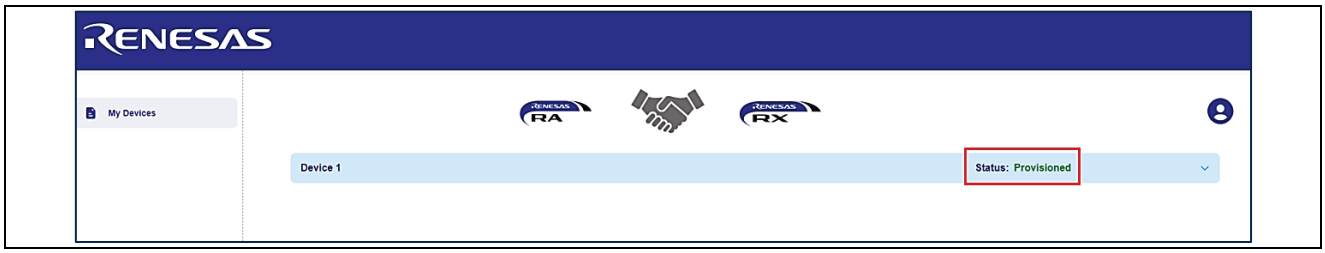


Figure 37. Active Device

6. After finishing the progress, you can get the connection certificate using the “Download Certificate” button. This is used for installation on the application demo of kits that you got in the previous step.

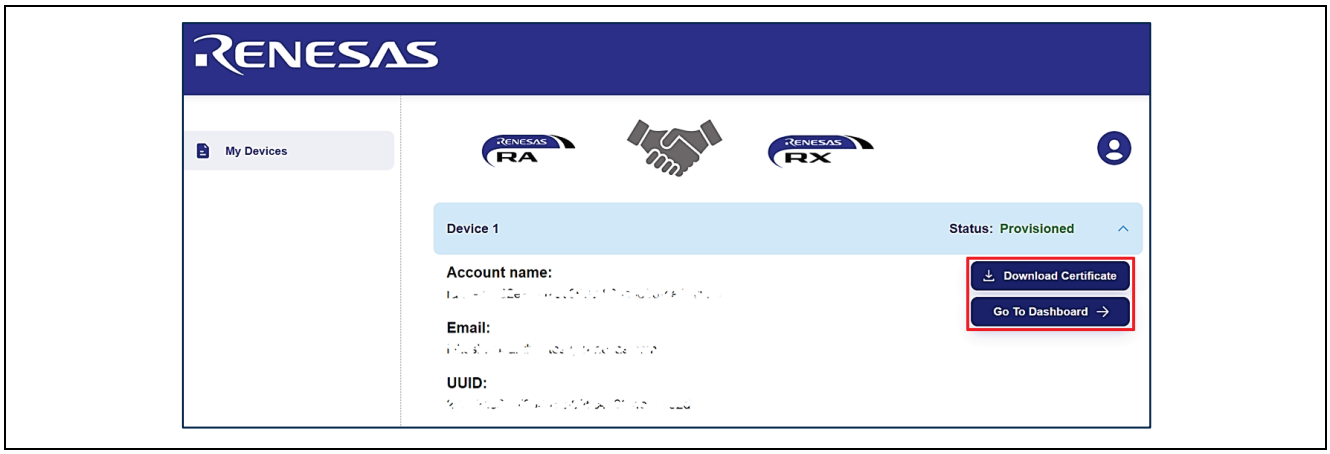


Figure 38. Dashboard Build Complete

7. Click “**Go To Dashboard**” to access the dashboard. First time users will access the dashboard with credentials “**admin**” **for both username and password** and will be directed to change the password. Once completed, users can access the dashboard.



Figure 39. Dashboard for this Application

4.3 Hardware Preparation

- Connect micro-USB cables to debug port (J14 on the CK-RX65N board)
- Connect micro-USB cables to serial port (J20 on the CK-RX65N board)
- Connect the RYZ014A Cellular Pmod module to the **Pmod1**
- **Set the Jumper of J16 “Debug”**
- Connect RYZ014A Cellular Pmod module and insert SIM card.

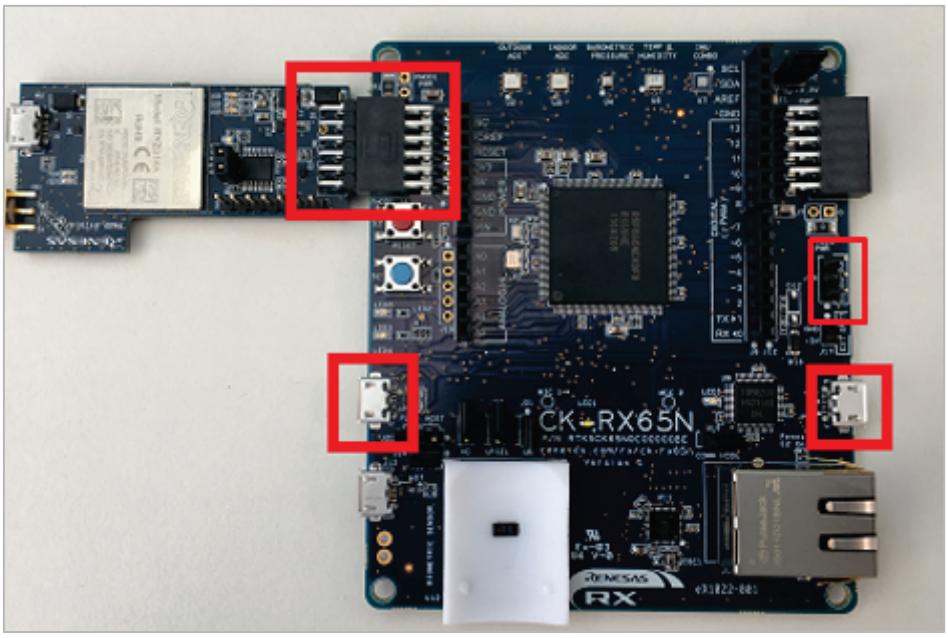


Figure 40. Connecting the USB and RYZ014A Pmod

4.4 Software Preparation - Running Project from IDE

4.4.1 Storing the Device Certificate, Key, MQTT Broker Endpoint and IoT Thing Name

Device Certificate, Device Private Key, MQTT Broker Endpoint and IOT Thing name need to be stored in the data flash for the application to work. These are obtained after registering to the Cloud Dashboard.

1. Press ‘**2**’ on the **Main Menu** to display **Data Flash** related commands as shown in the following screenshot. This sub menu has commands to store, read, and validate the data.

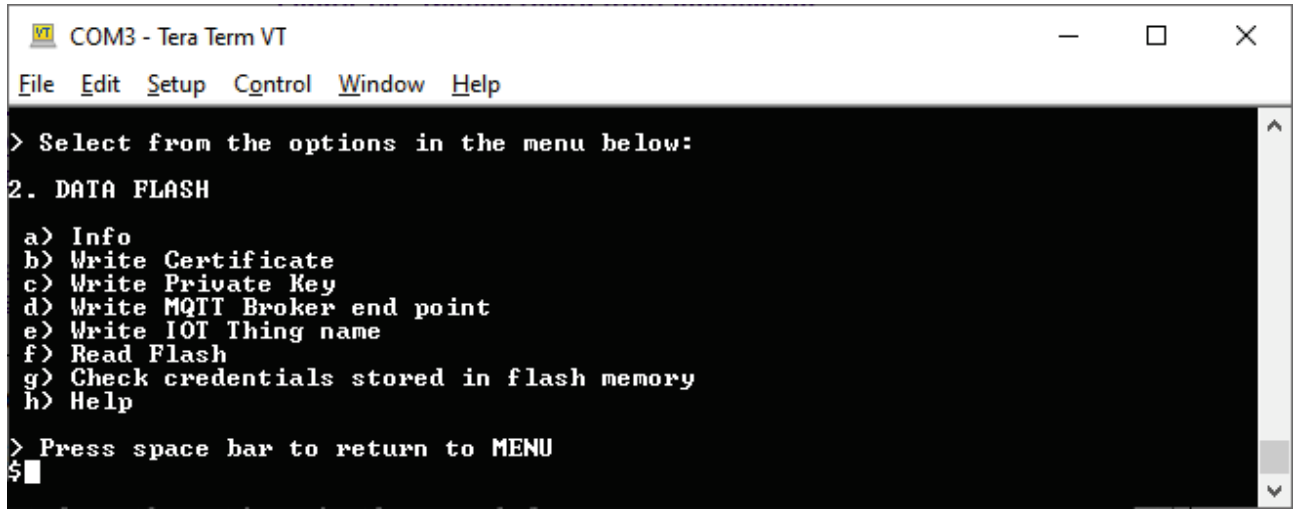


Figure 41. Data Flash related Menu and Commands

2. Unzip the `cert.zip` from the dashboard.

3. To store the **Device Certificate,** press the option '**b**' and Click the **File** tab of the Tera Term and **Send File** option and choose the downloaded Device certificate file from the dashboard "`xxxxxcertificate.pem.crt`". The details for downloading the certificates are provided in the Dashboard document linked as part of this Application Note.

