

AT16268: JD Smart Cloud Based Smart Plug Getting Started Guide

ATSAMW25

Introduction

This application note aims to help readers to get started with the Atmel® smart plug reference design working with the JD smart cloud.

Atmel smart plug is a typical and highly integrated IoT solution with MCU, Connectivity, Security, and Sensing technologies from Atmel.

JD smart cloud is a cloud platform for smart hardware products, providing IoT networking, big data analysis, mobile App etc.

The getting started guide also introduces how to operate the Smart Plug with JD Weilian App.

Features

- Setup guide for JD smart cloud based smart plug kit
- Smart plug operation manual
- JD Weilian APP operation manual

Figure 1. Atmel Smart Plug with JD Smart Cloud



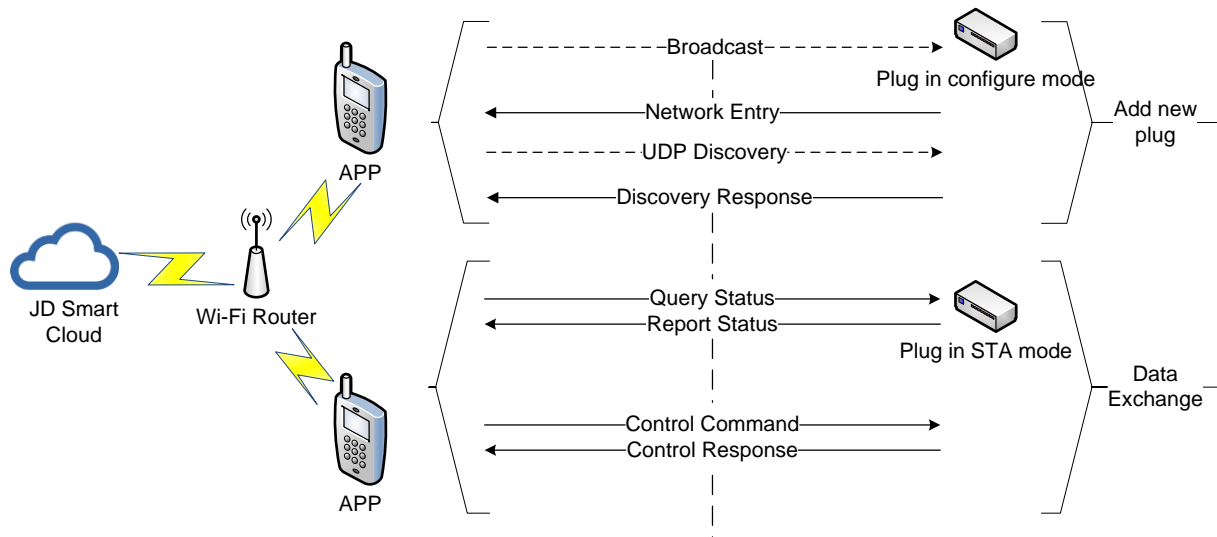
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1 Overview

