Honeywell

User Guide for RMWIFI

Document Information

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Approvals

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Contents

1. Section1:

1.1 Summary:

RMWIFI-M3 based on RMWIFI-M5 module provides a quick, easy and cost effective way to add Wi-Fi capabilities for RAE Systems products, such as AreaRAE2, MutlRAE2, and RAE-Hub etc.

The module combined 802.11 MAC, security, PHY functions, FLASH SRAM, and external antenna connectors, provides a Wi-Fi radio for end customers. It also integrates TCP/IP stack and other related network stacks such as DHCP client, DHCP server and web server etc. It can be used to connect to Ethernet conveniently and transfer data to network server like ProRAE Guardian directly.

1.2 Key Features:

• 46 * 26 mm (Length * Width) with M3 40-PINs interface

• RCS protocol API for application interface

• DSSS modulation for 1and 2Mbps, CCK modulation for 5.5 and 11Mbps

• Compatible with IEEE 802.11 b

• UART interface, SPI interface, I2C interface, one ADC channel, several GPIOs

• Low power consumption

• RoHS compliant, certified lead- and halogen-free

# 2. Section2:

2.1 Overview:

RMWIFI-M3 operates in the unlicensed 2.4 radio bands IEEE 802.11b, which supports Direct Sequence Spread Spectrum (DSSS) 1 Mb/s and 2 Mb/s data rates, and Complementary Code Keyed (CCK) 5.5 Mb/s and 11 Mb/s data rates. RMWIFI-M3 is based on RMWIFI-M5 module, which contains GS1011 WIFI

system-on-chip. The GS1011 have fully integrated RF Transceiver, low power PA and application processor. Both TX and RX chain in the module incorporate internal power control loops.

RMWIFI-M3 carries onboard single supply monitor for 1.8V voltage supply with optional module controlled external regulator enable control pin (DC_DC_CNTL).

2.2 Pin Definition:
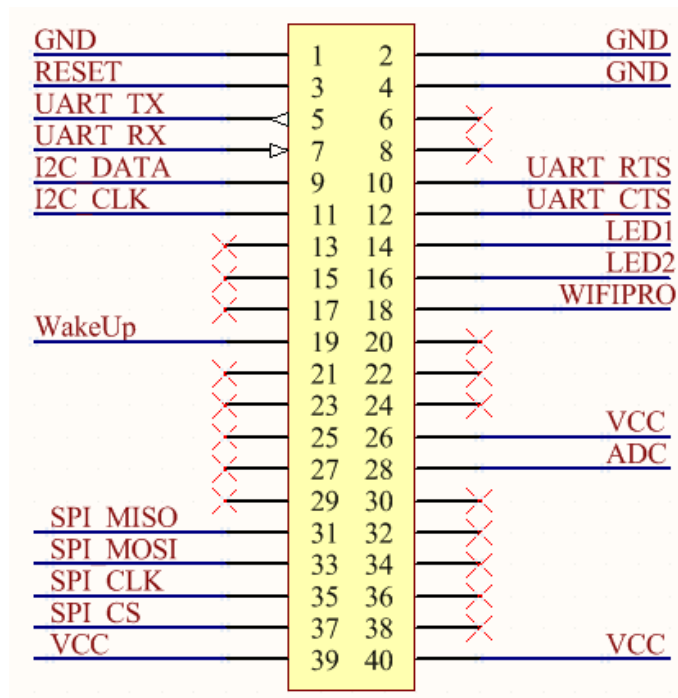
Connector Pin	Pin Name	Description	I/O
1	GND	Ground	
3	RESET	Active-low system reset	I/O
5	UART_TX	UART transmit output	O
7	UART_RX	UART transmit input	I
9	I2C_DATA	PU data signal for an external I2C device	I/O
11	I2C_CLK	PU clk signal for an external I2C device	I/O
13, 15, 17	NA		
19	WakeUp	WakeUp the Module	I
21, 23, 25, 27, 29	NA		
31	SPI_MISO	Slave SPI master in slave out	I/O

		line	
33	SPI_MOSI	Slave SPI master out slave in line	I/O
35	SPI_CLK	Slave SPI clock line	I
37	SPI_CS	Slave SPI chip select line	I
39	VCC	Digital voltage supply	
2, 4	GND	Ground	
6, 8	NA		
10	UART_RTS	RTS input (Request To Send) for UART hardware flow control	I
12	UART_CTS	CTS output (Clear To Send) for UART hardware flow control	O
14	LED1	LED indicate control PIN	O
16	LED2	LED indicate control PIN	O
18	WIFIPRO[1]	Enable/Disable into boot load	I
20, 22, 24	NA		
26	VCC	Digital voltage supply	
28	ADC	ADC input	
30, 32, 34, 36, 38	NA		
40	VCC	Digital voltage supply	

Note (1): If WIFIPRO is high during boot, the WLAN will wait for Flash download via SPI or UART.

3. Section3:

3.1 Voltage:

Power supply for the RMWIFI-M3 module will be provided by the host power pins.

Symbol	Min	Typ	Max	Unit
VCC	3.0	3.3	3.6	V

3.2 Current Consumption:

Condition: 25deg.C. The default voltage is 3.3V.