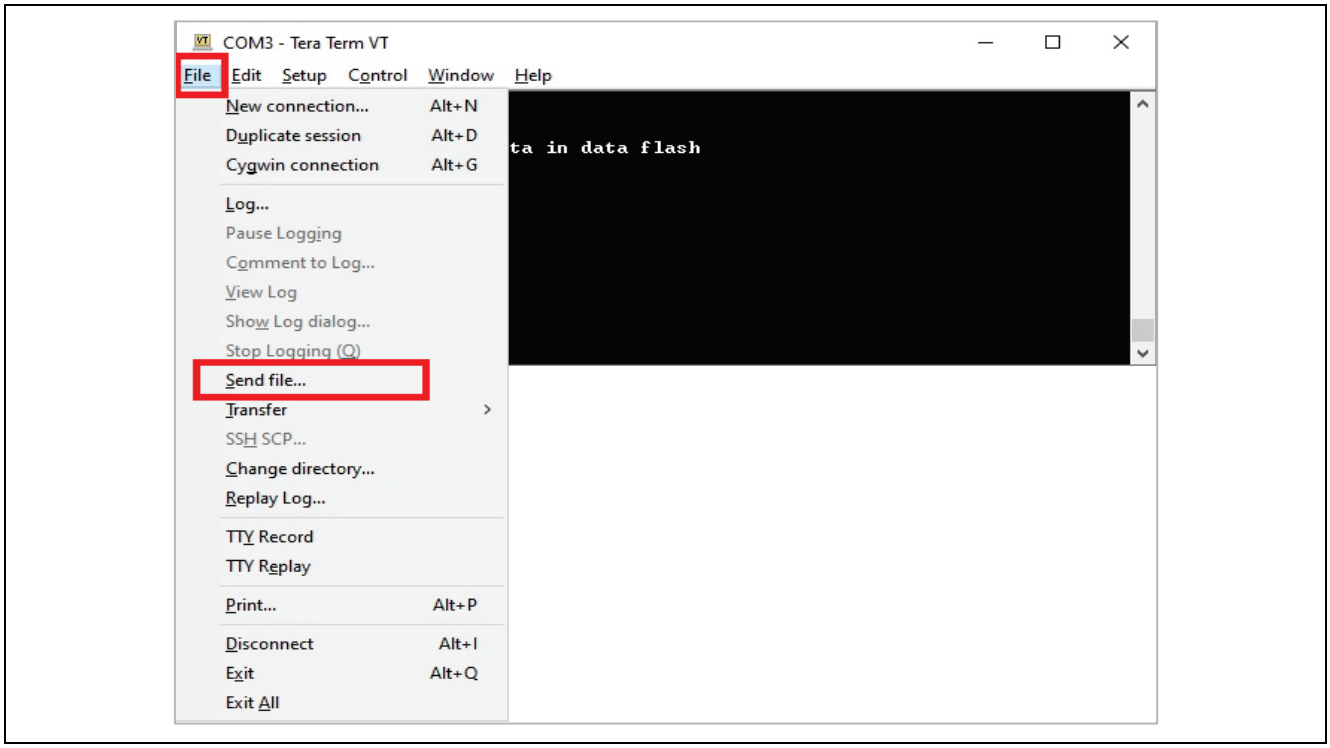


Figure 42. Accessing the Device Certificate

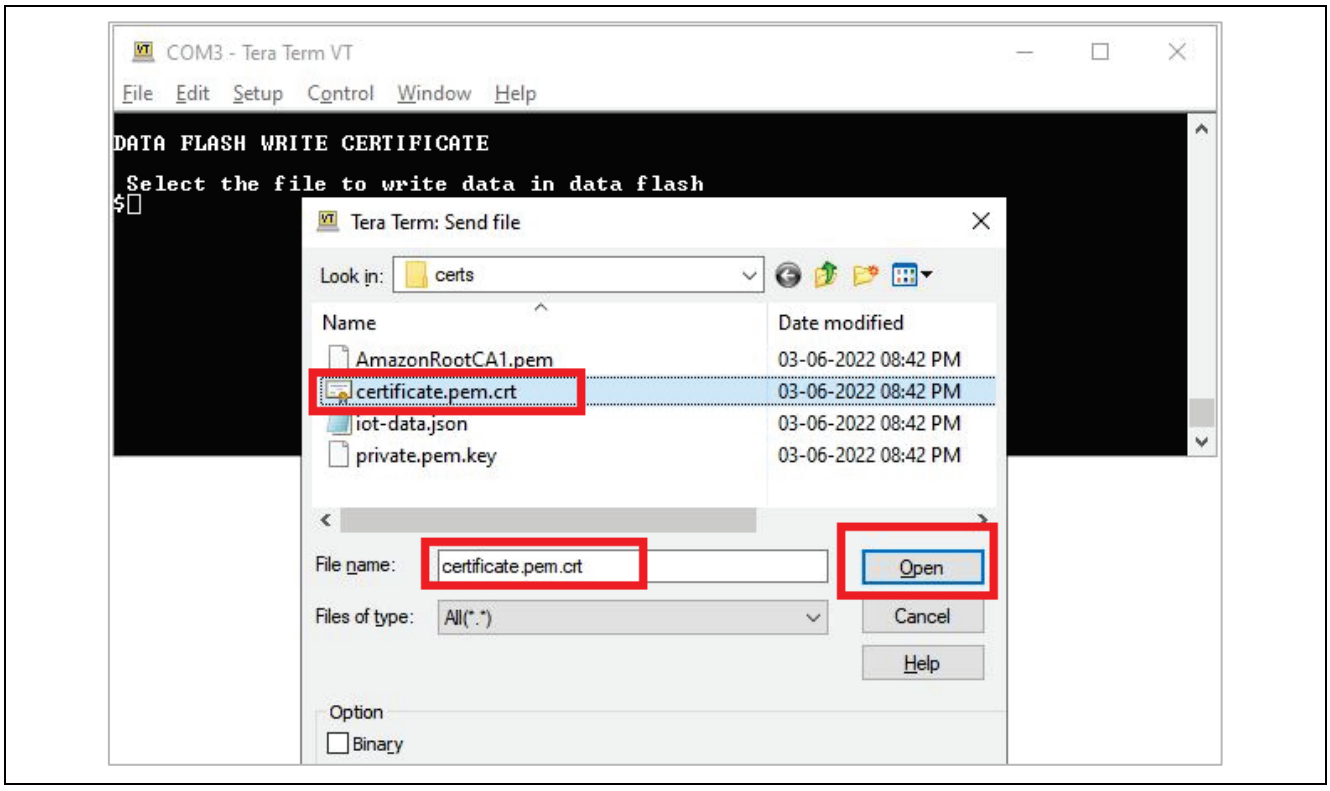


Figure 43. Downloading the Device Certificate into the Data Flash

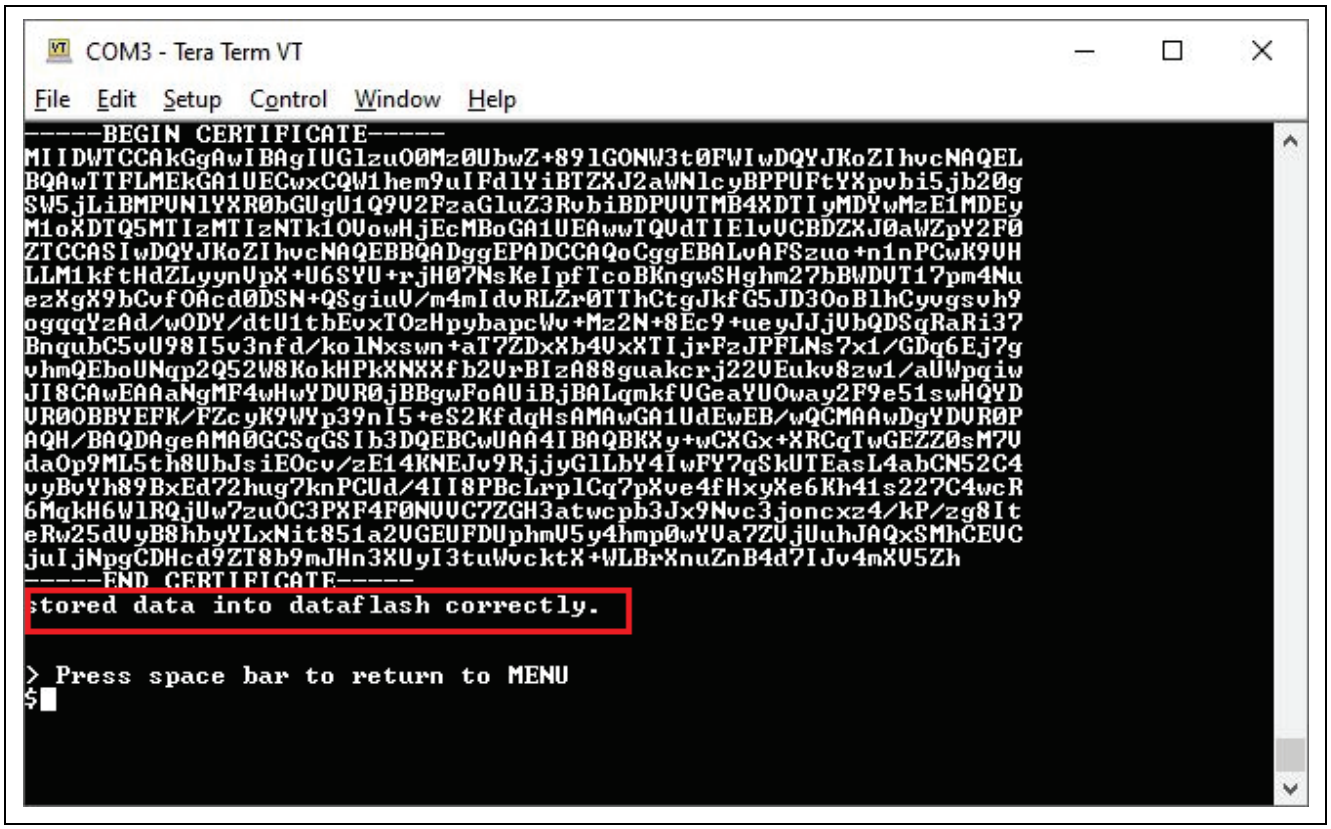


Figure 44. Status of the Downloaded Device Certificate into the Data Flash

4. To store the **Device Private Key,** press the option '**c**' and Click the **File** tab in the Tera Term and **Send File** option and choose the downloaded Device Private Key "`xxxxxxxprivate.pem.key`" which is downloaded from the Dashboard download link.
5. **Open the "iot-data.json" file.**
   This file has information about IoT things name and IoT endpoint.

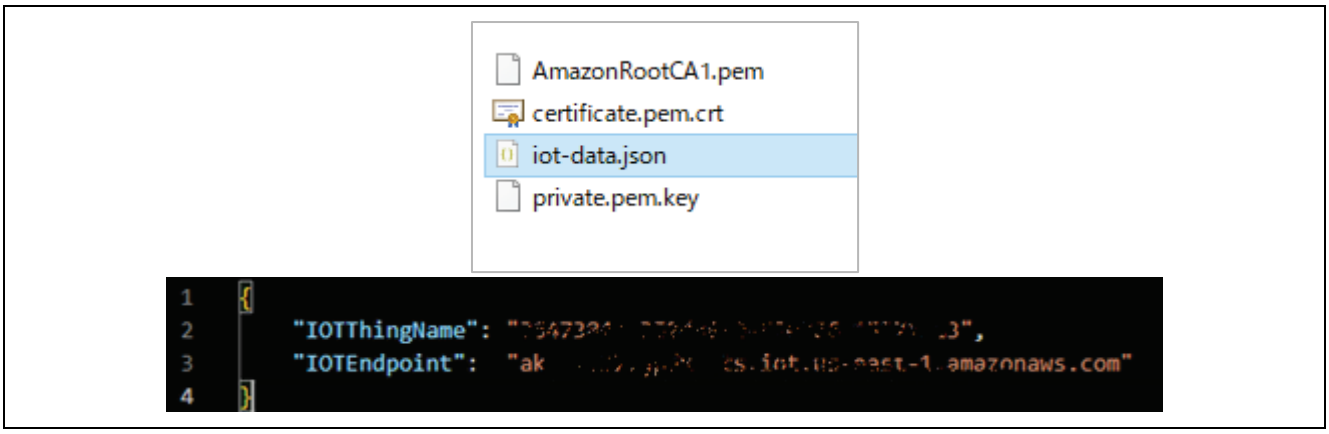


Figure 45. Getting the IoT Things Name and IoT Endpoint Information

6. To store the **MQTT Broker end point,** copy the end point string between the quotes **xxxxxxxxxx.iot.us-east-1.amazonaws.com** from the downloaded certificate link, press the option '**d**' and click the **Edit** tab in the Tera Term and "**Paste<CR>**" and verify and confirm the valid string and press **OK**.
   Note: Please copy the IOTEndpoint without "".

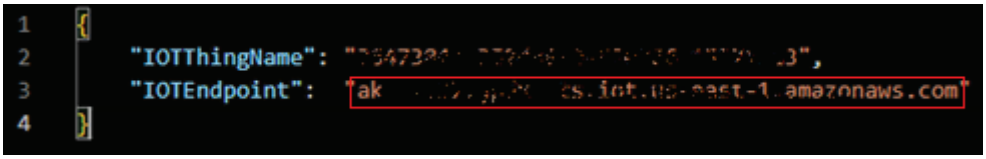


Figure 46. Copy the IOTEndpoint

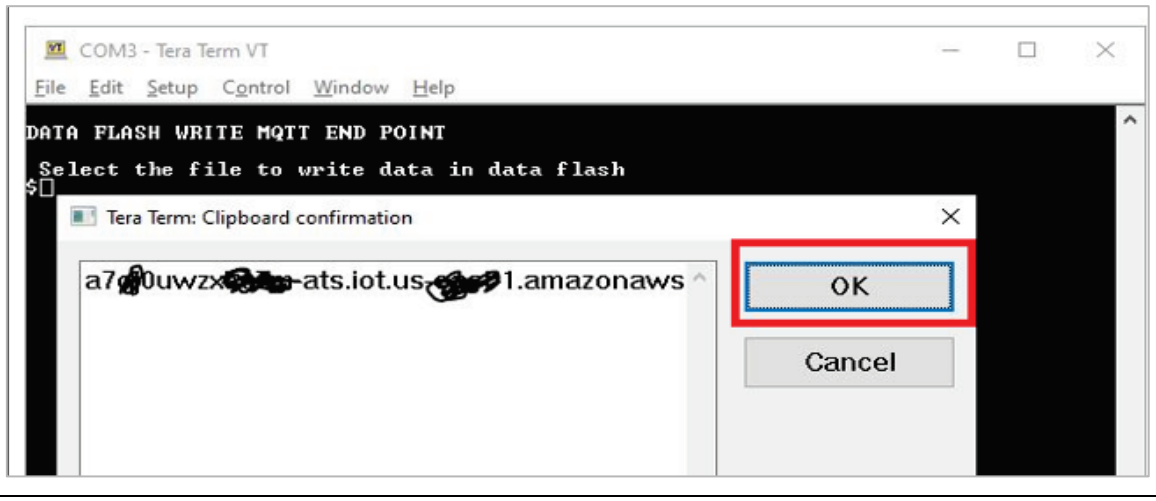


Figure 47. Storing the MQTT IoT endpoint into the Data Flash

7. To store the **IOT Thing Name,** copy the Thing Name string between the quotes **xxxxxxxx-xxxx-xxxxxxxx-xxxx** of IoT thing Name from the downloaded certificate link, press the option '**e**', click the **Edit** tab in the Tera Term and "**Paste<CR>**", verify and confirm the valid string, and press **OK**.
   Note: Please copy the IOTthingName without "".



Figure 48 Copy the IOTThingName

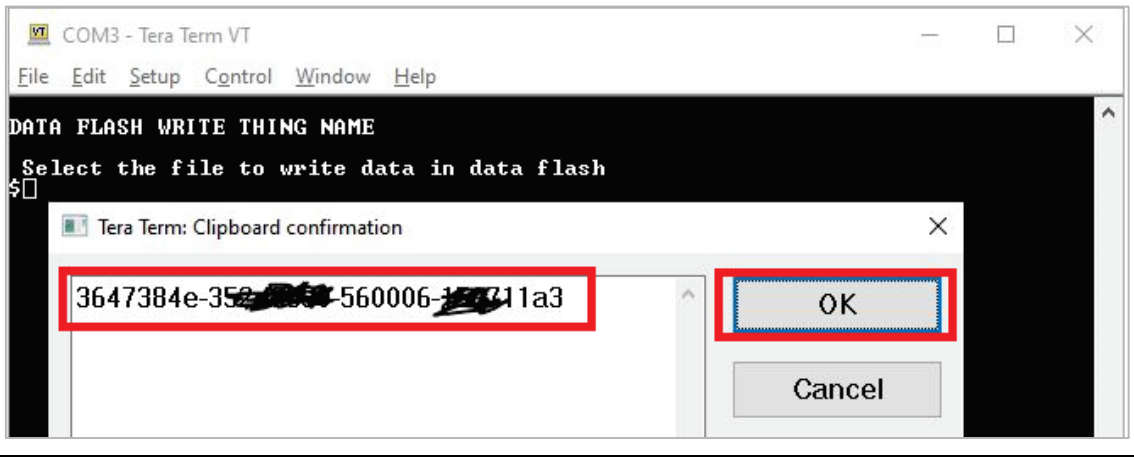


Figure 49. Storing the Thing Name into the Data Flash

8. Press option '**f' and 'g'** to read and validate the stored information in the data flash.

Note: Validation of the stored data is very limited and validates minimum set of data points. Users are required to input the valid data to the flash obtained from the dashboard for the proper working of the application.