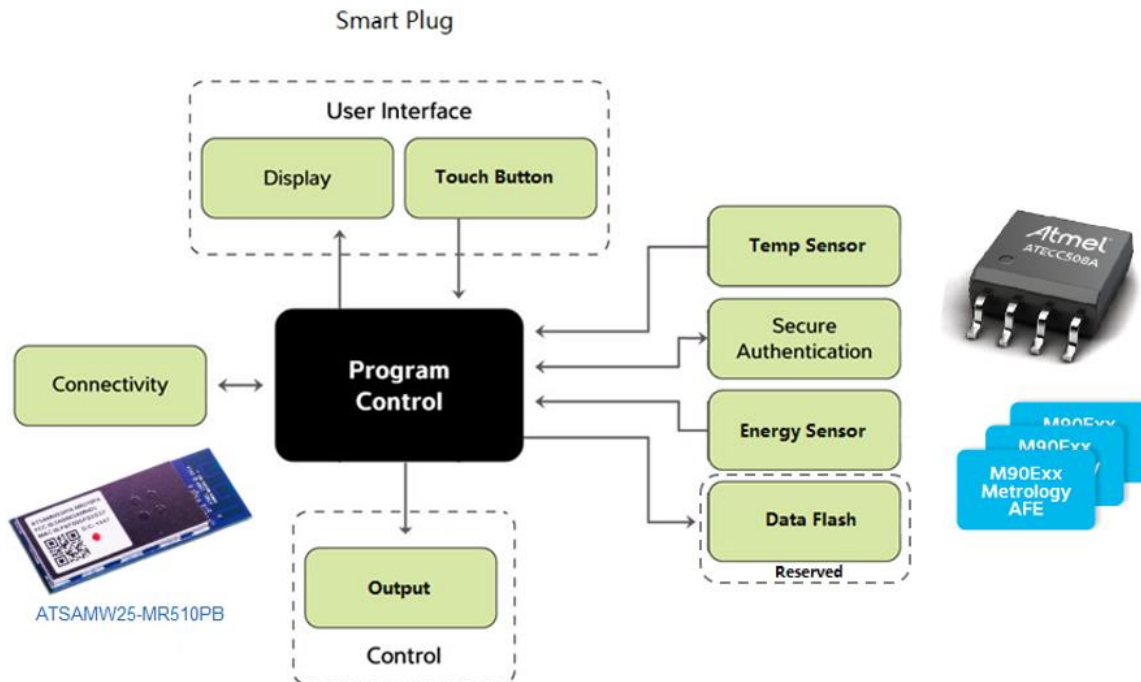
The Atmel smart plug reference design is a turnkey solution. It includes hardware, mechanical, firmware, and phone APP designs (for JD smart cloud based version, it uses JD Weilian APP). There are three types of smart plugs available: US, CN, and EU type. The smart plug kit is pre-programmed with the standard version firmware in factory, and users have to re-program the smart plug kit with JD version firmware for setting up. With the help of JD smart cloud, the smart plug kits can be controlled by cloud or locally in LAN.

Figure 1-1. Smart Plug Work Flow



The block diagram of smart plug is shown in Figure 1-2.

Figure 1-2. Smart Plug Block Diagram



For more details about the smart plug hardware design, refer to the [AT16225: Atmel Smart Plug Hardware User Guide](#) application note.

For more details about JD smart cloud based smart plug firmware design, refer to the [AT16267: Firmware User Guide on JD Smart Cloud Service Integration with Smart Plug](#) application note.

2 Smart Plug Setup

2.1 Prerequisites

To use this smart plug, the following prerequisites should be ready.

- Home Wi-Fi® AP or Wi-Fi router
- Android/iOS smart phone
- The latest JD Weilian APP (<http://smartcloud.jd.com/app>)

Figure 2-1. JD Weilian APP Icon and QR code for App download



2.2 Setup Steps

The following are setup steps for JD smart cloud based Smart Plug.

1. Smart plug is programmed with standard version in factory and users have to re-program the JD smart cloud based firmware, including bootloader and application firmware. The two firmware images files are attached to [AT16267: Firmware User Guide on JD Smart Cloud Service Integration with Smart Plug](#) and can be downloaded from Atmel website. Users can use either Atmel Studio 7 or atprogram utility for reprogramming the Smart Plug kit via SWD interface. Refer to the following application note to learn about more information: [AT16225 – Atmel Smart Plug Hardware User Guide](#).
2. Plug the smart plug into an electrical socket.

A factory new smart plug is working in configure mode, waiting for configuration. When it is powered on for the first time, the Wi-Fi indicator will toggle in yellow color. The AC power output is OFF by default, and the AC power output LED will be red.

Even before the smart plug kit is connected into network and JD smart cloud, it can be controlled by a touch button on the smart plug. A single touch will toggle the output, while a long touch (>5s) will reset the smart plug to factory new state and erase all the previous configuration data. Proceed with the following steps to use the JD Weilian APP control.
3. Open the JD Weilian APP installed on the smart phone.
4. Add the smart plug from the JD Weilian APP. For more details about the JD Weilian APP operation manual, refer to Chapter 4.
5. After the smart plug is successfully added in the JD Weilian APP, the user can control the smart plug and check the smart plug status through the JD Weilian APP.

3 Smart Plug Operation Manual

Smart plug operation is easy and intuitive. There are two LED indicators and one touch button on the smart plug.

