Multicast Application

User guide

Version 0.2

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About this Document

This document describes the process of bringing up the RS9113 based module as a WiFi station and used for Multicast data traffic.

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1 Introduction

This project is applicable to all the WiSeConnect variants like WiSeConnect Plus, WiSeMCU and WyzBee. The term WiSeConnect refers to its appropriate variant.

1.1 Protocol Overview

In Networking, Multicast IP Routing protocols are used to distribute data (for example, audio/video streaming broadcasts) to multiple recipients. Using multicast, a source can send a single copy of data to a single multicast address, which is then distributed to an entire group of recipients.

A multicast group identifies a set of recipients that are interested in a particular data stream, and is represented by an IP address from a well-defined range. Data sent to this IP address is forwarded to all members of the multicast group.

Routers between the source and recipients duplicate data packets and forward multiple copies wherever the path to recipients diverges. Group membership information is used to calculate the best routers at which to duplicate the packets in the data stream to optimize the use of the network.

1.2 Application Overview

1.2.1 Overview

This application demonstrates how to add WiSeConnect device to a multicast group and how to send and receive multicast data on a UDP socket.

In this application, WiSeConnect device connects to WiFi Access point and opens UDP socket and joins to a Multicast group ID. After successful join, application sends data to multicast group ID and receives data from Multicast group ID using opened UDP socket.

1.2.2 Sequence of Events

This Application explains user how to:

- Configure WiSeConnect device as a WiFi station
- Connect to WiFi Access Point
- Open UDP socket
- Join multicast group ID
- Send UDP data to multicast group ID
- Receive UDP data coming from Multicast group

1.3 Application Setup

The WiSeConnect in its many variants supports SPI and UART interfaces. Depending on the interface used, the required set up is as below:

1.3.1 SPI based Setup Requirements

- Windows PC1 with CooCox IDE
- Spansion (MB9BF568NBGL) micro controller

Note: If user does not have Spansion (MB9BF568NBGL) host platform, please go through the SPI-Porting guide **\sapis\docs\RS9113-WiSeConnect-SAPI-Porting-Guide-vx.x.pdf** for SAPIs porting to that particular platform.

- WiSeConnect device
- Wlan Access point
- Windows PC2 with iperf to send and receive Multicast data

1.3.2 UART/USB-CDC based Setup Requirements

- Windows PC1 with Dev-C++ IDE
- WiSeConnect device
- Wlan Access point
- Windows PC2 with iperf to send and receive Multicast data