4.4.1.1 Starting the Application

After activating the SIM card, registering to the Dashboard and configuring the required Cloud credentials via the CLI, the application is ready to run. Press option '**6**' to start the application. The application prints a welcome screen along with the status of validating the Cloud credentials data present in the data flash as shown below.

When the connection is successful, the data is shown.

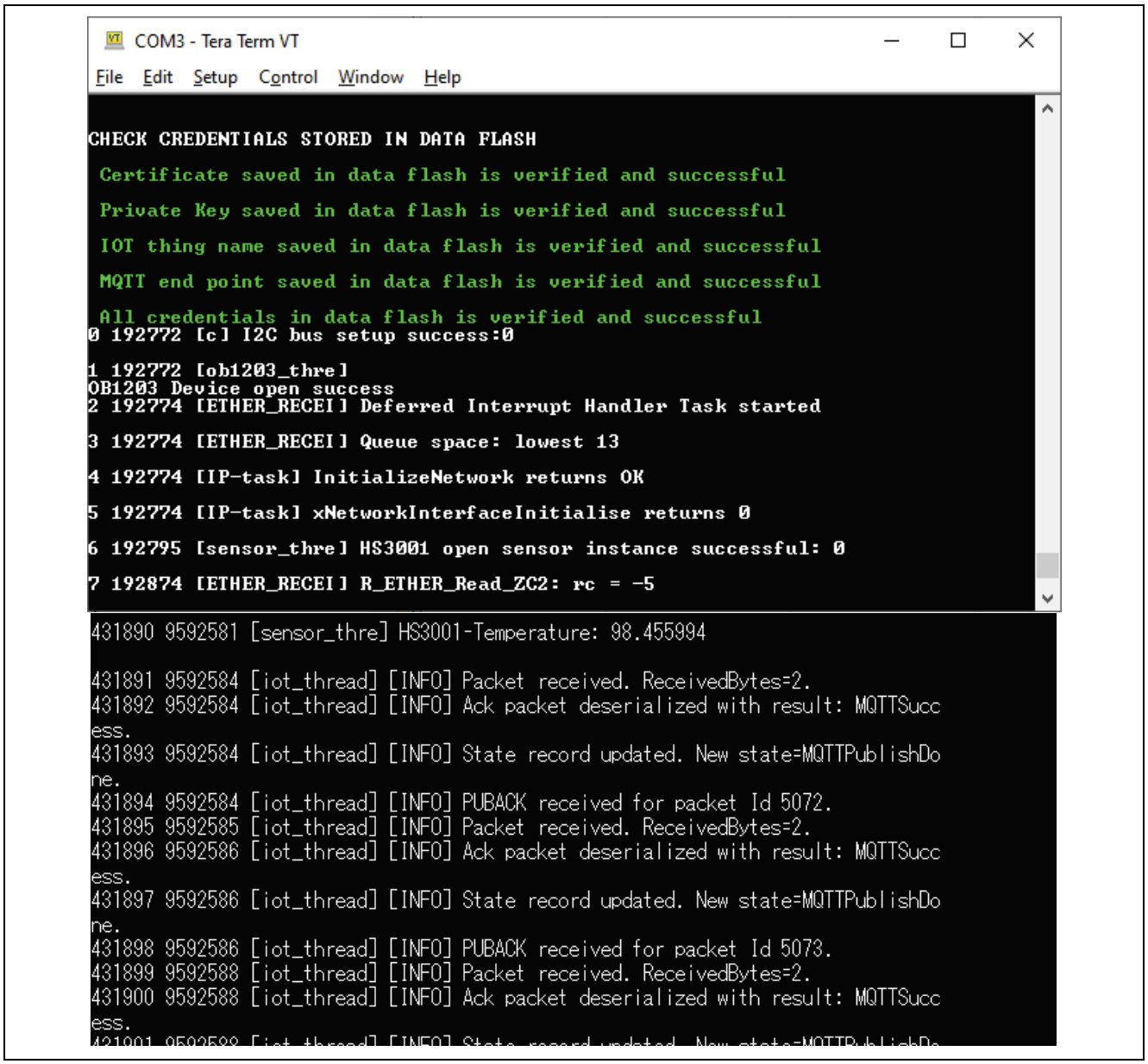


Figure 50. Welcome Screen on the Console

Note: Sensor data can be read correctly after the stabilization time.
For details on the stabilization time, please see "Table 4.Sensor Stabilization Time".

4.5 For Users Using their Own AWS Account

Note: Complete the steps up to “Check AWS IoT endpoints.”

Get an AWS Account

Get an AWS account > Click the "**Sign into the Console**" button.

When considering using AWS, you can use the AWS free tier AWS Free Tier.