3.1 Smart Plug LED Indicator

There are two LED indicators on the smart plug: A Wi-Fi indicator and an output indicator, as shown in [Figure 3-1](#) and [Figure 3-2](#). The color definition of the LED indicators:

Wi-Fi indicator:

- Yellow blink: Plug in scan and configure mode, not connected
- Yellow: Not connected
- Green blink: Plug in STA mode, connecting to home Access Point (AP)
- Green: Plug in STA mode, connected to home AP, connection is good
- Red: In error state

Smart plug output indicator:

- Green: ON
- Red: OFF

Figure 3-1. Wi-Fi Indicator on Smart Plug



Figure 3-2. Output Indicator on Smart Plug



3.2 Smart Plug Touch Button

There is a touch button on the smart plug to control the output ON/OFF status. The touch button is integrated with the output indicator as shown in [Figure 3-2](#). Touching the ON/OFF icon on the smart plug will toggle the output. If the smart plug is in STA mode and you touch this button for >5s, the smart plug will be reset to configure mode.

4 Phone APP Operation Manual

Atmel Smart Plug is working with the JD Weilian APP and JD smart cloud, developed by JD, the Chinese retail giant. The JD smart cloud provides the customers with Wi-Fi or sensor solutions, Cloud services, and user data analytics service, etc.

How the smart plug works with JD Weilian APP will be described in this chapter.

4.1 My Device Page

After opening the JD Weilian APP, the device page is displayed. All configured devices are listed in this page, including the smart plug or any other JD supported smart devices.

Figure 4-1. Weilian Devices Page



The icon below the device name shows online or offline status. If JD smart cloud doesn't receive heart beat packet from a device within 50s, Weilian APP will set it to offline status. The device page is also the main page from which to enter to other function pages.

- To add a new smart plug, touch the “+” symbol at the top right of this page and select “scan and add” (in Chinese) or add from “added device history” (in Chinese) if a type of device has been added before. Refer to Section 4.2 to know how to add a new smart plug.
- To get more details about a smart plug, touch the plug icon you want to use
- The left third button at the bottom, “Discovery” (in Chinese), lead to the page for some advanced features of JD, like IFTTT (if this then that, intelligent interaction between smart devices)
- The right button at the bottom, “My” (in Chinese), lead to the page for the JD account information

4.2 Add New Smart Plug

After touching the “+” symbol at the top right in the device page and selecting “scan and add” symbol with green outline in Figure 4-2 , the Weilian APP will scan the smart plug QR code. This QR code is a unique code for one kind of the product. All the smart plugs have the same QR product code.

The smart plug should be in configure mode at this moment, either by powered on for the first time or by touching the ON/OFF button >5s. When the yellow LED is blinking, it is in the configuring mode.

Figure 4-2. Add Device Page



Figure 4-3. Smart Plug QR Code



After the smart plug's QR code is scanned successfully, it will enter the network configure page. The user should enter the router password (the Weilian APP should also be connected to this router before the configuration starts) as shown in the figure below.

Figure 4-4. Enter Router Password

 添加设备



Atmel智能插座
.... 设备等待添加

“Castle”

密码

配置说明：

1.您的设备初次上电后自动进入可配置状态。
非第一次配置需要长按开关键5秒。使设备进入可配置状态。

确定

Now the Weilian APP will broadcast the connection information (SSID and PASSWORD). The smart plug is listening the data over radio by a Wi-Fi module. Once this information is decoded successfully, it will connect to the router and enter the next stage – UDP device discovery.

Figure 4-5. Config Mode



In the UDP discovery process, the smart plug will report its information and get the configuration data from the JD smart cloud.

The Weilian APP will display the devices with the scanned MAC address. The user can choose which device to be added.

Figure 4-6. Device Found



Click the device to be added and set its name. The smart plug is configured and added to the device list.

Figure 4-7. Add Device Done



If the process fails, e.g. due to bad network connection, press the touch button >5s. The smart plug will reenter the configure mode (yellow LED blinking). Proceed the steps above until the smart plug is configured successfully.

4.3 Add Shared Smart Plug

If you want to share a plug from others, go to the device page. After touching the “+” symbol at the top right in device page and select “scan and add” (with green outline in [Figure 4-2](#)), same process as adding a device, as shown in [Figure 4-2](#). Weilian APP will open the phone camera to scan the QR code from the other phone APP. The app will then add this device directly to your device list. To generate the QR code for sharing the smart plug to other users by JD Weilian APP), refer to [Section 4.4.4](#).

