

## M480 WiFi MQTT 客户端

NuMicro® 32 位系列微控制器范例代码介绍

### 文件信息

代码简述	本范例使用 M480 UART 驱动 ESP8266，实现 MQTT 客户端功能
BSP 版本	M480 Series BSP CMSIS V3.04.000
开发平台	NuMaker-IoT-M487 v1.3

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## 1 功能介绍

### 1.1 简介

本范例程序代码使用M480系列芯片，通过UART1驱动ESP8266 WiFi模块，实现MQTT客户端功能。当ESP8266模块连接上无线存取点后，开始建立与MQTT代理人的联机，并且每10秒发布NuMaker-IoT-M487板子上SW2(GPIO F11)和SW3(GPIO G5)按键状态的讯息。

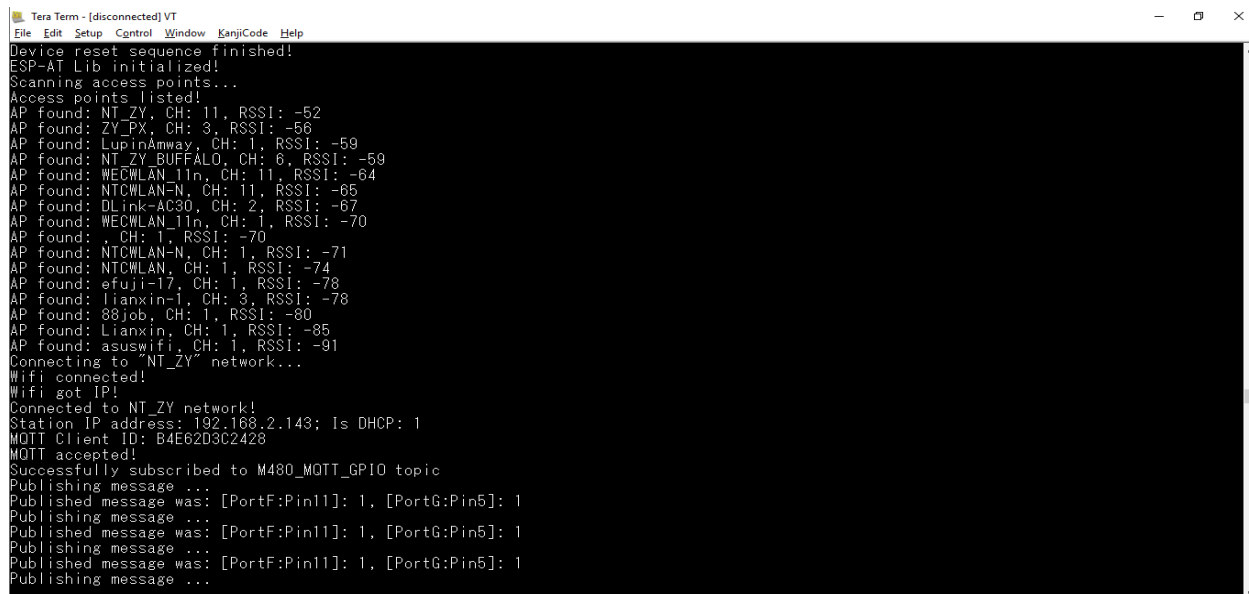
### 1.2 原理

范例程序核心使用了[ESP-AT Lib](#)函式库。ESP-AT Lib是一个AT命令解析器，用于使用AT命令与ESP8266 WiFi模块通信。ESP-AT Lib提供了Station和Access point无线网络管理API，并提供了BSD socket相似的API，方便应用程序建立主从式架构的网络应用。

MQTT是一种基于“发布(Publisher)/订阅(Subscriber)”机制的讯息传输协议。一个MQTT系统由服务器和通信的客户端所组成，而服务器通常称为“代理人(Broker)”。客户端可以是讯息的发布者，也可以是订阅者。