Item	Condition	Min	Nom	Max	Unit
Receive	RX		108		mA
Transmit	Tx power setting: P=0 **Single carrier**		145		mA
Sleep			200		uA

3.3 I/O DC Specification:

Parameter	Symbol	Min	Max	Unit
Input Low Voltage	V_{IL}		0.25*VCC	V
Input High Voltage	V_{IH}	0.8*VCC		V
Output Low Voltage	V_{OL}		0.4	V
Output High Voltage	V_{OH}	0.8*VCC		V

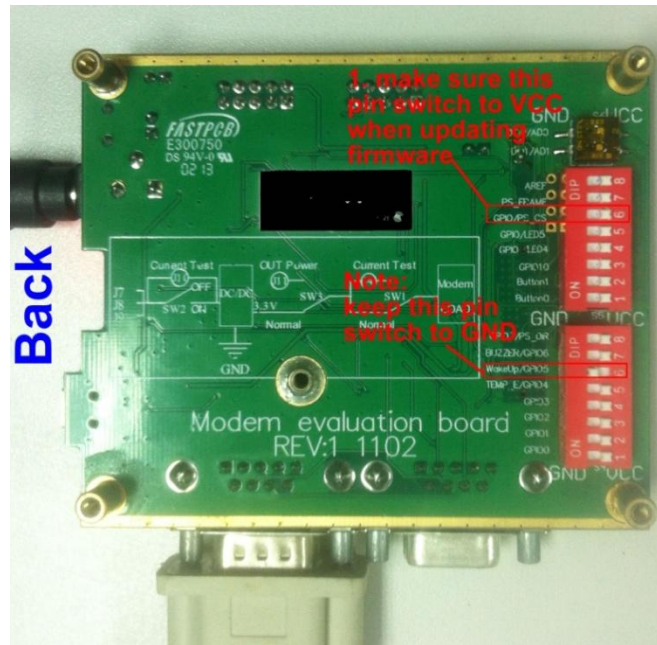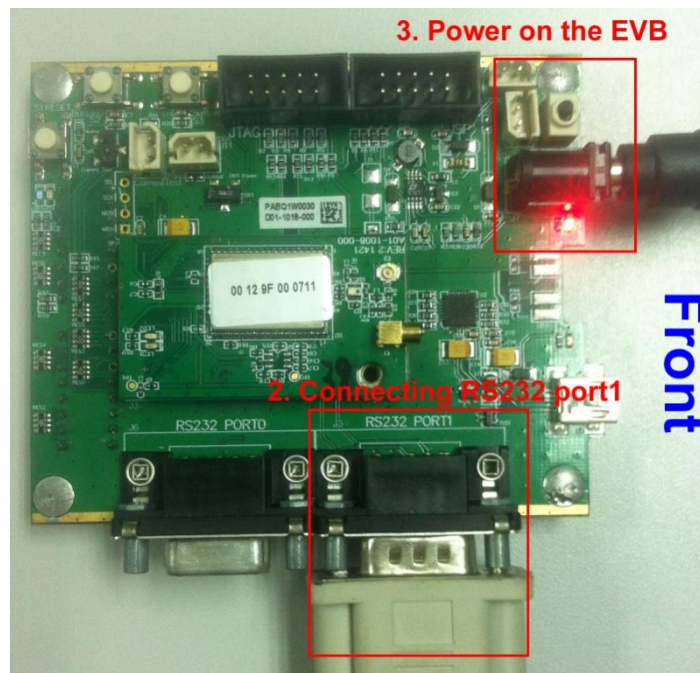## 3.4 Mechanical Drawing:

Unit: mm
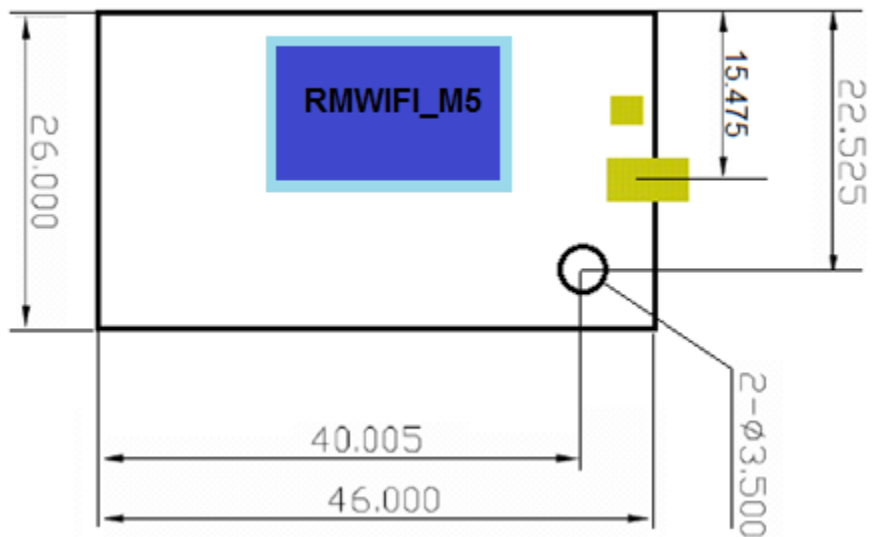
4. How to program RMWIFI:

4.1 Hardware interface setup:

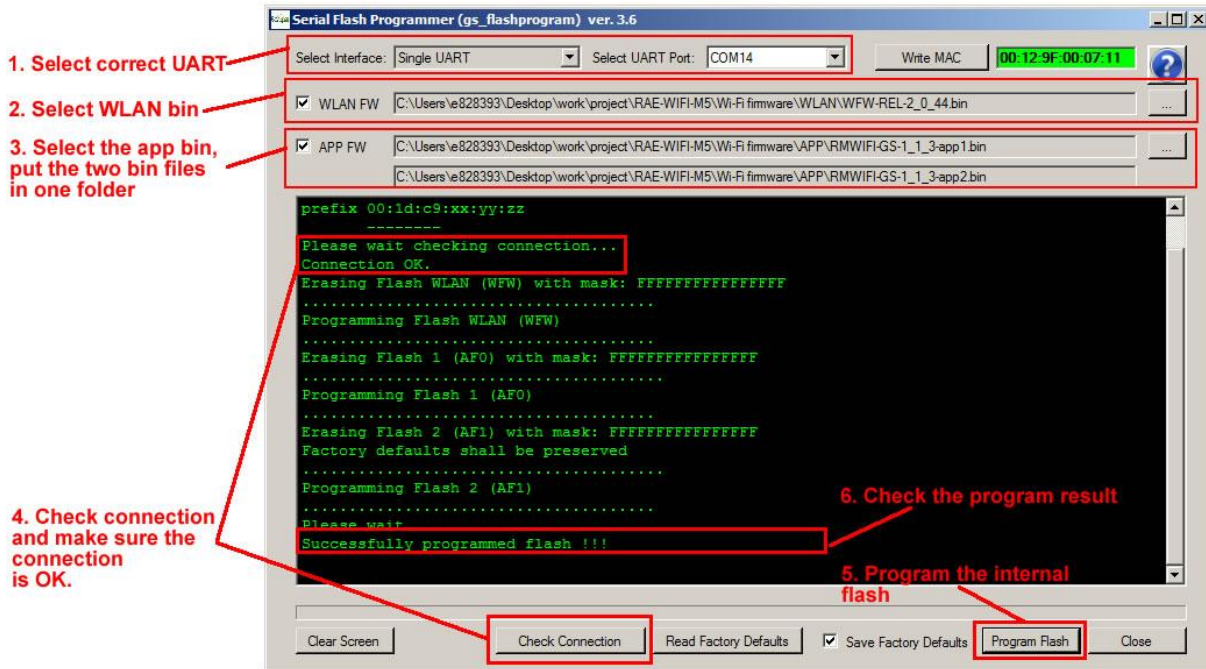### Configure the back side of the EVB as following picture:

### Configure the front side of EVB as following picture:

4.2 Program software interface introduction:

Programming RMWIFI modem needs three *.bin files which including WLAN bin, APP bin1 and APP bin2, please see following picture for detail:

4.3 Running application firmware

After upgrading RMWIFI modem firmware successfully, configure the back side of the EVB as following picture:
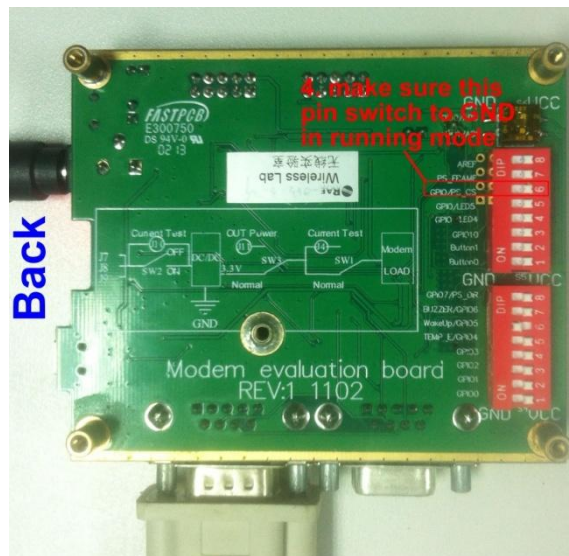
Then power-off and power on the EVB, RMWIFI modem application firmware will run and output information as following picture via EVB's RS232 interface:

5. Initialization:

5.1 Get module type:

Host command:

7B 41 00 06 74 2E 00 FF FF 7D

RMWIFI response:

7B 41 00 07 75 2E 00 00 3F F3 7D

Example communication sequence:

Note:

In order to make it easy when using COMM tools to communicate with RMWIFI, the CRC field of host command is replaced by FF FF.

5.2   Get MAC address:

Host command:

7B 41 00 06 74 08 00 FF FF 7D

RMWIFI response:

7B 41 00 0C 75 08 00 00 12 9F 00 07 11 60 7F 7D

Example communication sequence:

6. Scan and associate with AP:

6.1 Scan network:

1. Send scan command

Host command:

7B 41 00 0A 74 0F 00 FF FF 00 00 FF FF 7D

RMWIFI response:

7B 41 00 0A 75 0F 00 00 00 04 4C 58 3F 7D

Example communication sequence:

2. Get scan status and AP number found:

Host command:

7B 41 00 06 74 10 00 FF FF 7D

RMWIFI response:

7B 41 00 08 75 10 00 00 01 29 0D 7D

Example communication sequence:
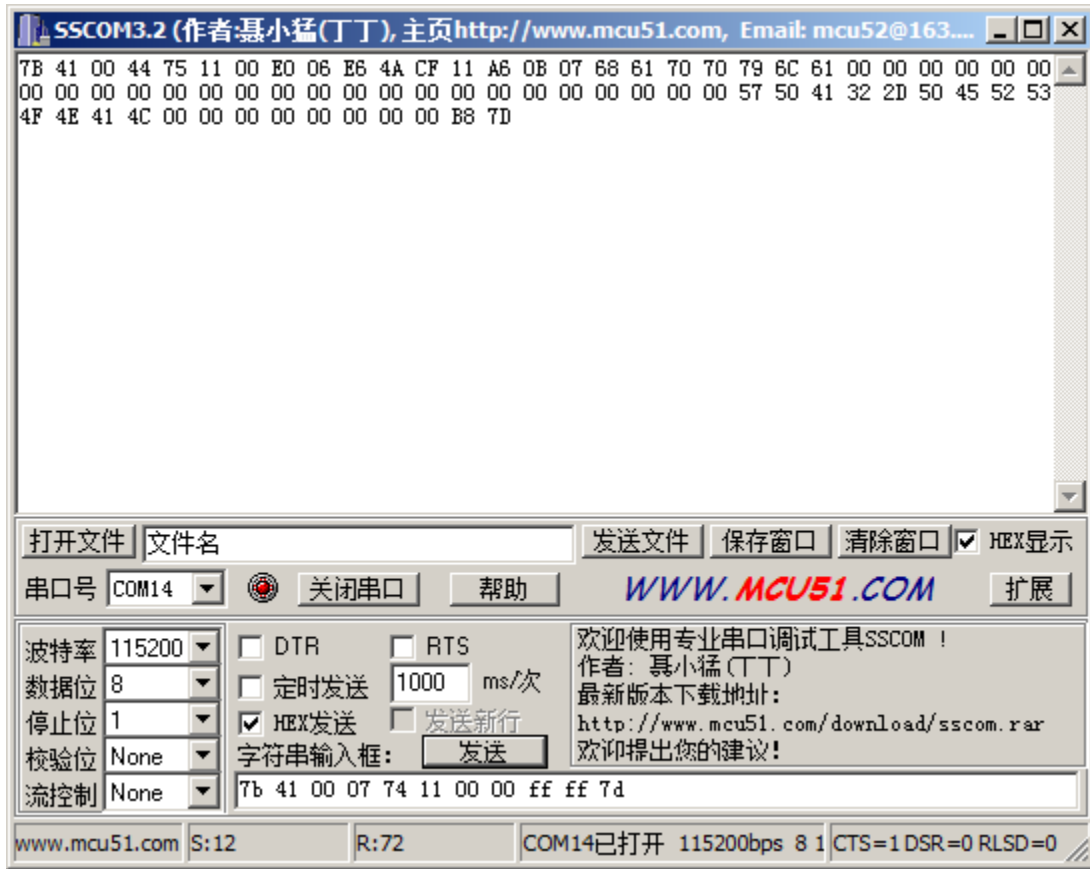
3. Get scanned AP information according to AP index:

Host command:

7B 41 00 07 74 11 00 00 FF FF 7D

RMWIFI response:

7B 41 00 44 75 11 00 E0 06 E6 4A CF 11 A6 0B 07 68 61 70 70 79 6C

61 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

00 00 00 00 00 57 50 41 32 2D 50 45 52 53 4F 4E 41 4C 00 00 00 00

00 00 00 00 B8 7D

Example communication sequence:

6.2 Set password:

Example:
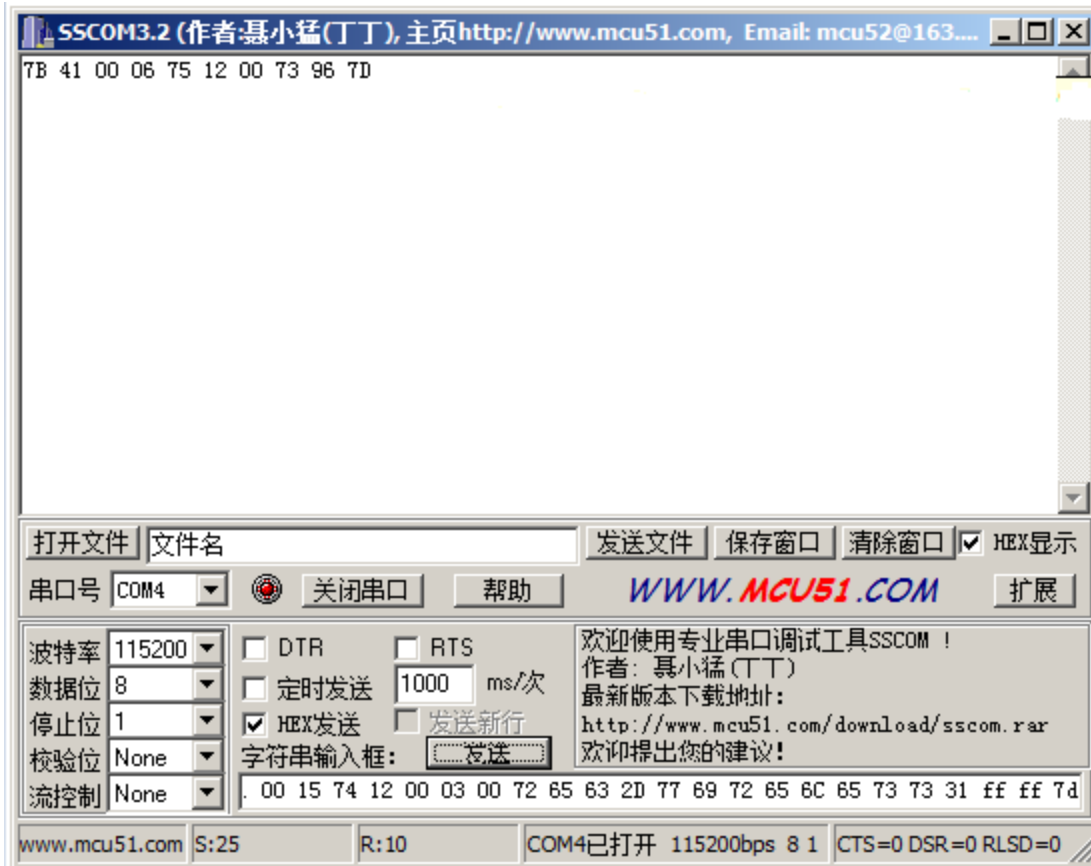
If one AP uses WPA/WPA2, and the password is rec-wireless1