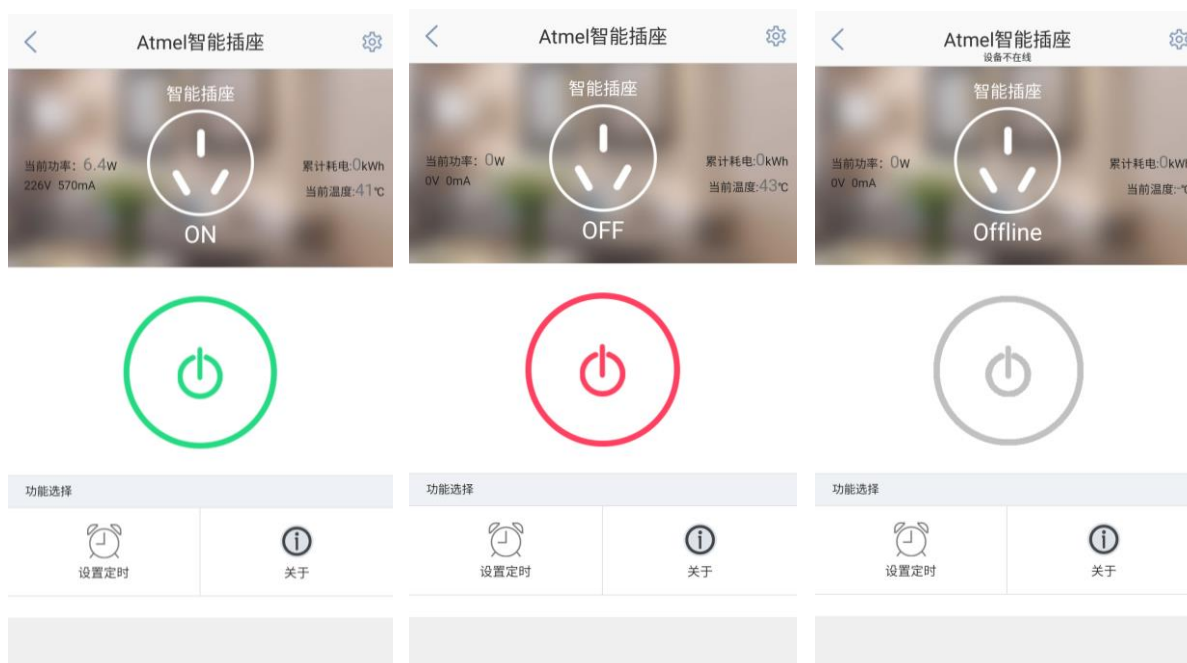
4.4 Smart Plug Control

4.4.1 Smart Plug UI

Click the smart plug in the device list as shown in [Figure 4-1](#). The smart plug device page will be displayed to show the plug state. For control, this smart plug device page is developed by HTML5 with CSS/JavaScript following JD’s HTML5 UI specification.

The HTML5 UI files with lua script are also attached to the document [AT16267: Firmware User Guide on JD Smart Cloud Service Integration with Smart Plug](#) which can be downloaded from Atmel web site.

Figure 4-8. Smart Plug HTML5 UI



The smart plug device page will display the real time output power, voltage, and current on the top left side. The power consumption after powered ON and the plug temperature will be displayed on the top right side. The status will be updated by the UI every 3s.

The button in the center shows the plug ON/OFF state. Green means ON and red means OFF. Touching it will toggle the plug state.

At the bottom left of this page, there are button of “Timing Setting” which functions are explained in the following sections.

If the plug is offline, it will show offline. The plug state button will turn grey and all buttons will be inactive.

4.4.2 Time Setting

In this smart plug the ON/OFF can be scheduled in a 7-day/24-hour format. Touching the “Timing Settings” button in the device page will open the “Timing” page. In this page, touching each schedule list will show the timing detail information where the user can set the time and select ON or OFF operation. By touching the days’ checkboxes, the user can select the days to repeat the timing setting. After a timing setting is chosen, touch “Save” to bring it into effect.

Figure 4-9. Timing Pages



The timing scheduler will be saved in the JD smart cloud. When it meets the timing settings, the cloud will send the command to the plug for the action preconfigured. This timing scheduler is not available when the plug is offline.

4.4.3 OTA


In the smart plug device page, touching the settings icon  in the top right corner will enter the settings page. If there is a newer version firmware available, it will display as shown below.

Figure 4-10. Setting Page



Clicking “firmware upgrade” (in Chinese), will enter the OTAU page. It will show the new firmware information.

Figure 4-11. OTAU Pages



Click bottom button “start upgrading” (in Chinese) and the OTAU process will start. The plug will download the binary file from JD server and then program the flash.

Figure 4-12. OTA Status - Downloading



After the download is complete, the installing will start and a new window will open.