在范例程序里，展示的是客户端讯息的发布者，固定会发布主题为“M480\_MQTT\_GPIO”的讯息到代理人端。代理人端使用的是“test.mosquitto.org”服务器。最后在Android手机上使用MQTT Dashboard 或者在iOS装置上使用MQTTTool在做为订阅者，来接收主题为“M480\_MQTT\_GPIO”的讯息。

### 1.3 执行结果



```
Tera Term - [disconnected] VT
File Edit Setup Control Window KanjiCode Help
Device reset sequence finished!
ESP-AT Lib initialized!
Scanning access points...
Access points listed!
AP found: NT_ZY, CH: 11, RSSI: -52
AP found: ZY_PX, CH: 3, RSSI: -56
AP found: LupinAmway, CH: 1, RSSI: -59
AP found: NT_ZY_BUFFALO, CH: 6, RSSI: -59
AP found: WECWLAN_11n, CH: 11, RSSI: -64
AP found: NTCWLAN-N, CH: 11, RSSI: -65
AP found: DLink-AC30, CH: 2, RSSI: -67
AP found: WECWLAN_11n, CH: 1, RSSI: -70
AP found: , CH: 1, RSSI: -70
AP found: NTCWLAN-N, CH: 1, RSSI: -71
AP found: NTCWLAN, CH: 1, RSSI: -74
AP found: efuji-17, CH: 1, RSSI: -78
AP found: lianxin-1, CH: 3, RSSI: -78
AP found: 88job, CH: 1, RSSI: -80
AP found: Lianxin, CH: 1, RSSI: -85
AP found: asuswifi, CH: 1, RSSI: -91
Connecting to "NT_ZY" network...
Wifi connected!
Wifi got IP!
Connected to NT_ZY network!
Station IP address: 192.168.2.143; Is DHCP: 1
MQTT Client ID: B4E62D3C2428
MQTT accepted!
Successfully subscribed to M480_MQTT_GPIO topic
Publishing message ...
Published message was: [PortF:Pin11]: 1, [PortG:Pin5]: 1
Publishing message ...
Published message was: [PortF:Pin11]: 1, [PortG:Pin5]: 1
Publishing message ...
Published message was: [PortF:Pin11]: 1, [PortG:Pin5]: 1
Publishing message ...
Published message was: [PortF:Pin11]: 1, [PortG:Pin5]: 1
```

## 2 代码介绍

设置连接无线存取点的 SSID 和 Key:

```
#ifndef __NETWORKIF_ESP8266_H__
#define __NETWORKIF_ESP8266_H__

//Preferred access point
#define DEF_JOIN_AP_SSID    "NT_ZY"
#define DEF_JOIN_AP_KEY    "12345678"

//ESP8266 network interface task
void NetworkIF_ESP8266_Task(void *pvParameter);

#endif
```

连接到 MQTT 代理人:

```
/** Make a connection to MQTT server in non-blocking mode */
static void example_do_connect(esp_mqtt_client_p client)
{
    if (client == NULL)
    {
        return;
    }

    /*
     * Start a simple connection to open source
     * MQTT server on mosquitto.org
     */
    retries++;
    esp_timeout_remove(mqtt_timeout_cb);
    esp_mqtt_client_connect(mqtt_client, "test.mosquitto.org", 1883, mqtt_cb,
&mqtt_client_info);
}
```

发布讯息:

```
/*
 * \brief          Timeout callback for MQTT events
 * \param[in]      arg: User argument
 */
```

```

void mqtt_timeout_cb(void *arg)
{
    esp_mqtt_client_p client = arg;
    espr_t res;

    char szPin0Name[20];
    char szPin1Name[20];
    static char tx_data[60];

    GenPinNameStr(szPin0Name, 20, READ_PIN0_PORT, READ_PIN0_PIN);
    GenPinNameStr(szPin1Name, 20, READ_PIN1_PORT, READ_PIN1_PIN);

    if (esp_mqtt_client_is_connected(client))
    {
        sprintf(tx_data, "[%s]: %u, [%s]: %u", szPin0Name, READ_PIN0, szPin1Name,
READ_PIN1);

        if ((res = esp_mqtt_client_publish(client, DEF_TOPIC_STR, tx_data,
ESP_U16(strlen(tx_data)), ESP_MQTT_QOS_EXACTLY_ONCE, 0, tx_data)) == espOK)
        {
            printf("Publishing message ...\r\n");
        }
        else
        {
            printf("Cannot publish...: %d\r\n", (int)res);
        }
    }

    esp_timeout_add(10000, mqtt_timeout_cb, client);
}