Log in to the AWS Management Console

Amazon Web Services > My Account > AWS Management Console

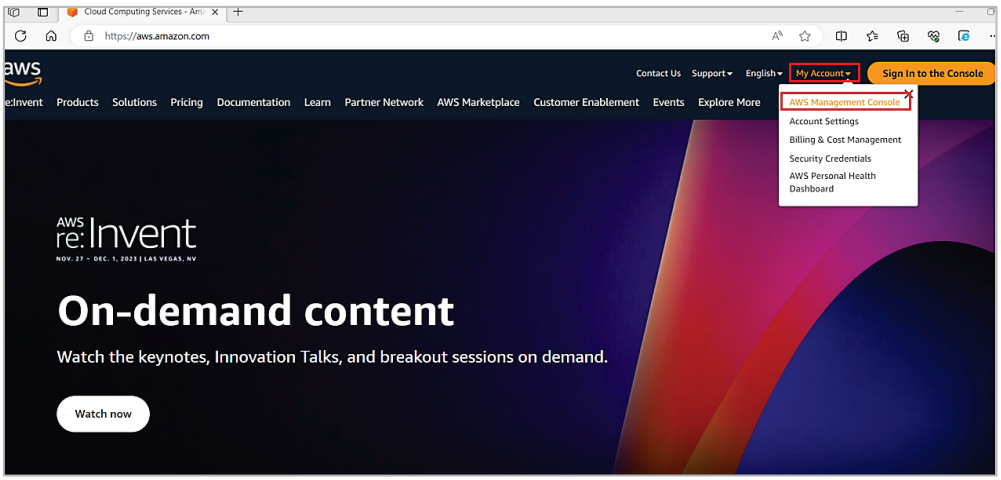


Figure 51. Login the AWS

Move to IoT Core Control Panel

- **AWS services > All services > IoT Core**

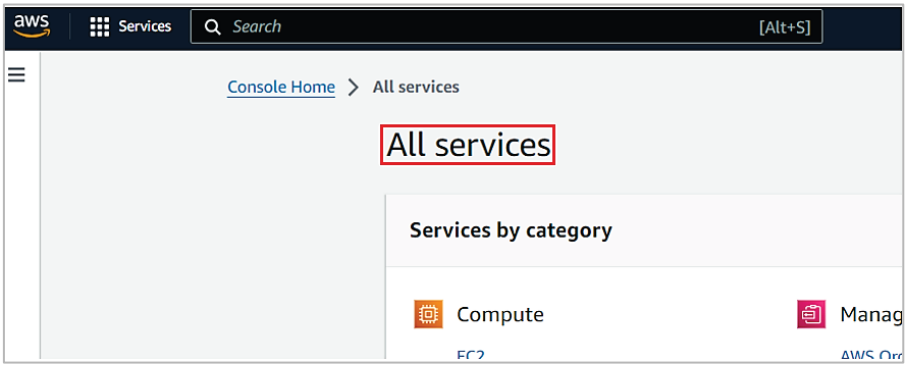


Figure 52. Search the IoT Core 1/2

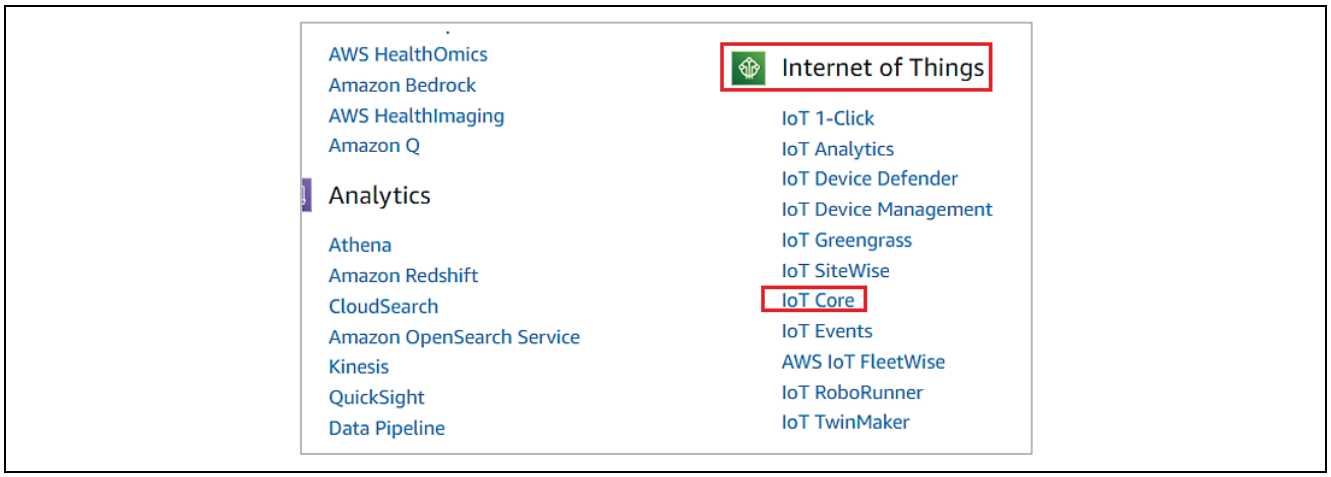


Figure 53. Search the IoT Core 2/2

Create a Security Policy

- **Secure > Policies > Create a policy**

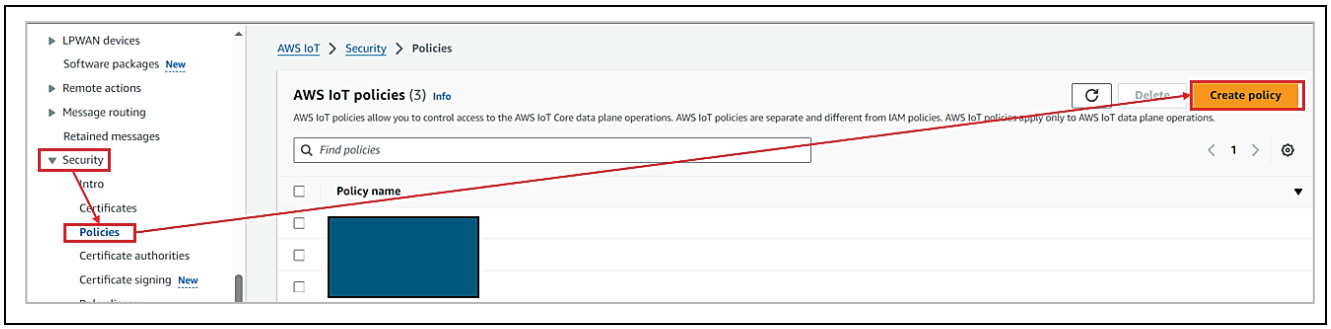


Figure 54. Create the Policy 1/3

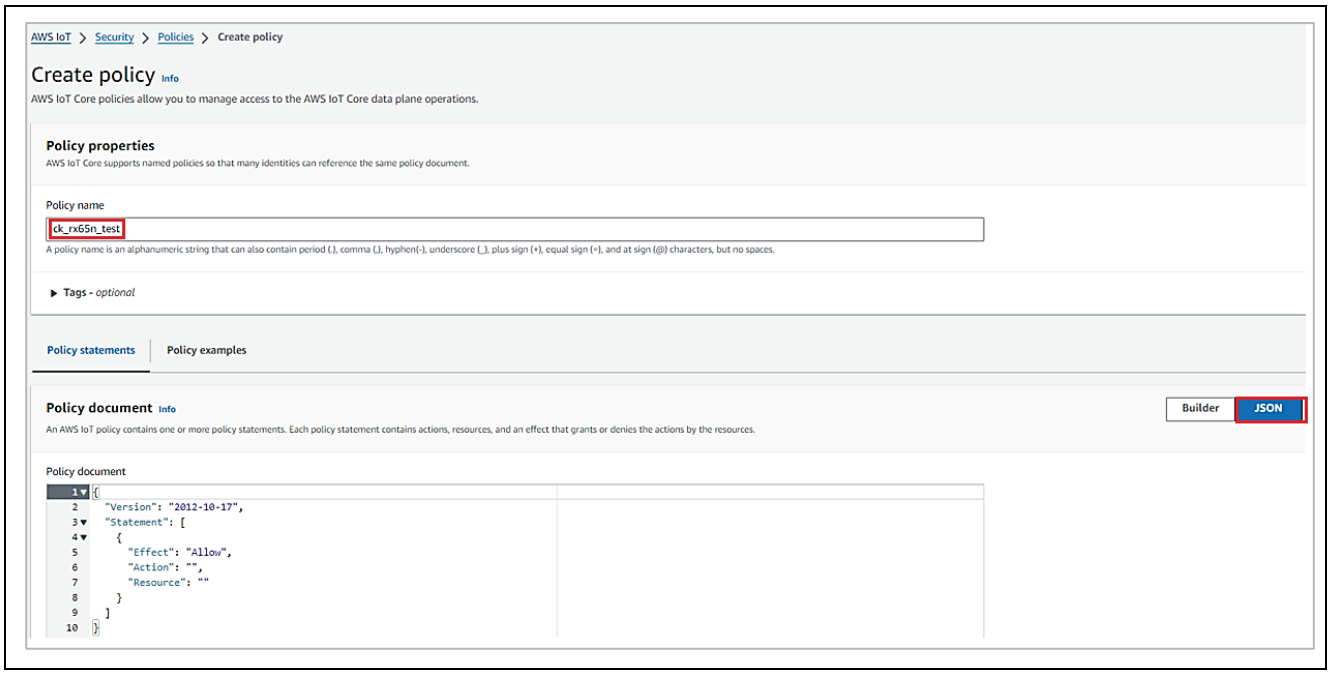


Figure 55. Create the Policy 2/3

Copy the following code

```
{
  "Version": "2012-10-17",
  "Statement":
  [
    {
        "Effect": "Allow",
        "Action": "iot:Connect",
        "Resource": "*"
    },
    {
        "Effect": "Allow",
        "Action": "iot:Publish",
        "Resource": "*"
    },
    {
        "Effect": "Allow",
        "Action": "iot:Subscribe",
        "Resource": "*"
    },
    {
        "Effect": "Allow",
        "Action": "iot:Receive",
        "Resource": "*"
    }
  ]
}
```

Paste the copied code into the policy syntax > Create

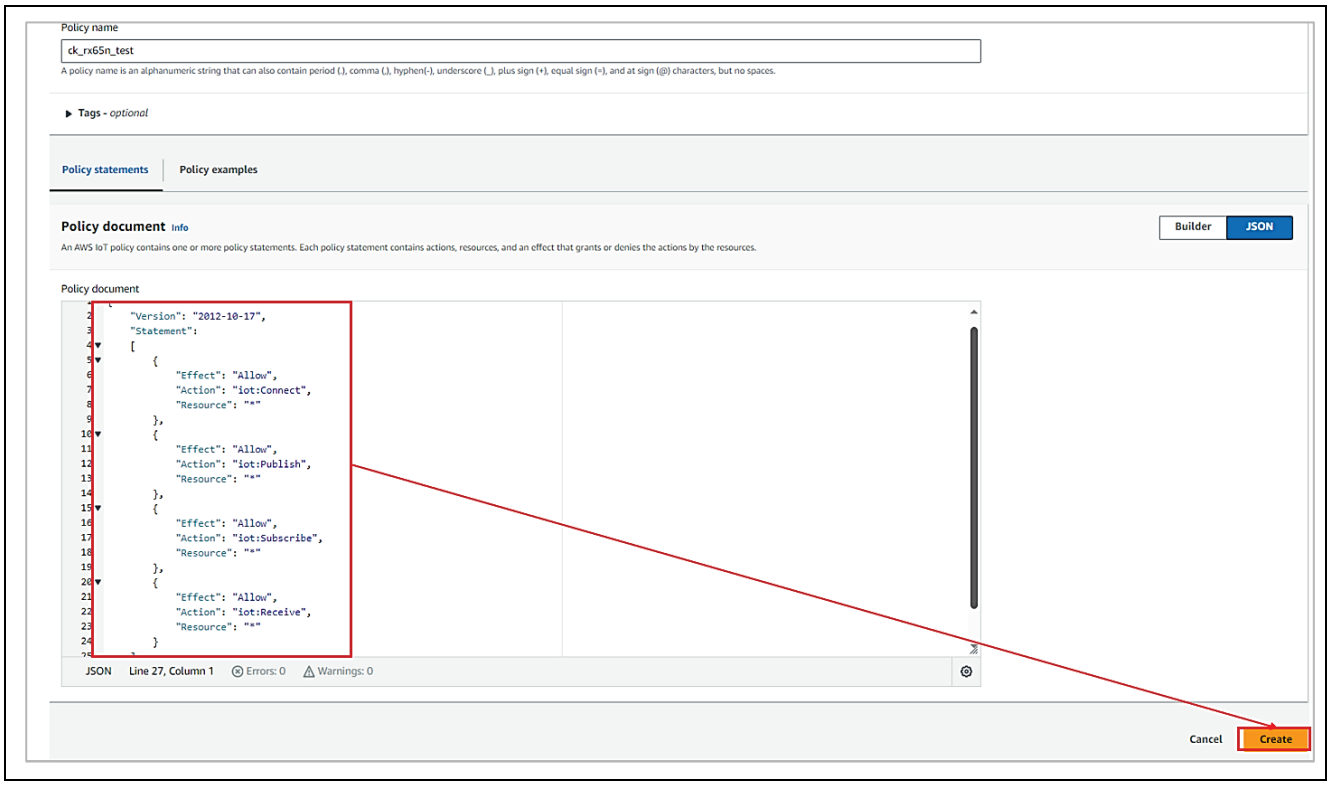


Figure 56. Create the Policy 3/3

Register your device (thing) with AWS IoT

- **Manage** > **Things** > Register a Thing

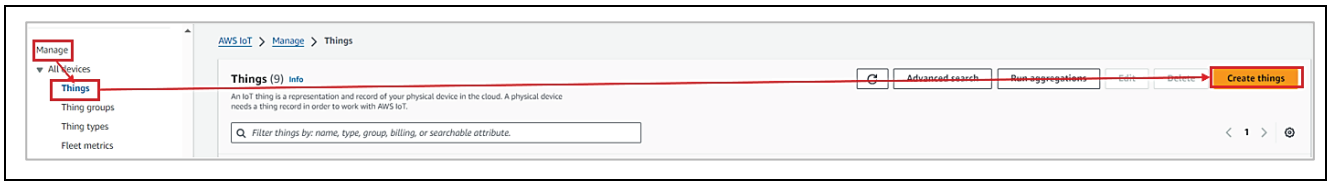


Figure 57. Creating the Things 1/5

Creating AWS IoT things > Create a single thing

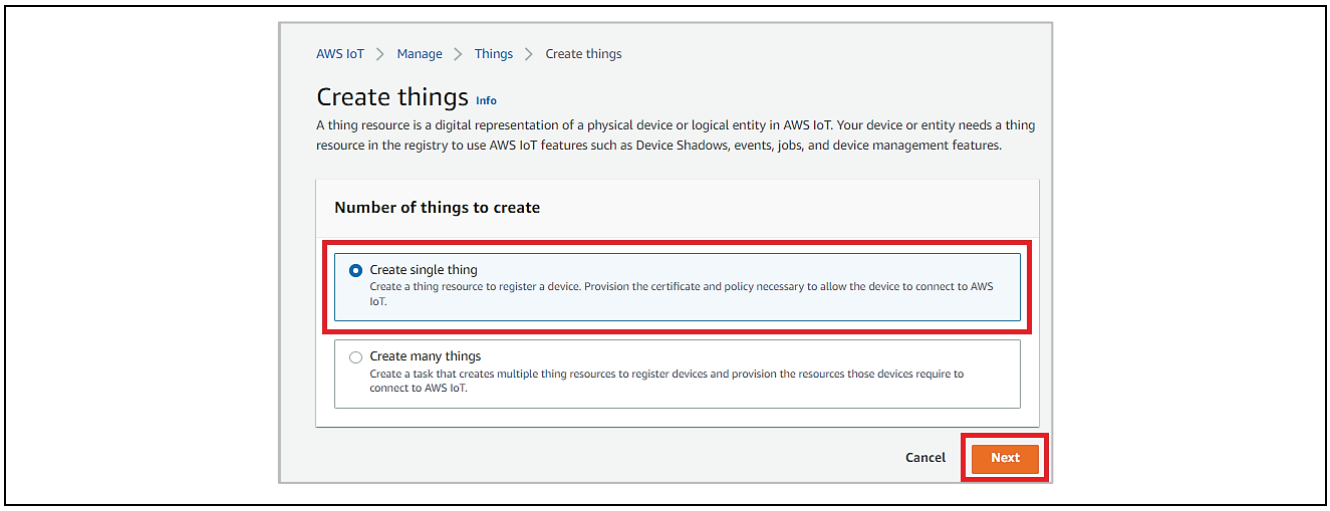


Figure 58. Creating the Things 2/5

- Add your device to the thing name > **Next**
- Make a note of the name with a text editor (this will be used later)

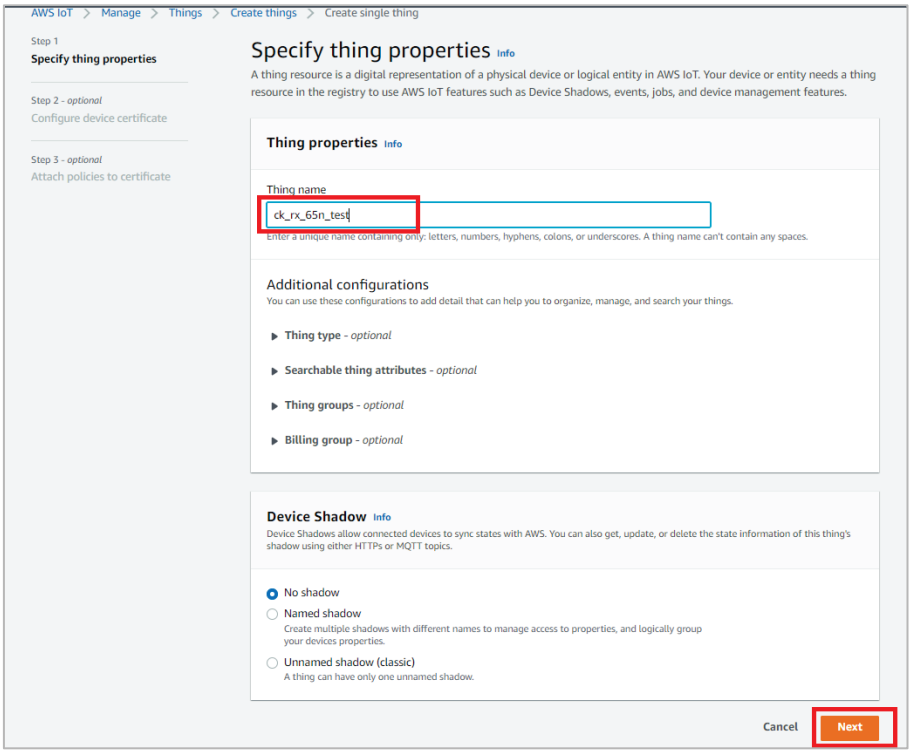


Figure 59. Creating the Things 3/5

- Auto-generate a new certificate.

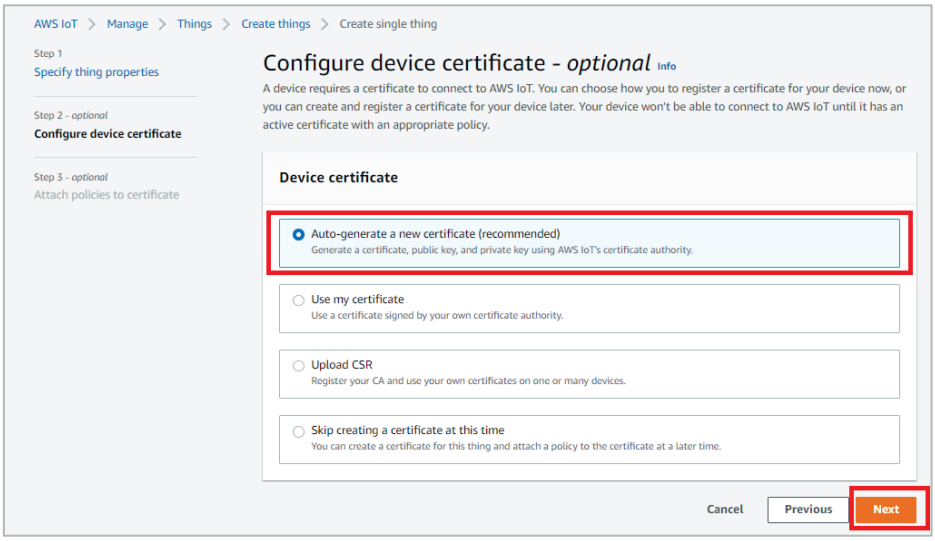


Figure 60. Creating the Things 4/5

- Add a policy for your thing.