Figure 4-13. OTA Status - Installing



Once it is successfully installed, the OTA success information will be displayed. Click the bottom red button “start to use” (in Chinese) to use it normally.

Figure 4-14. OTAU Status - Finish




The device setting page will show that the firmware is the latest version.

Figure 4-15. Setting Page

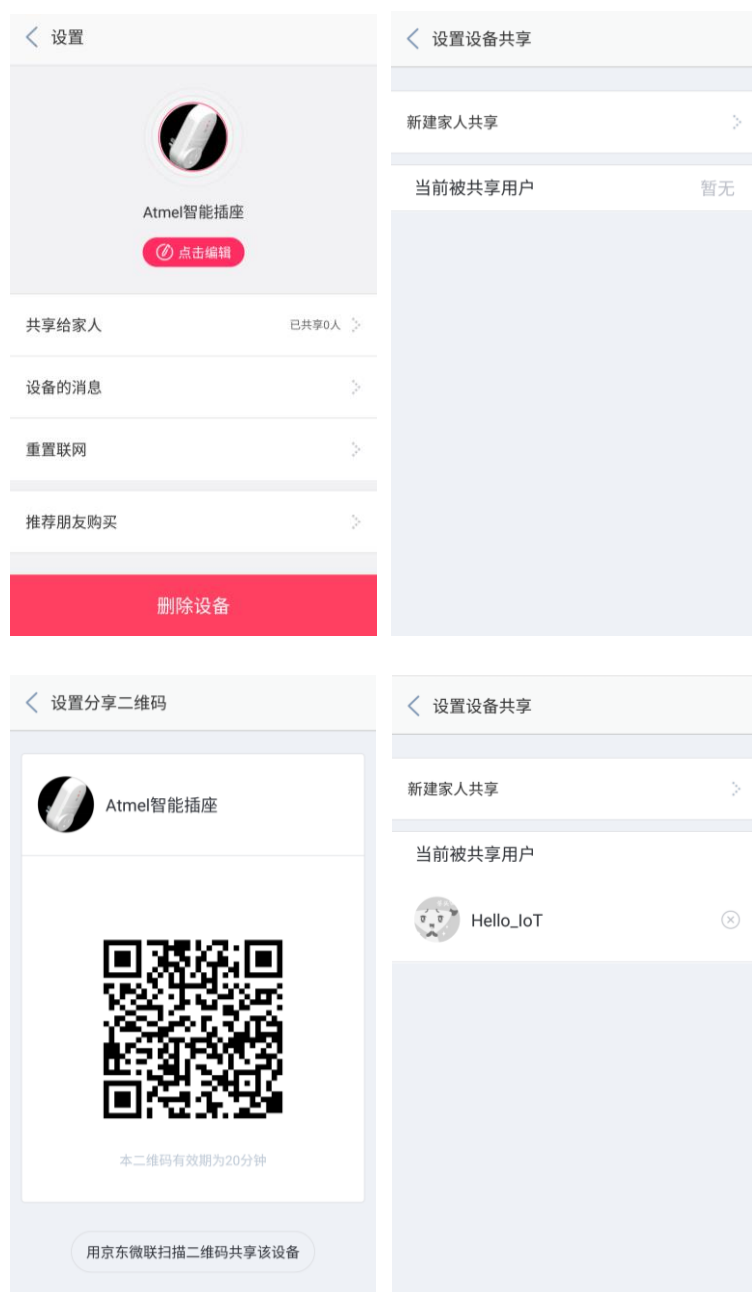


4.4.4 Share Smart Plug

The sharing function is provided by the JD Weilian APP. In the smart plug device page, touching the setting icon  on top right corner will enter the settings page. Select the first item “share to family” to enter the sharing settings page. Click the first item on sharing setting page, “Create a new sharing”, then a QR code, appears and

will be valid for 20 minutes. After scanning the QR code successfully, the new user can have this smart plug in his Weilian APP device list with permission to control the plug. Also the shared users can be displayed in the sharing user's App. The device share can be disabled by the sharing user.

Figure 4-16. Sharing Device Pages




4.4.5 IFTTT Feature

IFTTT (if this then that) is the feature for different smart devices to interact with each other. When a state of a device reach a certain value, it will trigger another device to perform actions. For example, if the room temperature is above 30°C measured in one sensor device, the air conditioner will start cooling.

For the smart plug, this feature can also be set in “discovery” page which is entered by clicking the third bottom button on the device page. Select the third item “Device Interaction”.