```

### 3 软件与硬件环境

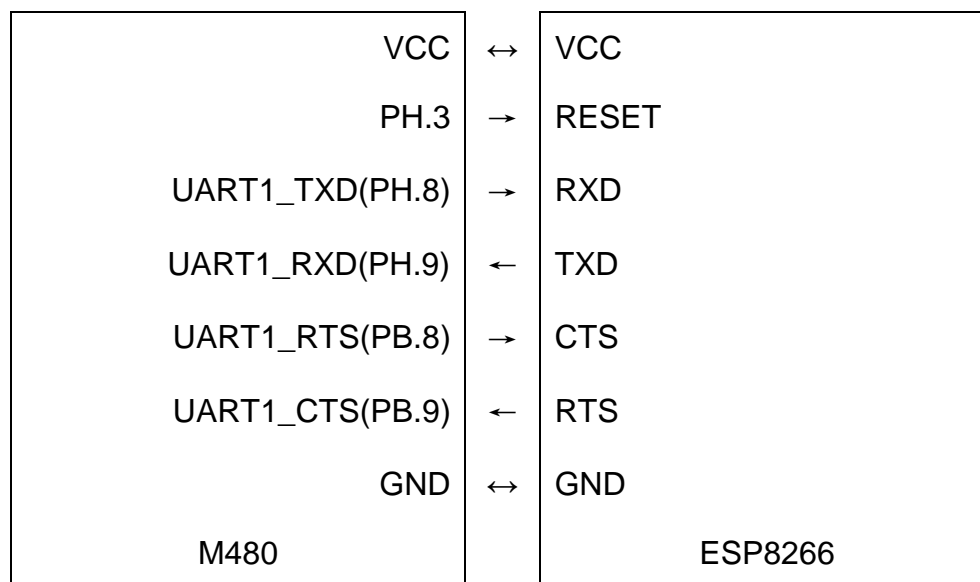
#### ● 软件环境

- BSP 版本
  - ◆ M480 Series BSP CMSIS V3.04.000
- IDE 版本
  - ◆ Keil uVersion 5.26

#### ● 硬件环境










- 电路组件
  - ◆ NuMaker-IoT-M487
  - ◆ ESP8266 模块
- 示意图

M480 通过 UART1 接口与 ESP8266 模块连接。



## 4 目录信息

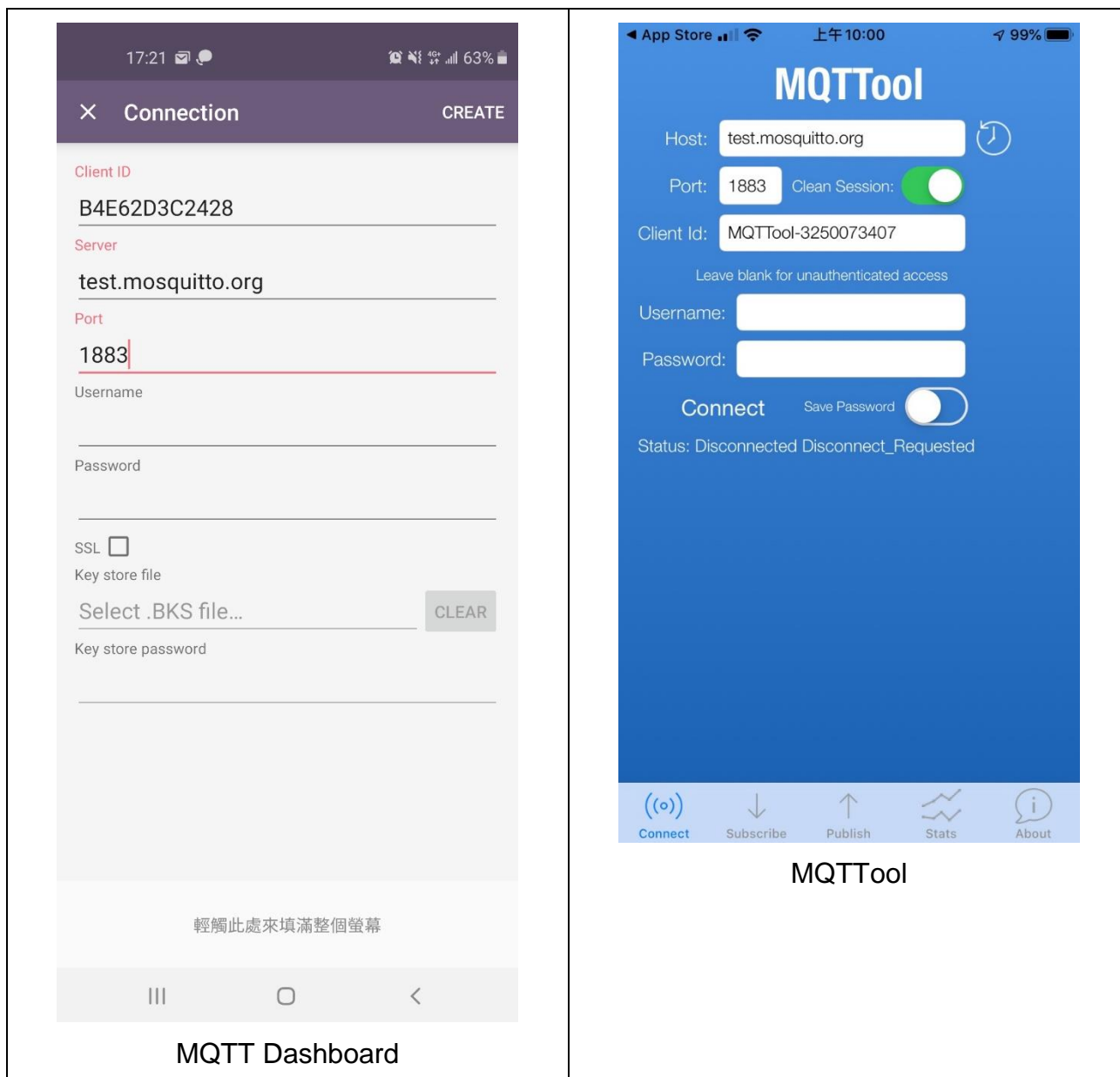
### EC\_M480\_WiFi\_MQTTClient\_V1.00

 Library	Sample code header and source files
 CMSIS	Cortex® Microcontroller Software Interface Standard (CMSIS) by Arm® Corp.
 Device	CMSIS compliant device header file
 StdDriver	All peripheral driver header and source files
 SampleCode	
 ExampleCode	Source file of example code
 ThirdParty	
 FreeRTOS	A real time operating system available for free download. Its official website is: <a href="http://www.freertos.org/">http://www.freertos.org/</a>
 ESP_AT_Lib	ESP_AT Library commands parser is generic, platform independent, library for communication with ESP8266 WiFi module using AT commands. Its official website is <a href="https://mayerle.eu/documentation/esp_at/html/index.html">https://mayerle.eu/documentation/esp_at/html/index.html</a>