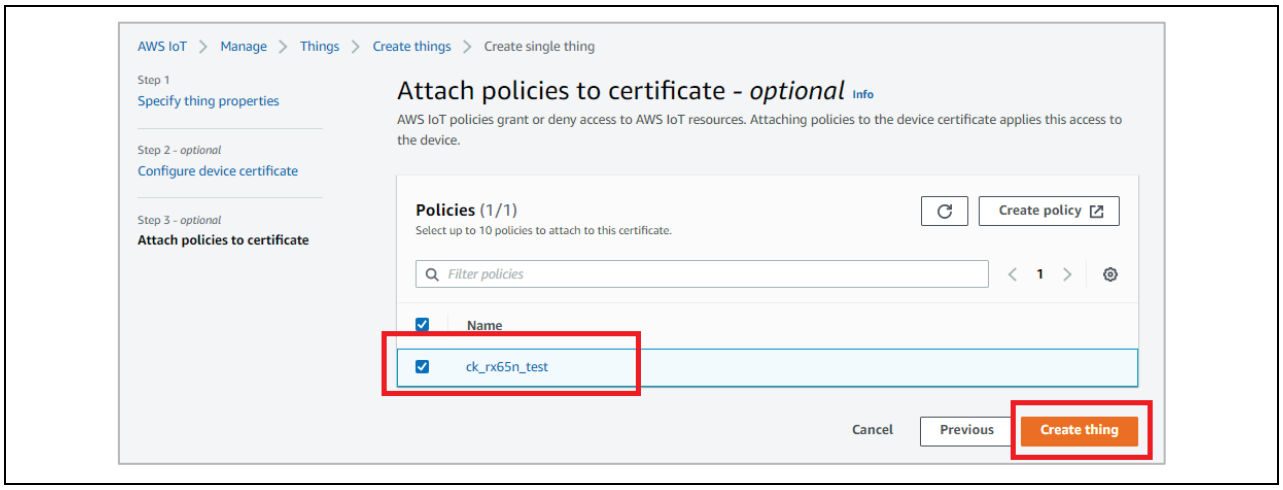


Figure 61. Creating the Things 5/5

Download a certificate for this thing/A public key/A private key

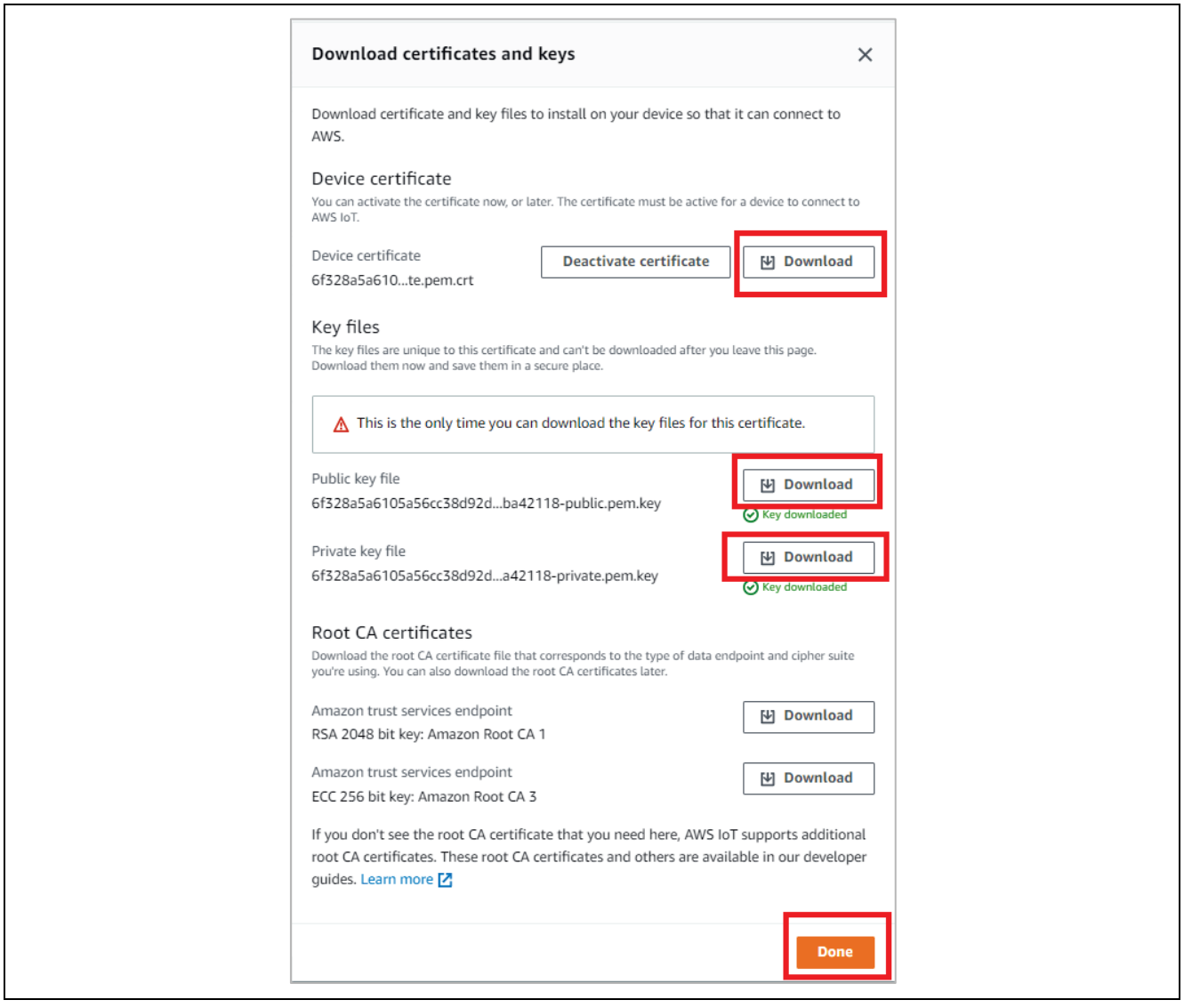


Figure 62. Download a Certificate for this Thing/ Public Key/ Private Key

Check AWS IoT Endpoint

- Make a note of the endpoint in a text editor (this will be used later)

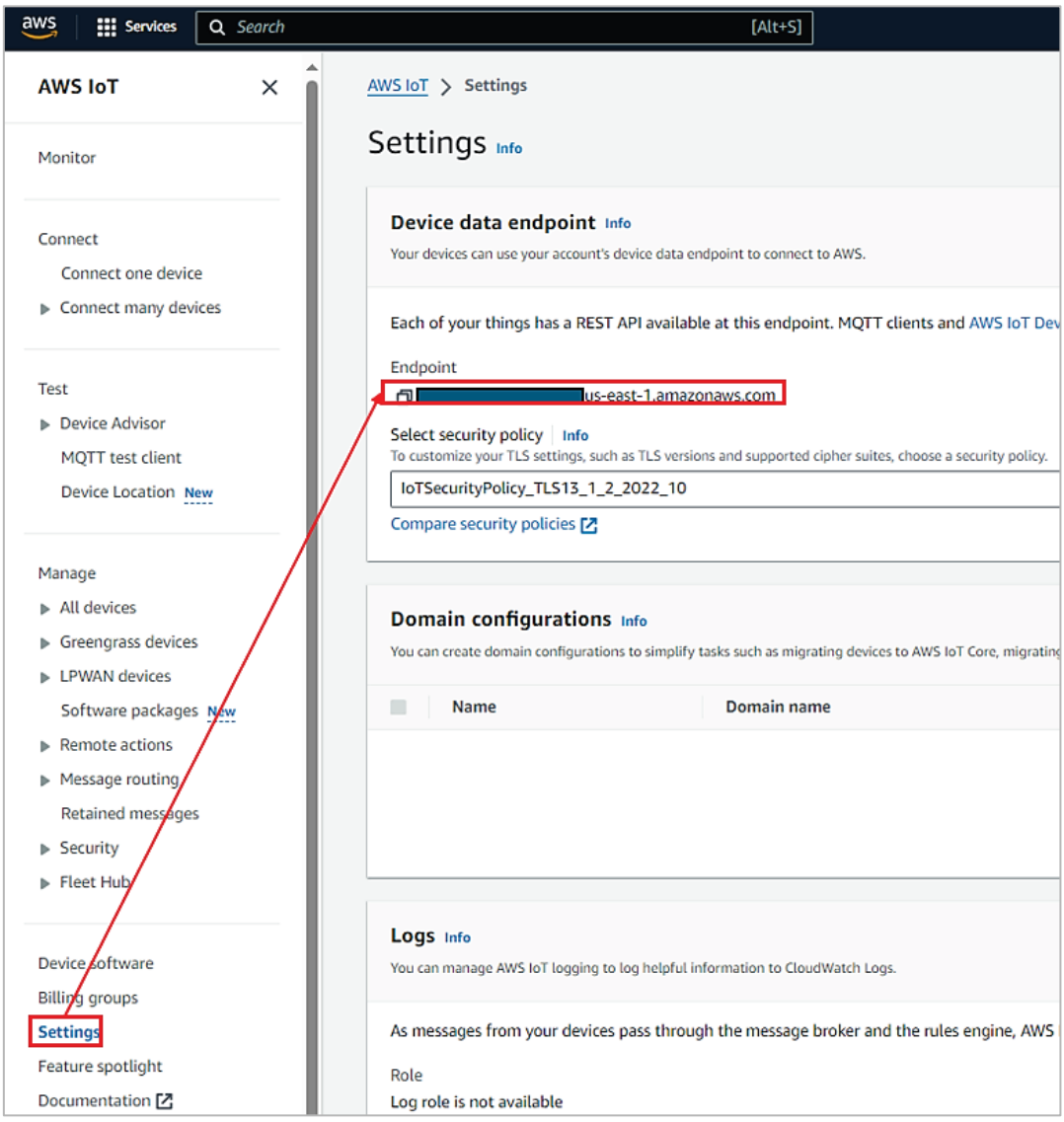


Figure 63. Check AWS IoT Endpoints

You can also access the tutorial to register a device to AWS IoT tutorial on GitHub at https://github.com/renesas/amazon-freertos/wiki/Register-device-to-AWS-IoT

4.5.1 Installing the Credentials

Please see section **4.4 Software Preparation - Running Project** from IDE for details.

4.6 Connecting to AWS IoT

This section describes the steps to be followed to connect the device to the AWS IoT.

Note: For Ethernet applications, firewalls in the network may prevent connectivity to AWS IoT. Configure the network to allow access to the MQTT Port 8883.

4.7 Verifying the Application Project using AWS Dashboard and Renesas Dashboard

This section describes the steps on how to verify this application example's functions.

Note: Wait for the board to get the IP address from the service provider upon successful cellular initialization, and the board to resolve the DNS lookup for the endpoint. After the successful MQTT connection message on the Console "***Successful MQTT Connection to the end point***", the device is ready for Publishing and Subscription of Messages.

Note: This Application involves AWS MQTT IOT Core, user has an option to use the AWS IOT Dashboard for the Validation purpose, in addition to using the Renesas GUI based Dashboard for customized view of all the Sensor Data.

For verification purposes, the user can use the AWS IoT core Dashboard for configuring and controlling the subscription and publishing of the topics as described in the following sections.

On the AWS cloud Dashboard, go to IoT Core and select **Test**, then choose **MQTT test client**. Subscribe to a topic listed below one at a time. The sample snapshot for subscribing to the topics are shown below.

Note: The messages shown below are **case sensitive**; users need to take care of this while entering the publish or subscribe messages.
Only enter one message at a time. Copy the message 'as-is' between the quotes and do not include any extra spaces.

```
"aws/topic/iaq_sensor_data"
"aws/topic/oaq_sensor_data"
"aws/topic/hs3001_sensor_data"
"aws/topic/icm_sensor_data"
"aws/topic/icp_sensor_data"
"aws/topic/ob1203_sensor_data"
```

Note: After the subscription to the Topics, the Dashboard is ready to receive the messages being published from the device.