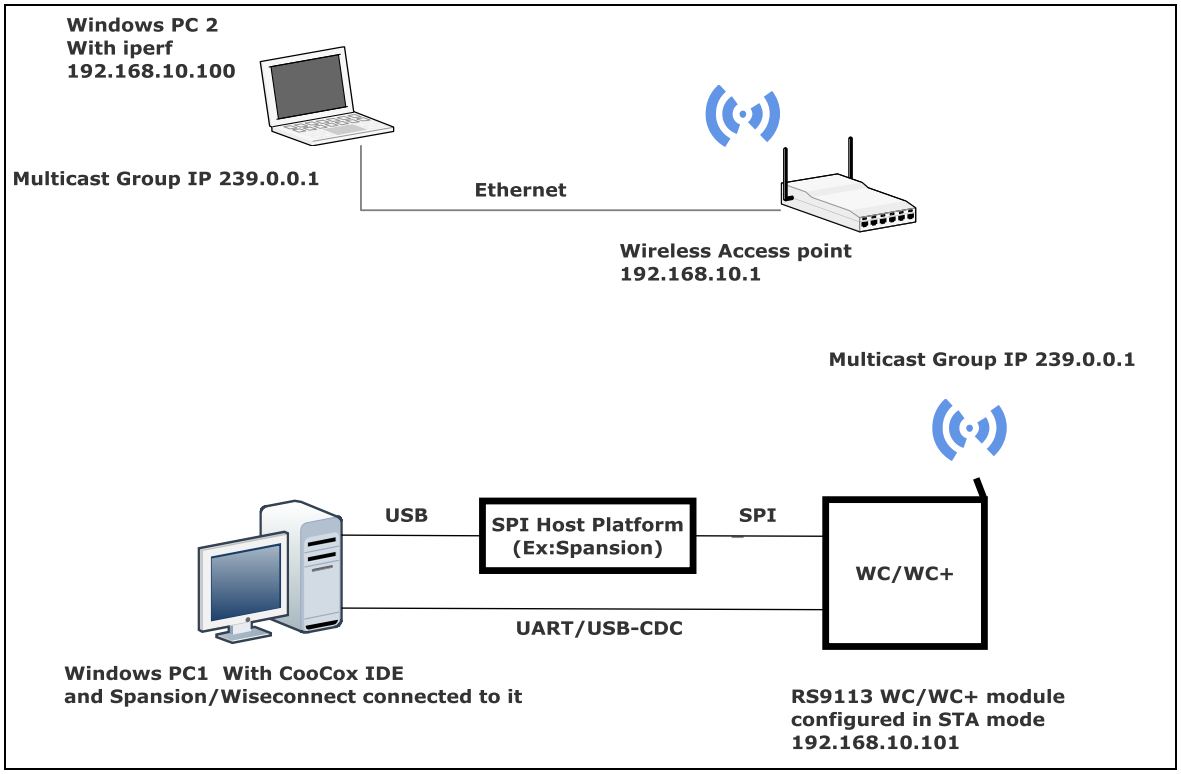


Figure 1: Setup Diagram

2 Configuration and Execution of the Application

The example application is available in the Release at **{Release $}/host/sapis/examples.** These examples will have to be initialized, configured and executed to test the application. The initialization varies based on the interface but configuration and execution are the common.

2.1 Initializing the Application

2.1.1 SPI Interface

If User using SPI interface, Please refer the document ***sapis/platforms/spansion_MB9BF568NBGL/RS9113-WiSeConnect_SAPIS_Spansion_Project_User_guide.pdf*** for opening the ***multicast*** example in CooCox IDE.

2.1.2 UART/USB-CDC Interface

If User using UART interface, Please refer the document ***sapis/platforms/ windows_uart/RS9113-WiSeConnect_SAPIS_Windows_Project_UserGuide.pdf*** for opening the ***multicast*** example in Dev-C++ IDE

2.2 Configuring the Application

1. Open sapis/examples/wlan/multicast/rsi_multicast_app.c file and update/modify following macros:

SSID refers to the name of the Access point.

```
#define SSID                    "<ap name>"
```

CHANNEL_NO refers to the channel to be scanned, If it is 0, device will scan all the channels

```
#define CHANNEL_NO                  0
```

SECURITY_TYPE refers to the type of security. In this application STA supports Open, WPA-PSK, WPA2-PSK securities.

Valid configuration is:

RSI_OPEN - For OPEN security mode

RSI_WPA - For WPA security mode

RSI_WPA2 - For WPA2 security mode

```
#define SECURITY_TYPE           RSI_OPEN
```

PSK refers to the secret key if the Access point configured in WPA-PSK/WPA2-PSK security modes.

```
#define PSK                     "<psk>"
```

DEVICE_PORT port refers internal UDP port number

```
#define DEVICE_PORT             5001
```

SERVER_PORT port refers remote UDP server port number

```
#define SERVER_PORT             5002
```

MULTICAST_GROUP_ADDRESS refers the device to which multicast group address has to join. **MULTICAST_GROUP_ADDRESS** address should be configured in long format and in little endian byte order.

Example: To configure "239.0.0.1" as multicast group IP address, update the macro **MULTICAST_GROUP_ADRESS** as **0x010000EF.**

```
#define MULTICAST_GROUP_ADDRESS   0x010000EF
```

NUMEBR_OF_PACKETS refers how many packets to send/receive to/from multicast group before leaving multicast group.

```
#define NUMBER_OF_PACKETS     <no of packets>
```

RECV_BUFFER_SIZE is expected size of data in each packet. If packet is half the size of receive buffer, then Device will read for the data again.

```
#define RECV_BUFFER_SIZE  <receive buf size>
```

To configure IP address

DHCP_MODE refers whether IP address configured through DHCP or STATIC

```
#define DHCP_MODE   1
```

Note: If user wants to configure STA IP address through DHCP then set **DHCP_MODE** to 1 and skip configuring the following **DEVICE_IP, GATEWAY** and **NETMASK** macros.
(Or)
If user wants to configure STA IP address through STATIC then set **DHCP_MODE** macro to "0" and configure following **DEVICE_IP, GATEWAY** and **NETMASK** macros.

IP address to be configured to the device in STA mode should be in long format and in little endian byte order.