Host command:

7B 41 00 15 74 12 00 03 00 72 65 63 2D 77 69 72 65 6C 65 73 73 31

FF FF 7D

RMWIFI response:

7B 41 00 06 75 12 00 73 96 7D

Example communication sequence:

6.3 Associate with AP:

Example:

The AP SSID that the module wants to associate with is gainspandemo.

Host command:

7B 41 00 12 74 13 00 67 61 69 6E 73 70 61 6E 64 65 6D 6F FF FF 7D
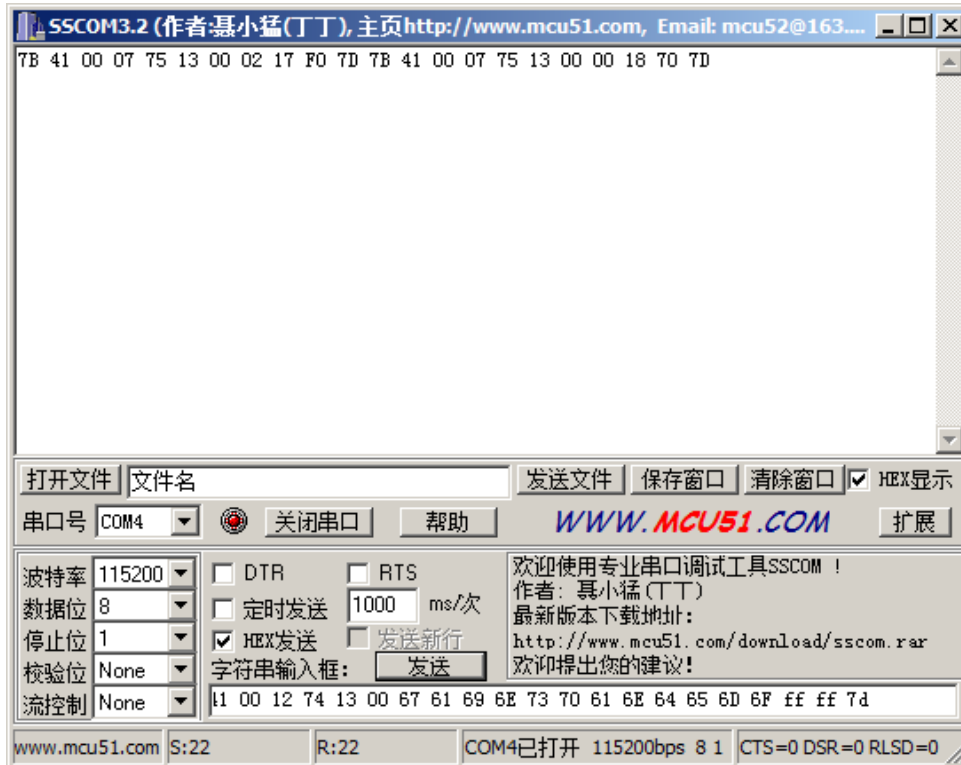
RMWIFI response:

7B 41 00 07 75 13 00 02 17 F0 7D

7B 41 00 07 75 13 00 00 18 70 7D

The Wi-Fi module will response two commands, first command responses immediately after it receives the associate command and indicates it's doing. The second response command will delay