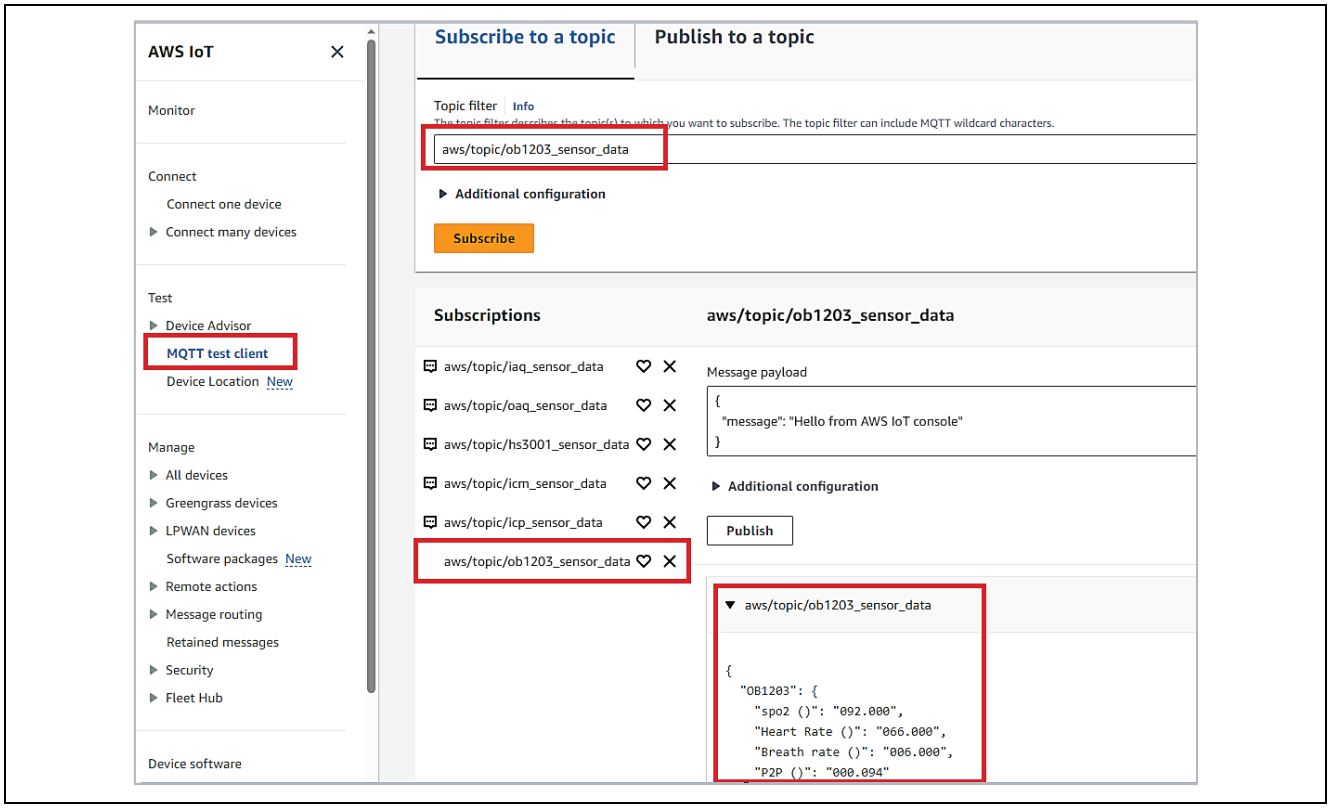


Figure 64. Subscribe to a Topic Messages on the AWS IoT Screen

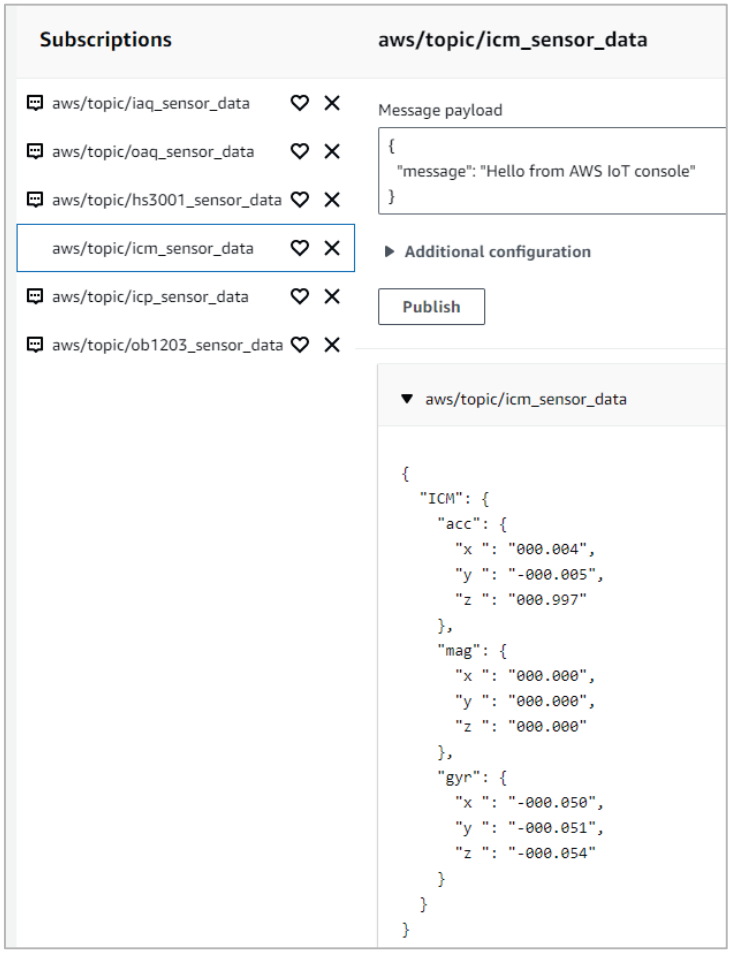


Figure 65. Subscribed Messages on the AWS IoT Screen

4.8 LED Alerts

The board is subscribed to the topic below:
ck_rx65n_test/example/topicRx

If we publish the below data from AWS console
HS3001 temperature alerts:
Based on the temperature, the dashboard sends alert messages to CK-RX65N kit via the following topic:

Topic: `aws/topic/set_temperature_led_data`

Message:	{"Temperature_LED":"HOT"}	Will turn on RED in Tri-Color LED
Message:	{"Temperature_LED":"WARM"}	Will turn on GREEN in Tri-Color LED
Message:	{"Temperature_LED":"COLD"}	Will turn on BLUE in Tri-Color LED

Example:
Click Test > MQTT test client

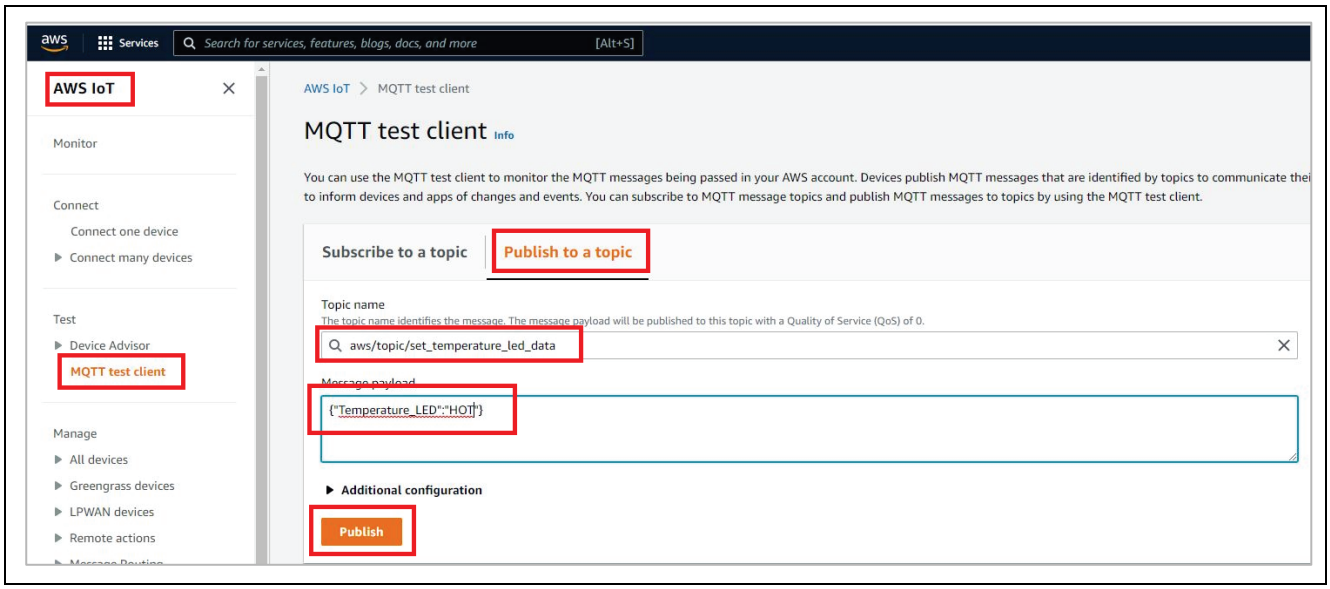


Figure 66. Publish the MQTT Message 1/2

OB1203 SPO2 alert alerts:

Based on the SP02 value, dashboard sends the alert messages to the CK-RX65N kit via the following topic:

Topic: `aws/topic/set_spo2_led_data`

Message: `{"Spo2_LED":"ON"}` Will turn on BLUE LED in CK-RX65N
Message: `{"Spo2_LED":"OFF"}` Will turn off BLUE LED in CK-RX65N



Figure 67. Publish the MQTT message 2/2

5. Restrictions

5.1 Communication Time (Cellular Version of Project)

This version of the cellular project may disconnect when running for more than 10 hours.

Then it shows the following errors at the terminal.

It can re-communicate when you reset the device.

If you face this issue least a few hours, please do “**8. Apply Patch files**” step 4.1.1 section.

```
367788 708615 [iot_thread] [ERROR] A single byte was not read from the transport: transportStatus=-27648.
367892 708625 [iot_thread] [ERROR] A single byte was not read from the transport: transportStatus=-27648.
367986 708634 [iot_thread] [ERROR] Exiting process loop due to failure: ErrorStatus=MQTTRecvFailed
368080 708643 [iot_thread] [ERROR] A single byte was not read from the transport: transportStatus=-27648.
368185 708653 [iot_thread] [ERROR] Receiving incoming packet length failed. Status=MQTTRecvFailed
368251 708662 [iot_thread] [ERROR] Failed to receive data over network. bytesReceived=-27648
368322 708672 [iot_thread] [ERROR] Exiting process loop due to failure: ErrorStatus=MQTTRecvFailed
368388 708682 [iot_thread] [ERROR] A single byte was not read from the transport: transportStatus=-27648.
368477 708691 [iot_thread] [ERROR] Failed to receive data over network. bytesReceived=-27648
368571 708700 [iot_thread] [ERROR] Receiving incoming packet length failed. Status=MQTTRecvFailed
368665 708709 [iot_thread] [ERROR] Failed to receive data over network. bytesReceived=-27648
368759 708718 [iot_thread] [ERROR] Receiving incoming packet length failed. Status=MQTTRecvFailed
368853 708727 [iot_thread] [ERROR] Failed to receive data over network. bytesReceived=-27648
368946 708736 [iot_thread] [ERROR] A single byte was not read from the transport: transportStatus=-27648.
369041 708746 [iot_thread] [ERROR] Failed to receive data over network. bytesReceived=-27648
369133 708754 [iot_thread] [ERROR] Receiving incoming packet length failed. Status=MQTTRecvFailed
369227 708763 [iot_thread] [ERROR] Exiting process loop due to failure: ErrorStatus=MQTTRecvFailed
369332 708773 [iot_thread] [ERROR] Failed to receive data over network. bytesReceived=-27648
369436 708783 [iot_thread] [ERROR] Failed to receive data over network. bytesReceived=-27648
369530 708792 [iot_thread] [ERROR] Receiving incoming packet length failed. Status=MQTTRecvFailed
```

5.2 Automatic Alert Feature from Renesas Dashboard

This application does not support automatic alerts from Renesas Dashboard via LED status on the board at this time.

6. Note and Troubleshooting

6.1 Sensor Stabilization Time

Each sensor has a stabilization time during which correct values cannot be read.

The following table shows the details of sensor stabilization times.

Table 4. Sensor Stabilization Time

Sensor Name	When power up first time	After soft or hard reset
ZMOD4410 IAQ	Up to 1 min	Up to 1 min
ZMOD4510 OAQ	Up to 1.5 hours	Up to 1 hours
OB1203	Up to 20 Min (After putting finger on sensor, it may take up to 60 seconds to sense data)	Up to 20 seconds (After putting finger on sensor, it may take up to 60 seconds to sense data)
HS3001	Up to 30 seconds	Up to 10 seconds
ICP	Up to 30 seconds	Up to 10 seconds
ICM	Up to 30 seconds	Up to 10 seconds

6.2 Connection Issue When Using Ethernet (Wired cable)

The Ether PYH only supports the full-duplex communication. If your router or Ethernet hub only supports half duplex, it cannot connect to the internet. Please use full duplex devices.

6.3 Current Supply Short Issue When Using RYZ014A

If the CK-RX65N board is not powered through the Debug port (J14), the current available to the board may be limited to 100 mA. When using the supplied RYZ014A Pmod module with other code (found here: RYZ014A - LTE Cat-M1 Cellular IoT Module | Renesas) be aware that this Pmod has a maximum operating current of **480 mA** dependent upon the LTE band, Tx/Rx settings, and network coverage. Please ensure that the host board can supply sufficient power or provide supplemental USB power via CN4 on the Pmod to avoid RF instability.

6.4 When Build Errors Occur

If a 'No such file or directory' error occurs, the project path may be too long. When the path is longer than 256 characters, e^2 studio outputs errors at build time.
When this error occurs, move the project to a shorter path location (such as, under C:\).

6.5 When Unable to Log in to the Dashboard (Grafana Account)

If you cannot log in to the Dashboard with the password you changed in step 6 of section 4.2.2 Getting the Account 10 USD for Trial of AWS, try the following:

- Set “admin” in the Email or username field and set the changed password in the password field.

When changing the password for the initial session, the username is not changed from admin. Therefore, admin must be entered in the username field. To enable users to log in with your own username and email address, please change the user information in the Server Admin menu after logging in.

6.6 Notes on Performing Firmware Update Over-The-Air on AWS FreeRTOS

The following symptoms occur when performing Firmware Update Over-The-Air (FOTA) on AWS FreeRTOS.