Example: To configure "192.168.10.10" as IP address, update the macro **DEVICE_IP** as **0x0A0AA8C0**.

```
#define  DEVICE_IP          0X0A0AA8C0
```

IP address of the gateway should also be in long format and in little endian byte order

Example: To configure "192.168.10.1" as Gateway, update the macro GATEWAY as **0x010AA8C0**

```
#define  GATEWAY            0x010AA8C0
```

IP address of the network mask should also be in long format and in little endian byte order

Example: To configure "255.255.255.0" as network mask, update the macro **NETMASK** as **0x00FFFFFF**

```
#define   NETMASK           0x00FFFFFF
```

2. Open ***sapis/include/rsi_wlan_config.h*** file and update/modify following macros,

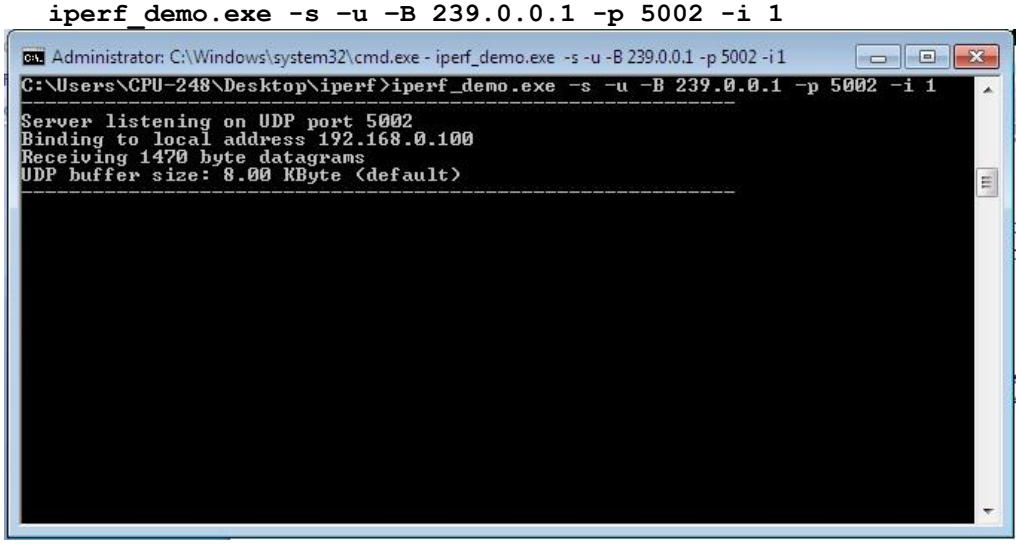
```
#define  CONCURRENT_MODE          RSI_DISABLE
#define  RSI_FEATURE_BIT_MAP      FEAT_SECURITY_OPEN
#define  RSI_TCP_IP_BYPASS        RSI_DISABLE
```

```
#define  RSI_TCP_IP_FEATURE_BIT_MAP TCP_IP_FEAT_DHCPV4_CLIENT
#define  RSI_CUSTOM_FEATURE_BIT_MAP  0
#define  RSI_BAND                    RSI_BAND_2P4GHZ
```

2.3 Executing the Application

1. Configure the Access point in OPEN/WPA-PSK/WPA2-PSK mode to connect WiSeConnect device in STA mode.
2. Open multicast UDP server socket on port number **`SERVER_PORT (Ex: 5002)`** by binding to **`MULTICAST_GROUP_ADRESS (Ex: 239.0.0.1)`** using iperf application in Windows PC2 which is connected to Access point through LAN.