## 5 如何执行范例程序

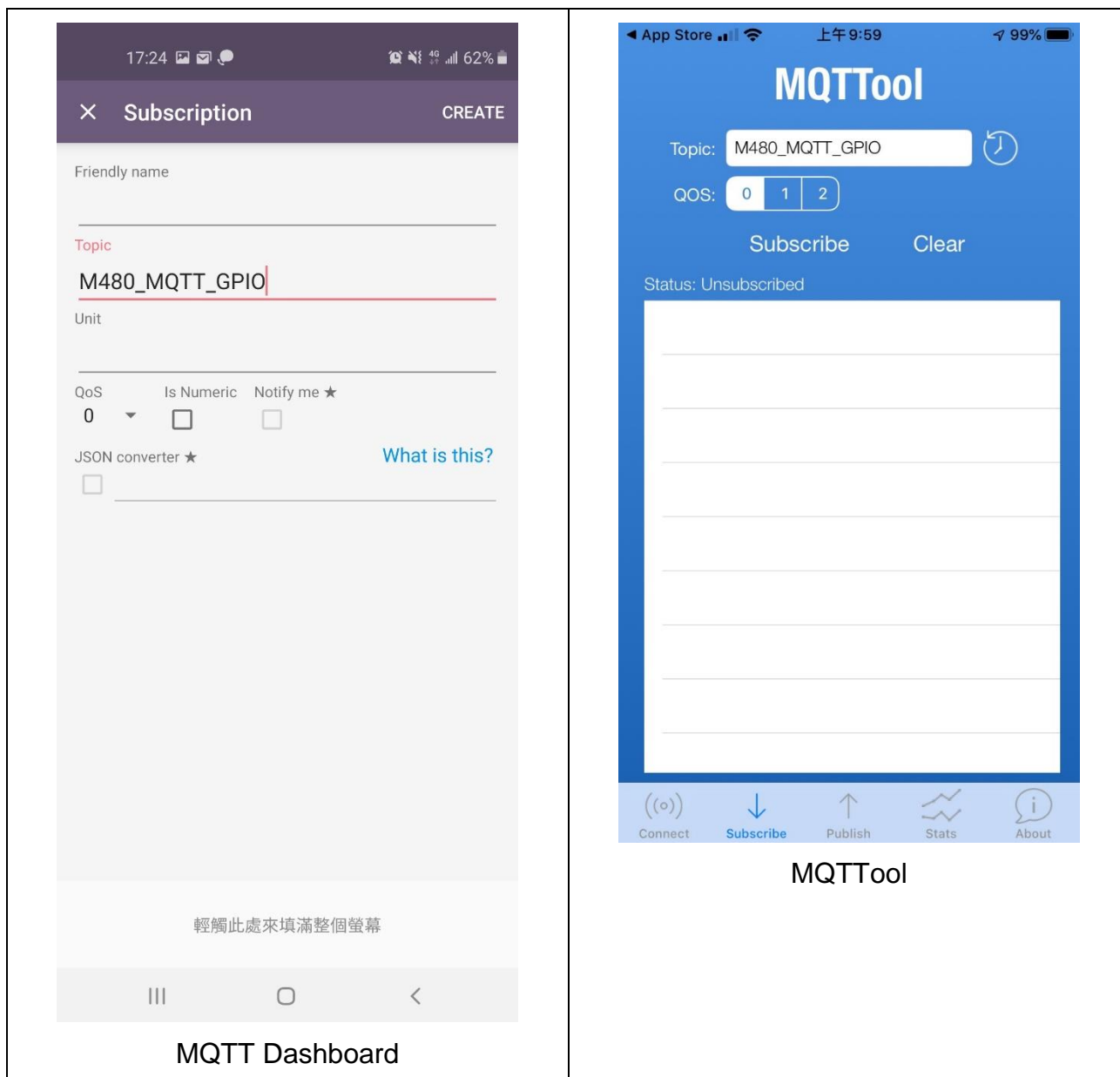
1. 根据目录信息章节进入 ExampleCode 路径中的 KEIL 文件夹，双击 M480\_WiFi\_MQTTClient.uvproj。
2. 进入编译模式接口
  - a. 编译
  - b. 下载代码至内存
  - c. 进入 / 离开除错模式
3. 进入除错模式接口
  - a. 执行代码
4. 从 Google Play 上安装 MQTT Dashboard 或者从 App Store 安装 MQTTTool