1. Device (thing) names and credential information are overwritten.
2. Processing of OTA fails after recovering from low power consumption mode.

For more information, refer to the Tool News at:

[Notes] RX Family Notes on Performing Firmware Update Over-The-Air on AWS FreeRTOS (renesas.com)

6.7 When the Trial 10 USD is Used Up

When the trial 10 USD is used up, status will change to “Quarantined”. At this time, the user cannot download the certificate or go to Dashboard.

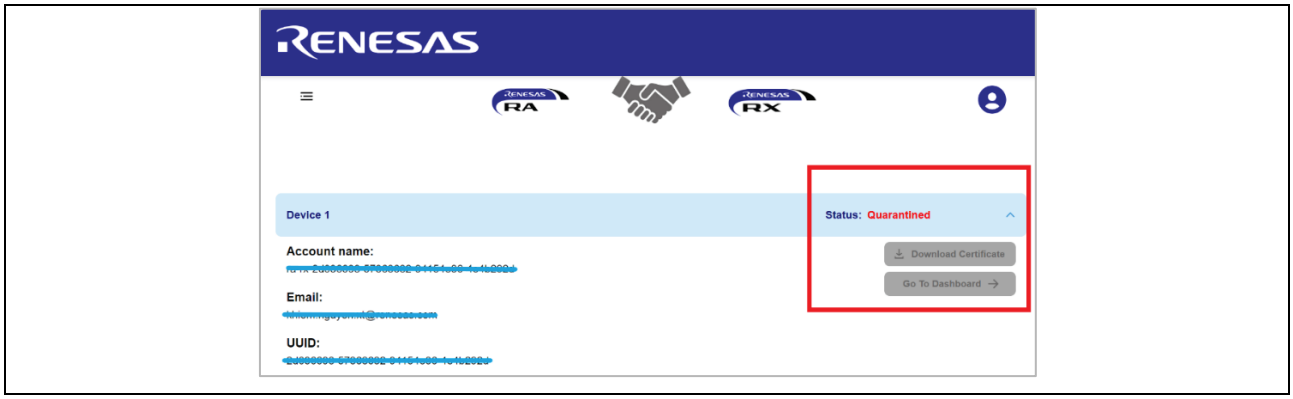


Figure 68. Account Used Up Trial 10 USD

Note: Please add payment options before the account is quarantined and enable the option on the dashboard. If the account is quarantined, please contact Renesas Customer Support.

To enable option on the dashboard, go to the user profile.

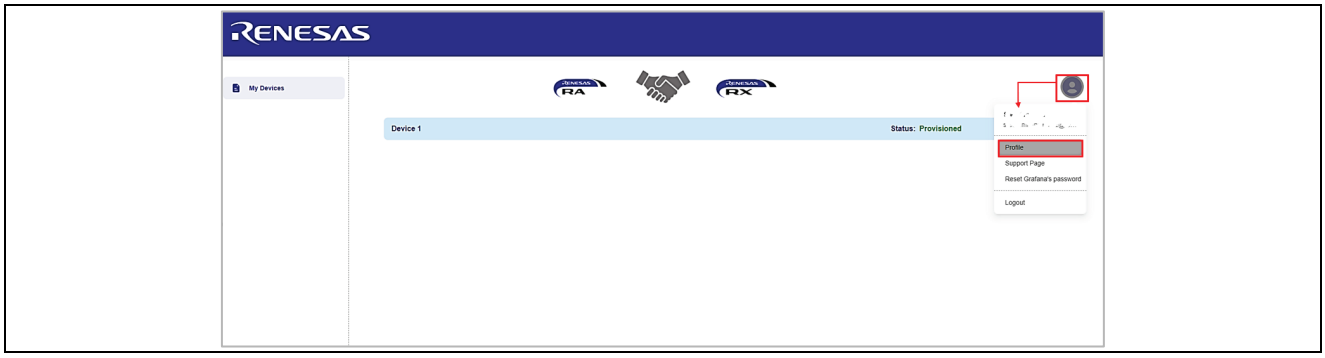


Figure 69. Choose Profile

Choose “**Yes**” for the **Payment Preference Update Confirmation**.

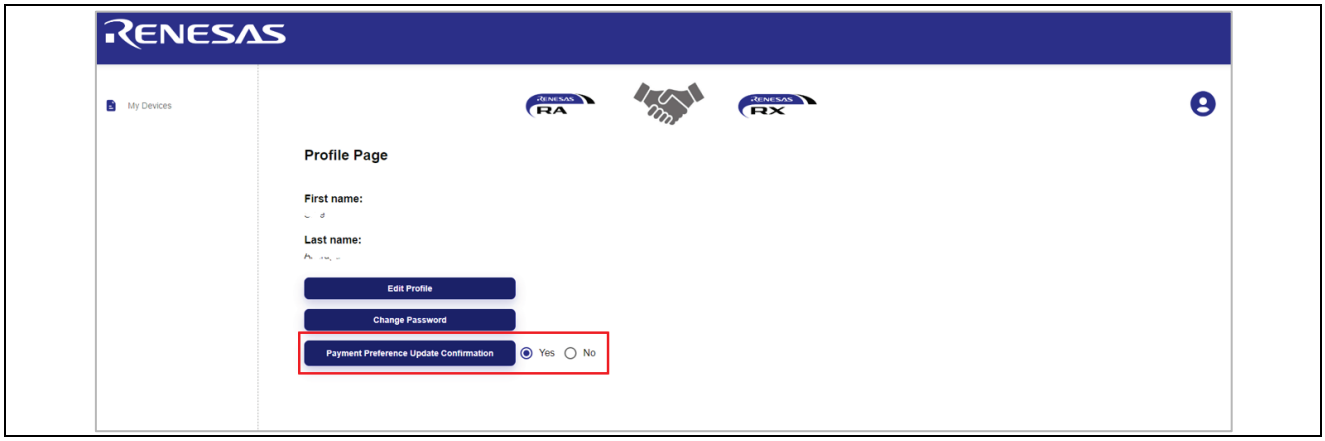


Figure 70. Payment Confirmation

To add a credit card to continue using this account or using another AWS account, go to https://cloud-ra-rx.awsapps.com/start#/, sign up with AWS account.

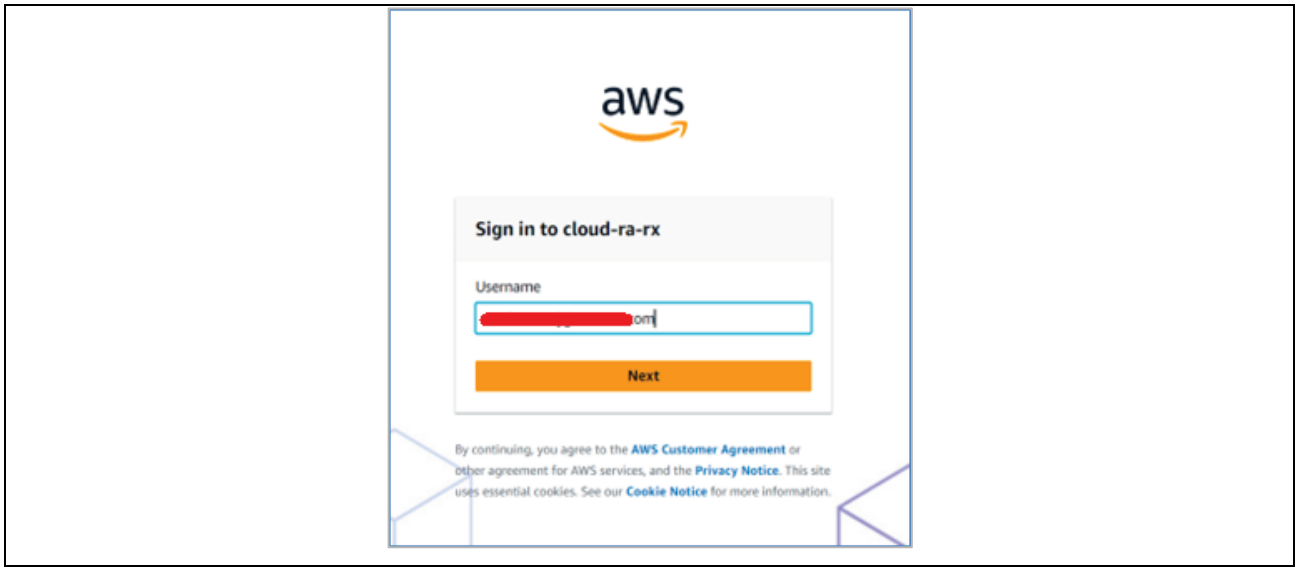


Figure 71. Sign up to AWS Account

Go to **Manage Console > Account > AWS Billing > Payment preferences > Add payment method.**

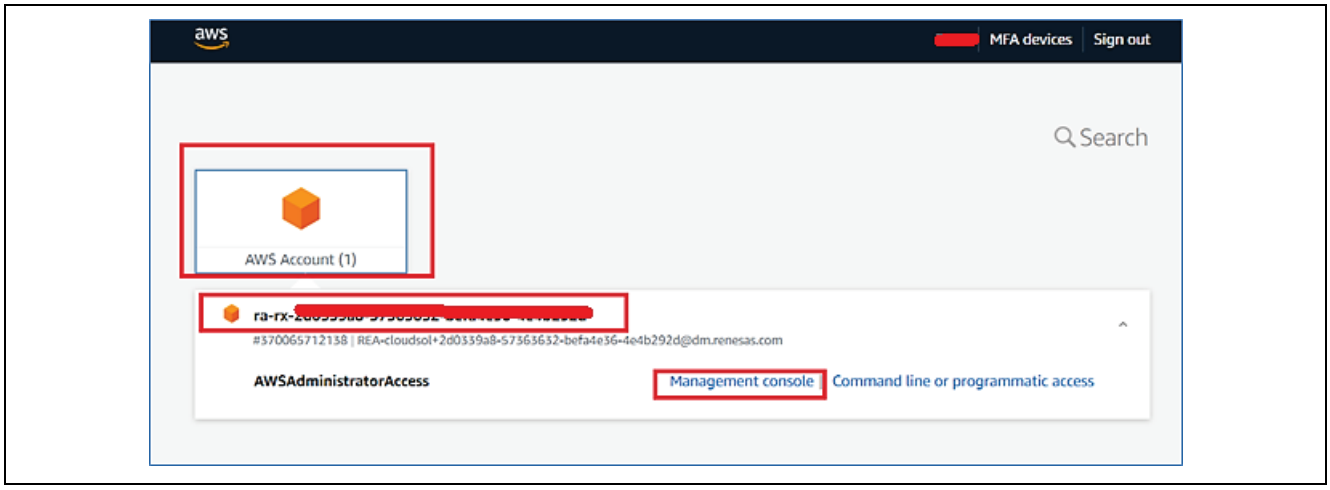


Figure 72. Add Credit Card for Trial Account (1/4)

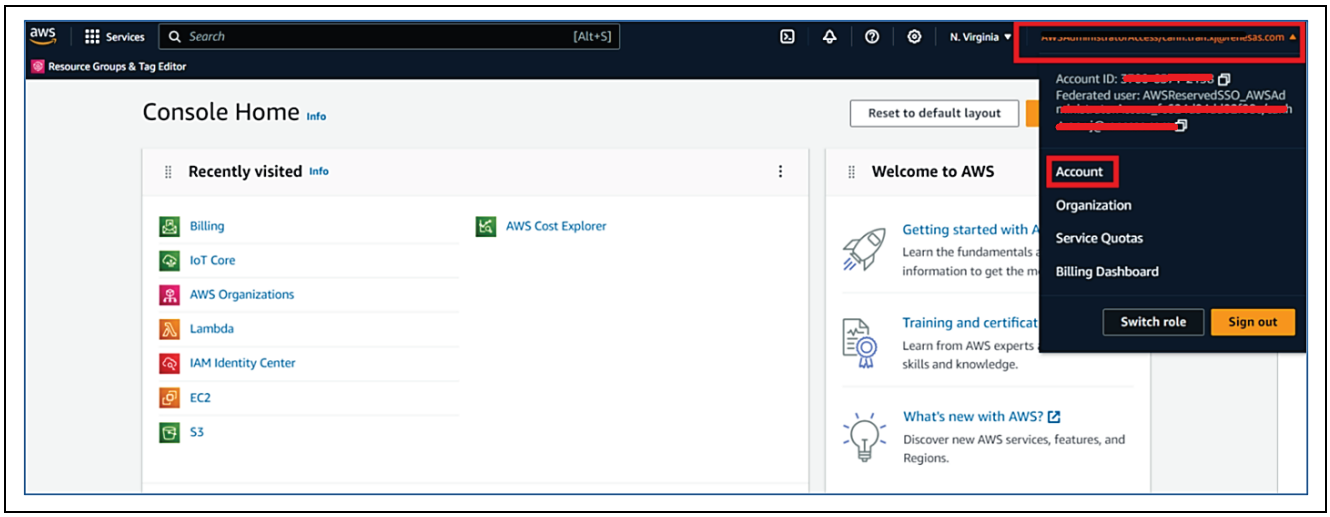


Figure 73. Add Credit Card for Trial Account (2/4)