   `iperf_demo.exe -s –u –B 239.0.0.1 -p 5002 -i 1`



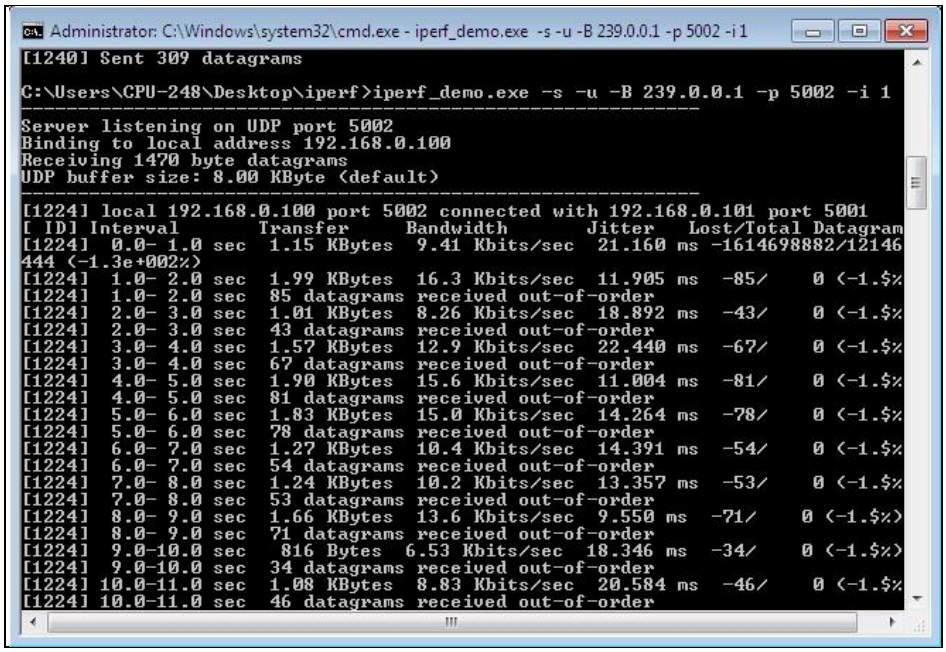
3. **SPI Interface**

If User using SPI interface, Please refer the document ***sapis/platforms/spansion_MB9BF568NBGL/RS9113-WiSeConnect_SAPIS_Spansion_Project_User_guide.pdf*** for executing the ***multicast*** example in CooCox IDE.

4. **UART/USB-CDC Interface**

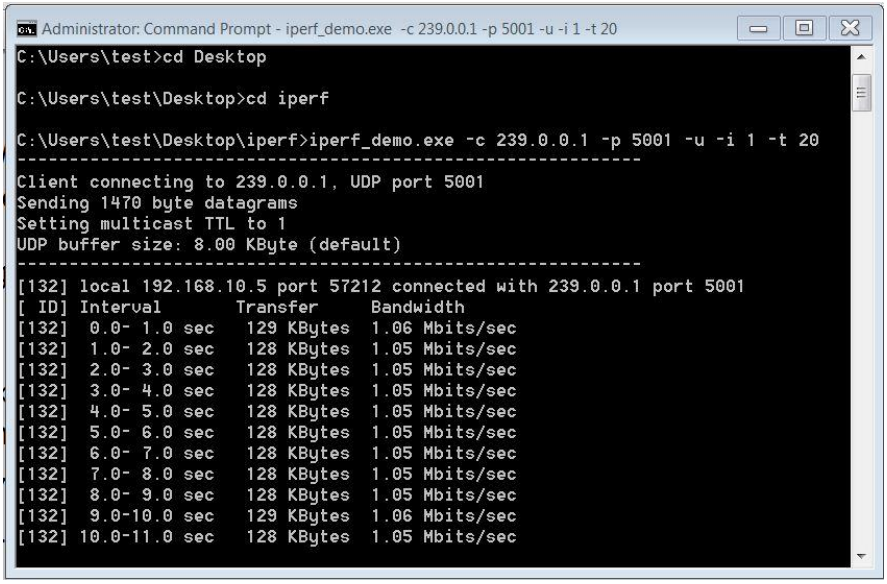
If User using UART interface, Please refer the document ***sapis/platforms/ windows_uart/RS9113-WiSeConnect_SAPIS_Windows_Project_UserGuide.pdf*** for executing the ***multicast*** example in Dev-C++ IDE

5.
6. After the program gets executed, WiSeConnect Device will be connected to Access point and get IP.
7. After successful connection with Access point, Device will join to the multicast group and sends configured number of UDP packets to multicast group address on port number **`SERVER_PORT.`** After Device starts sending multicast data, user can see UDP receiving data on opened UDP socket on port number **`SERVER_PORT`**.



8. After sending configured NUMBER of UDP packets from device, remote Windows PC2 stops receiving data on SERVER_PORT and WiSeConnect device waits for receiving multicast data on UDP port number **DEVICE_PORT.**
9. From Windows PC2, after UDP data reception stops, open UDP client socket and send UDP data to multicast IP address with port number **DEVICE_PORT** by giving following command in **iperf,**

```
iperf_demo.exe -c 239.0.0.1 -p <DEVICE_PORT> -u -i 1 -t 100 -T32
```



10. Device will read configured number of packets which are coming from joined multicast group address and leave from that joined multicast group.