Figure 4-17. Device Interaction Page

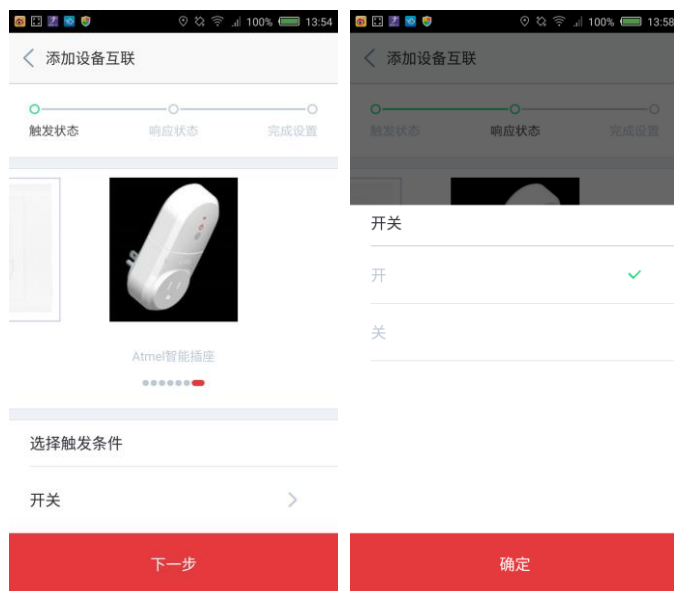


In “device Interaction” page, touch the  icon in the top right corner. Now you can add/edit the IFTTT rules or check the messages.

Here is an example on how to add an IFTTT rule:

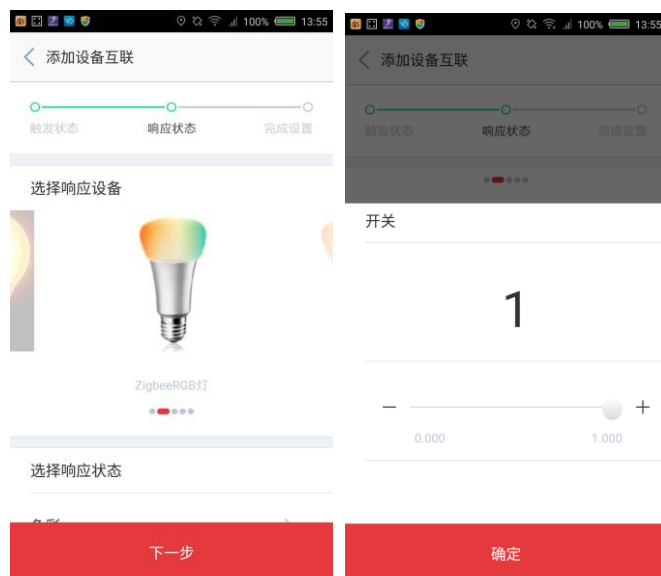
First, touch the add menu to choose the IFTTT source, and the trigger condition. Here the smart plug “on” state can be selected:

Figure 4-18. Trigger Source Setting



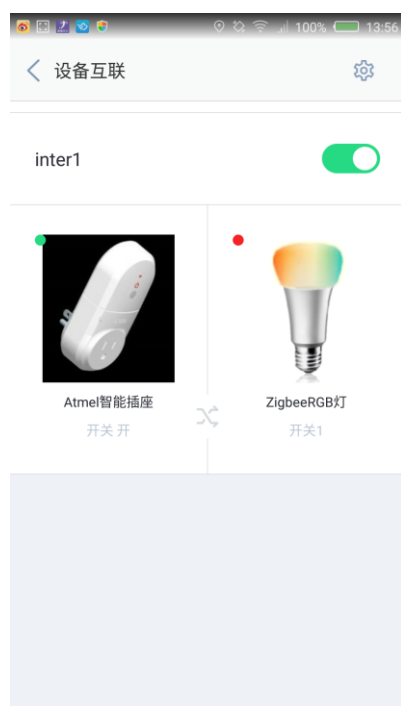
Then, select the IFTTT destination, which condition is triggered by the smart plug on state. Here a ZigBee® RGB light is used as an example. It will be ON when the smart plug is set on.

Figure 4-19. Trigger Destination Setting



Now you can see this IFTTT rule is added to the rule list. It can be enabled/disabled, edited, or removed.

Figure 4-20. IFTTT Rule List



5 Revision History

Doc Rev.	Date	Comments
42707A	04/2016	Initial document release.



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