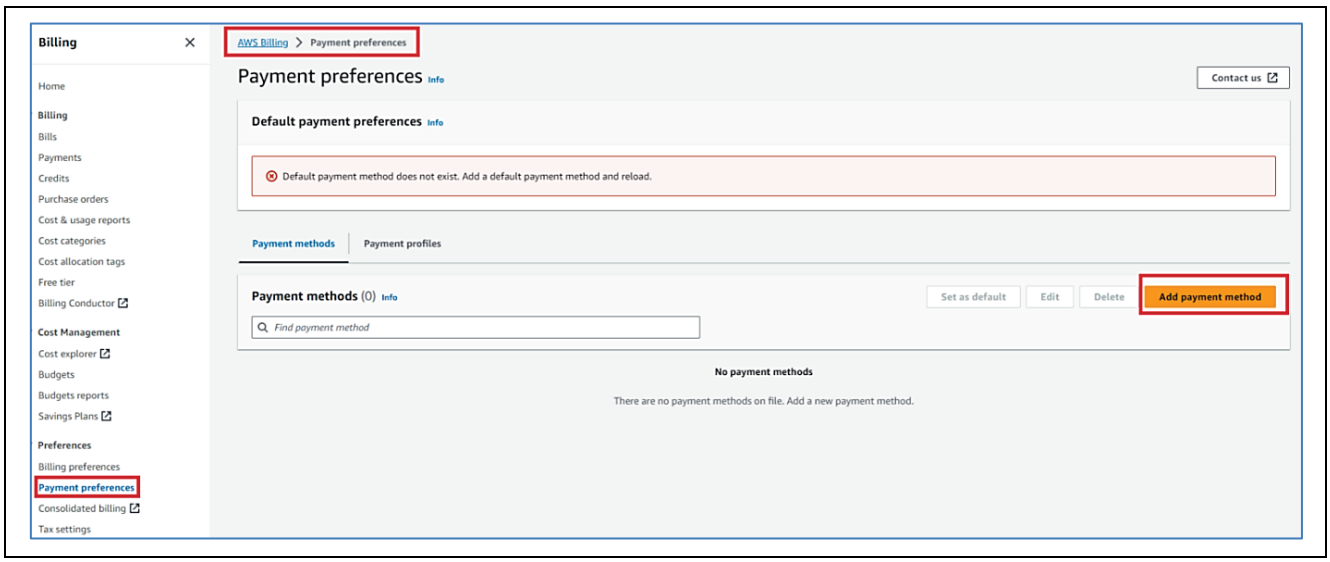


Figure 74. Add Credit Card for Trial Account (3/4)

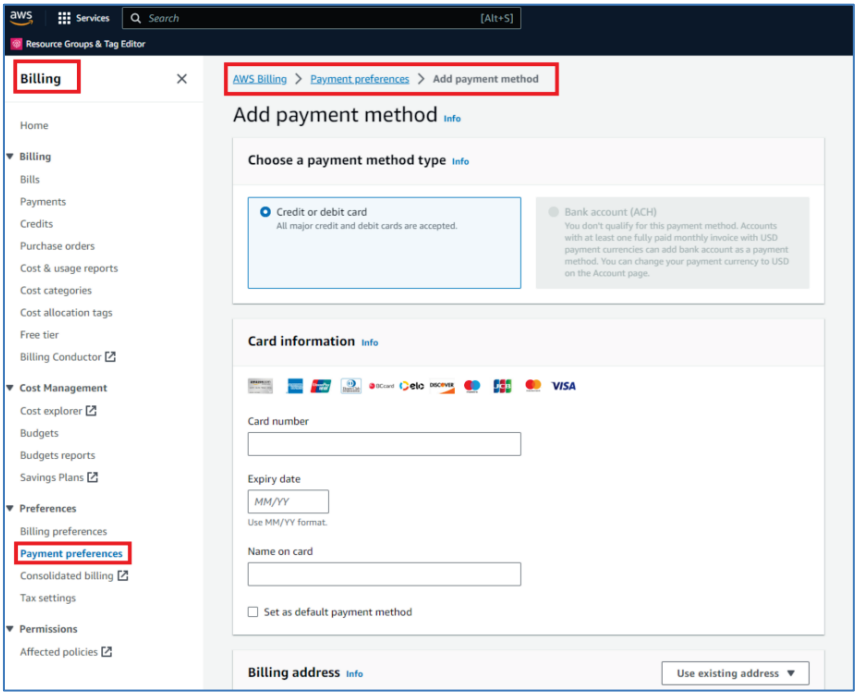


Figure 75. Add Credit Card for Trial Account (4/4)

6.8 How to Enable/Disable EC2 Instance

AWS trial accounts start billing immediately after device registration. The following steps will disable the EC2 instance, saving the user's credits.

Access AWS account from https://cloud-ra-rx.awsapps.com/start#/ using the dashboard credentials. (Refer to the Figure 71 to login).

Note: If you wish to use the dashboard again, please enable the EC2 instance before using it.

To disable the EC2 instance, use the following steps:

1. From the **Services** menu, select **Compute** and then choose **EC2.**

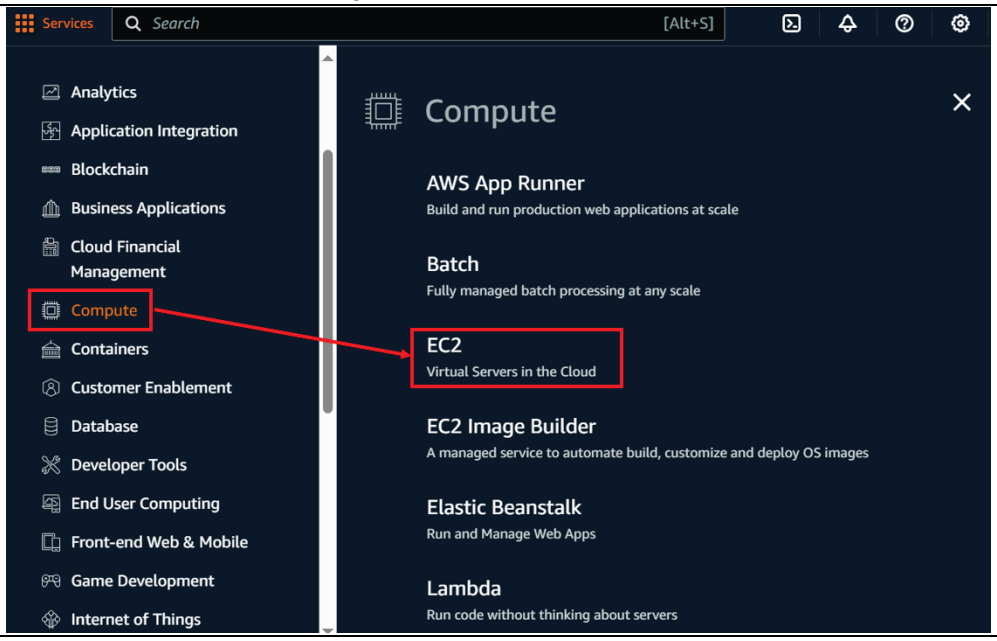


Figure 76. EC2 AWS Service

2. Choose the instance, then change the **Instance state** to **Stop instance**

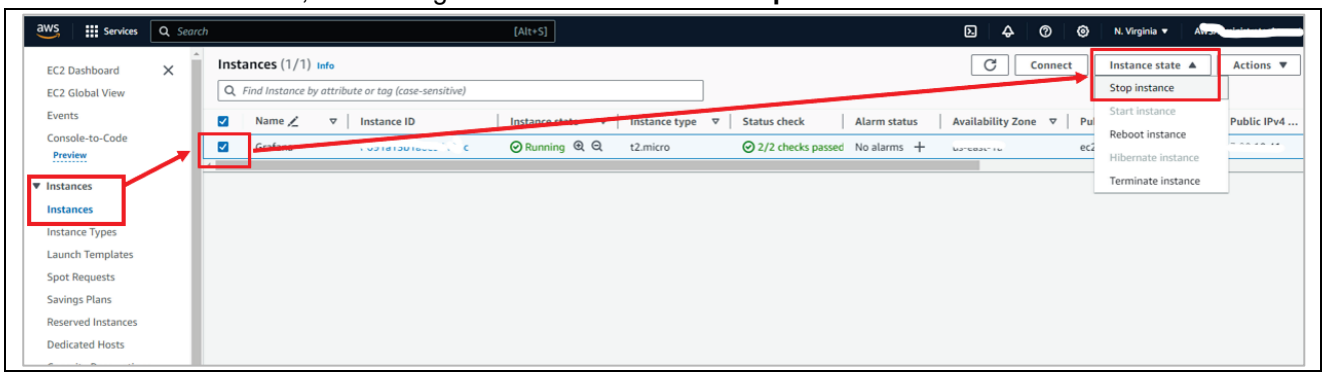


Figure 77. Disable Instance

Website and Support

Visit the following vanity URLs to learn about key elements of the RX family, download components and related documentation, and get support.

CK-RX65N Kit Information	renesas.com/rx/ck-rx65n
RX&RA Cloud Solutions	renesas.com/cloudsolutions
RX Cloud solution web	renesas.com/rx-cloud
RX Product Information	renesas.com/rx
RX Product Support Forum	renesas.com/rx/forum
RX Driver Package	renesas.com/RDP
Renesas Support	renesas.com/support

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Jun.14.22		First version
1.10	Jun.29.22	15	Improved 5.1.4 Activating a SIM card on MicroAI Launchpad of activation way of SIM
		49	Added the restrictions section
		Program	Fixed the program about getting the issue of UUID lacking parts of the number.
1.20	Jul.06.22	10-11	Added 8. Apply Patch files
		50	Removed “SpO2 sensor of OB1203 (Cellular version of Project)” from the restriction section. Updated 5.1 Communication time (Cellular version of Project).
		Program	Updated Cellular version of Project - Supported SpO2 sensor of OB1203. - Added patch file to project.
1.30	Jun.02.23	11	Added the settings for Truphone SIM
		26	Added 4.1.6 about the activation procedure for Truphone SIM
		50	Added 6.4 about when build errors occur.
			Added 6.5 about when unable to log in to the Dashboard (Grafana account)
			Added 6.6 Notes on Performing Firmware Update Over-The-Air on AWS FreeRTOS
1.31	Jan.19.24	—	Fix typo mistake
		5	Updated Figure 2
		5	Updated description for 4. Connection to AWS section
		11, 19	Removed information of MicroAI Sim card, added note about SIM Card’s information
		—	Removed 4.1.5.2 Activate a SIM card on MicroAI Launchpad Section due to the MicroAI SIM card is discontinued to support CK-RX65N.
		44	Correct description for “LED Alerts” Section
		45	Added “Automatic alert from Renesas Dashboard feature” into Restrictions section
		23-26, 33-40, 46-50	Updated information about latest Renesas Dashboard (add payment, enable/disable EC2 instance, …), AWS

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)
   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.
2. Processing at power-on
   The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.
3. Input of signal during power-off state
   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.
4. Handling of unused pins
   Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.
5. Clock signals
   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.
6. Voltage application waveform at input pin
   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).
7. Prohibition of access to reserved addresses
   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.
8. Differences between products
   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You shall be responsible for determining what licenses are required from any third parties, and obtaining such licenses for the lawful import, export, manufacture, sales, utilization, distribution or other disposal of any products incorporating Renesas Electronics products, if required.
5. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
6. Renesas Electronics products are classified according to the following two quality grades: “Standard” and “High Quality”. The intended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below.
   "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.
   "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

   Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user’s manual or other Renesas Electronics document.
7. No semiconductor product is absolutely secure. Notwithstanding any security measures or features that may be implemented in Renesas Electronics hardware or software products, Renesas Electronics shall have absolutely no liability arising out of any vulnerability or security breach, including but not limited to any unauthorized access to or use of a Renesas Electronics product or a system that uses a Renesas Electronics product. RENESAS ELECTRONICS DOES NOT WARRANT OR GUARANTEE THAT RENESAS ELECTRONICS PRODUCTS, OR ANY SYSTEMS CREATED USING RENESAS ELECTRONICS PRODUCTS WILL BE INVULNERABLE OR FREE FROM CORRUPTION, ATTACK, VIRUSES, INTERFERENCE, HACKING, DATA LOSS OR THEFT, OR OTHER SECURITY INTRUSION (“Vulnerability Issues”). RENESAS ELECTRONICS DISCLAIMS ANY AND ALL RESPONSIBILITY OR LIABILITY ARISING FROM OR RELATED TO ANY VULNERABILITY ISSUES. FURTHERMORE, TO THE EXTENT PERMITTED BY APPLICABLE LAW, RENESAS ELECTRONICS DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THIS DOCUMENT AND ANY RELATED OR ACCOMPANYING SOFTWARE OR HARDWARE, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE.
8. When using Renesas Electronics products, refer to the latest product information (data sheets, user’s manuals, application notes, “General Notes for Handling and Using Semiconductor Devices” in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
12. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
13. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
14. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.

(Note1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.

(Note2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

(Rev.5.0-1 October 2020)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

Contact information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:
www.renesas.com/contact/.

© 2024 Renesas Electronics Corporation. All rights reserved.