5. 使用 MQTT Dashboard 或者 MQTTTool 建立 MQTT 联机。Client ID 可以是任意的字符串。

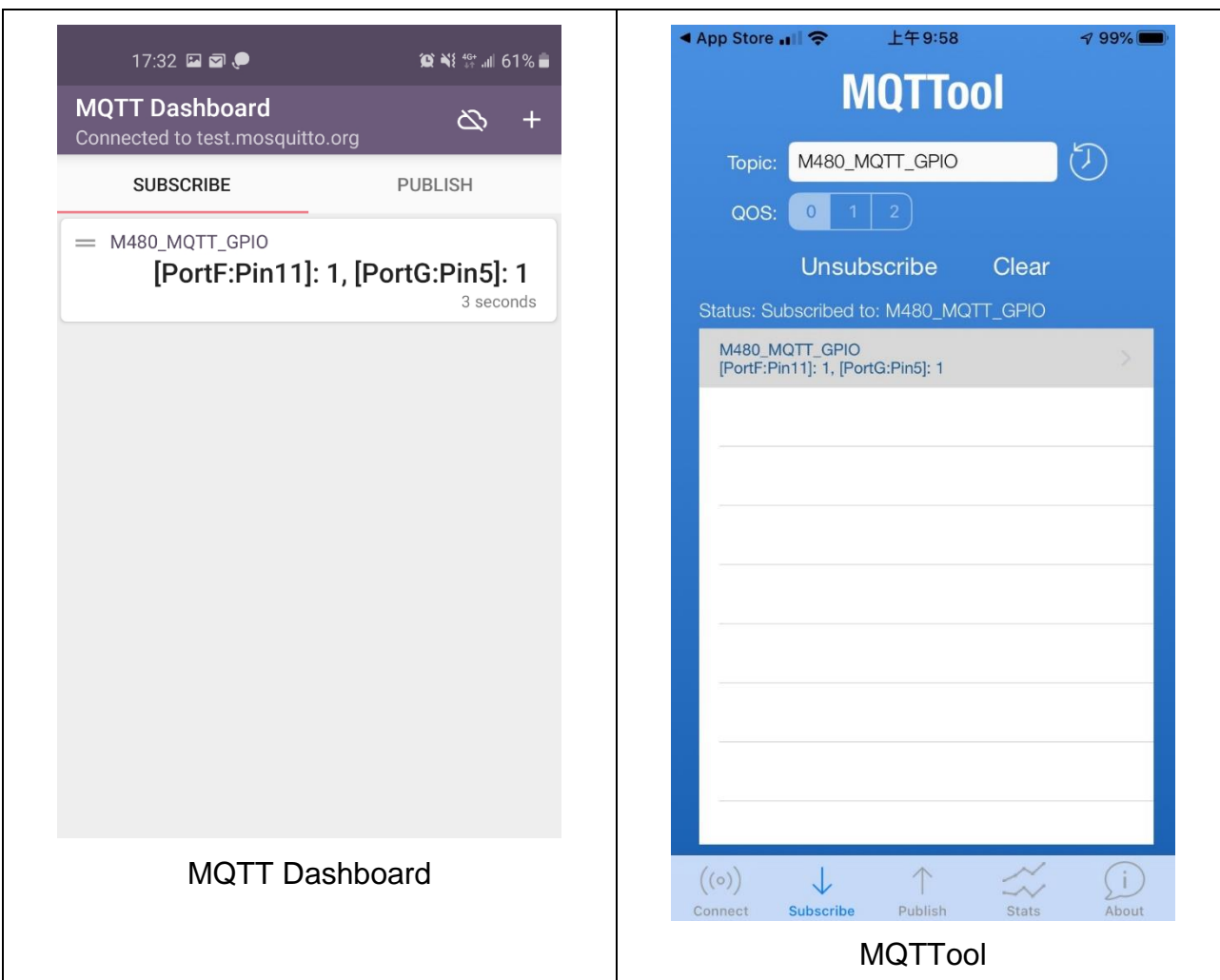




## 6. 订阅主题



## 7. 接收讯息



## 6 修订纪录

Date	Revision	Description
Oct. 8, 2019	1.00	1. 初始发布.

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