for seconds and indicates whether it associates with AP
successfully. Check the red byte of the response command, 0x00
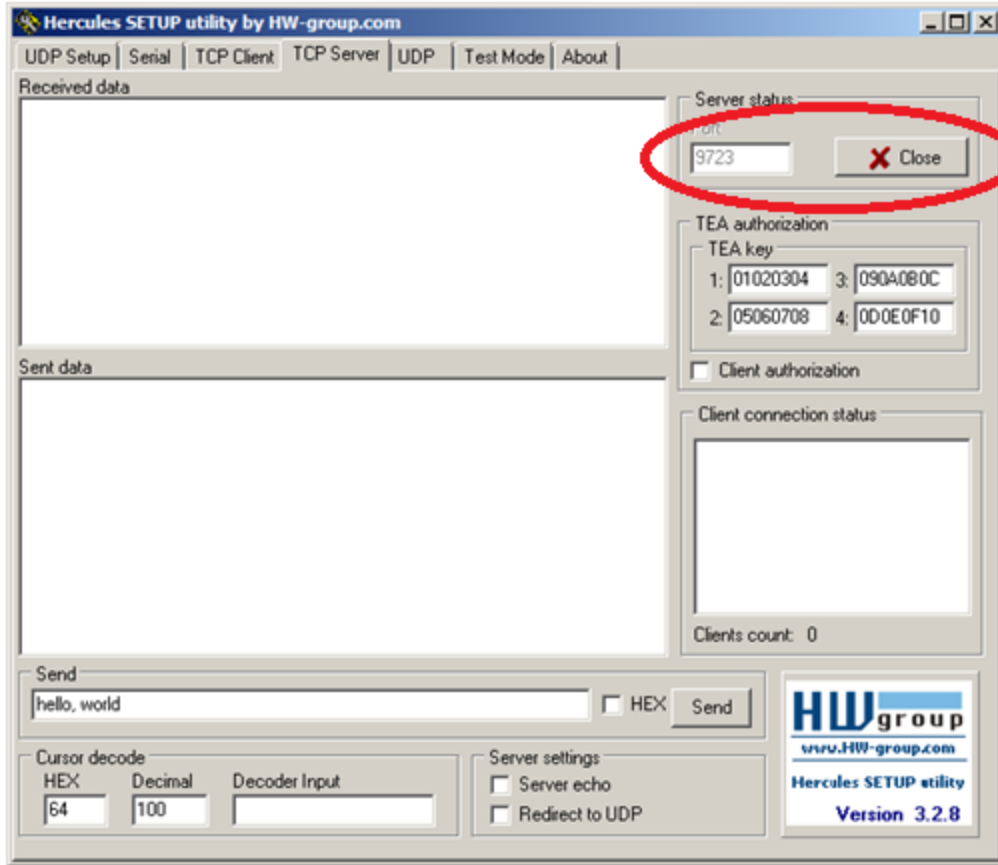indicates that it has associated with AP successfully.

Example communication sequence:

7. How to communicate using TCP:

7.1 Connect to TCP server:

1. Use the socket test tool, create a TCP server as following picture,
   the TCP listen port is 9723:

2. Connect to the TCP server:

Host command:
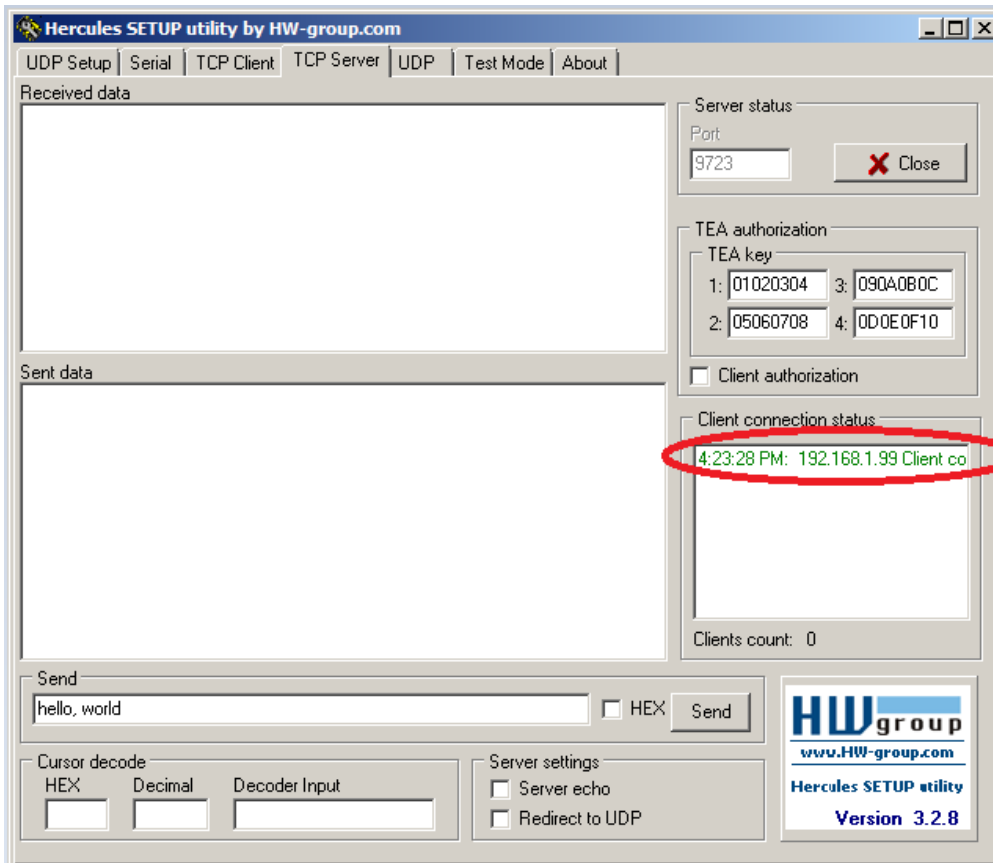
7B 41 00 0c 74 1A 00 c0 a8 01 86 25 fb ff ff 7d

RMWIFI response:

7B 41 00 07 75 1A 00 00 AC 70 7D

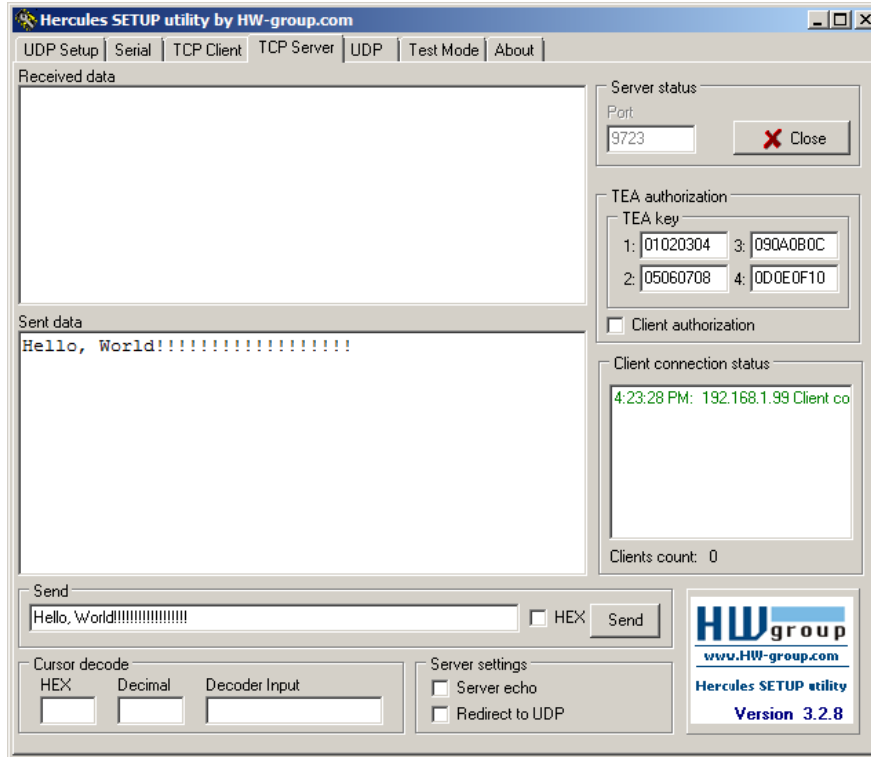**Example communication sequence:**

The socket test tools will inform that one client has connected to it:

7.2   Receive data packet from server:

From the socket test tools side, send data packet to RMWIFI as following picture:

The RMWIFI will receive the data packet from TCP server:

7.3   Send data packet to server:
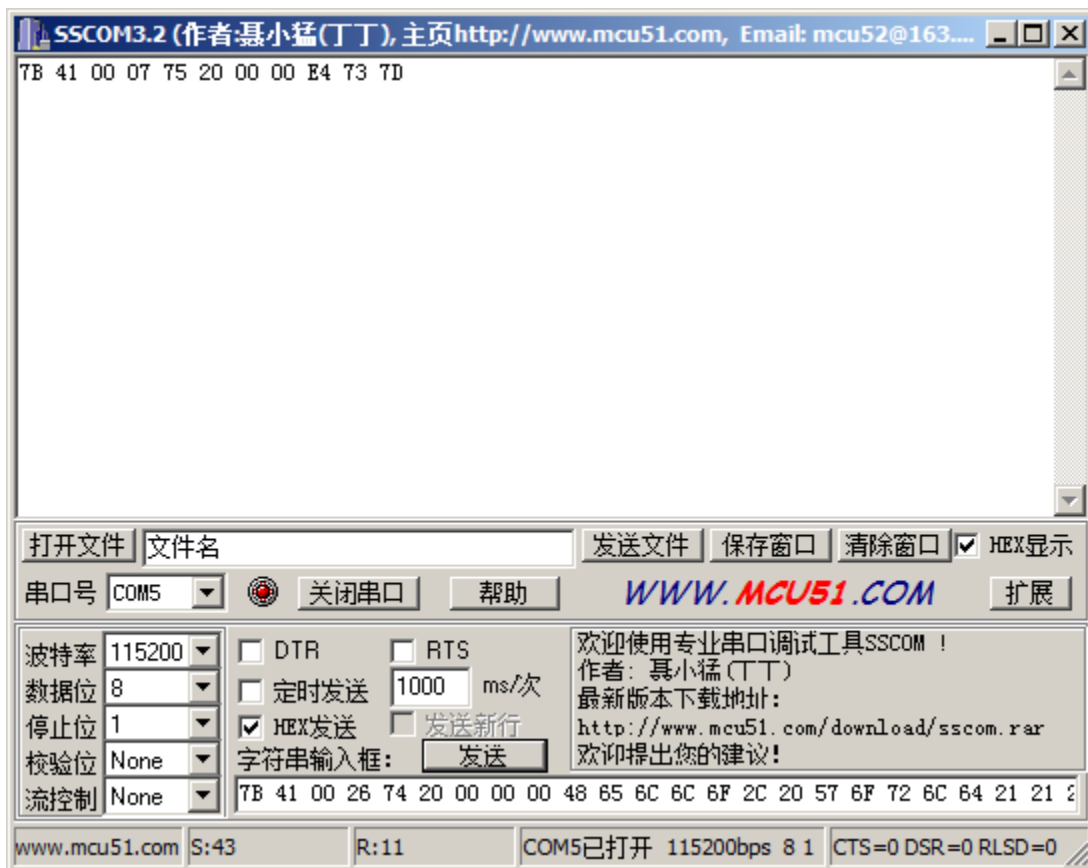
Send the same data packet back to TCP server:

Host command:

7B 41 00 26 74 20 00 00 00 48 65 6C 6C 6F 2C 20 57 6F 72 6C 64 21

21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 FF FF 7D

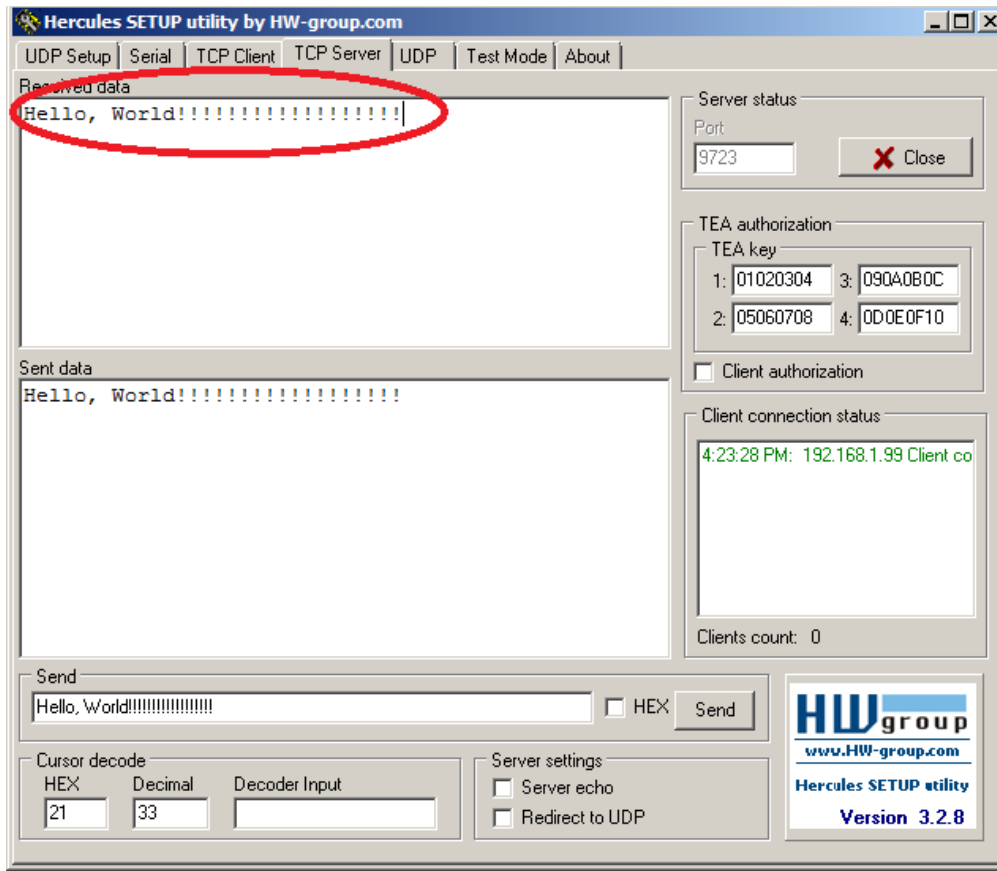**RMWIFI response:**

7B 41 00 07 75 20 00 00 E4 73 7D

Example communication sequence:

The socket test tool side will receive the data packet as following picture which is the same data packet as it sends out:
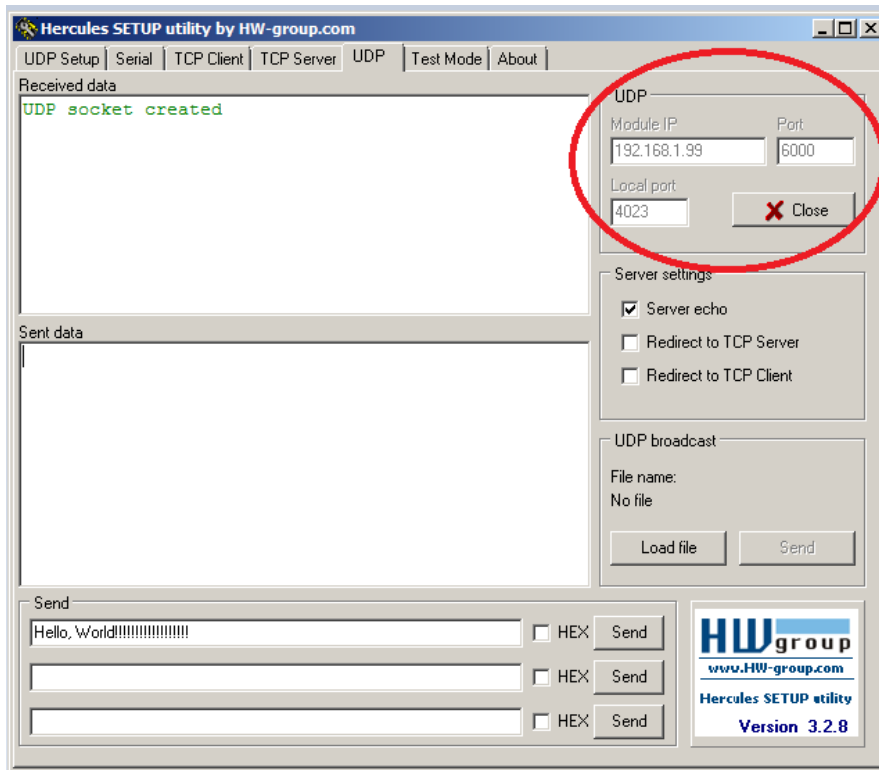
Note:

During doing the test, please make sure the host PC running the socket test tools connects to the same AP as Wi-Fi module associate with.

8. How to communication using UDP:

Firstly, use socket tool to create UDP socket which listen on local port 4023, remote communication node IP: 192.168.1.99, port: 6000, see following picture for detail:

8.1 Receive data packet from UDP server:

1. In order to receive data packet from remote using UDP protocol, communication via UDP, RMWIFI will need to listen on local port: 6000.

Host command:
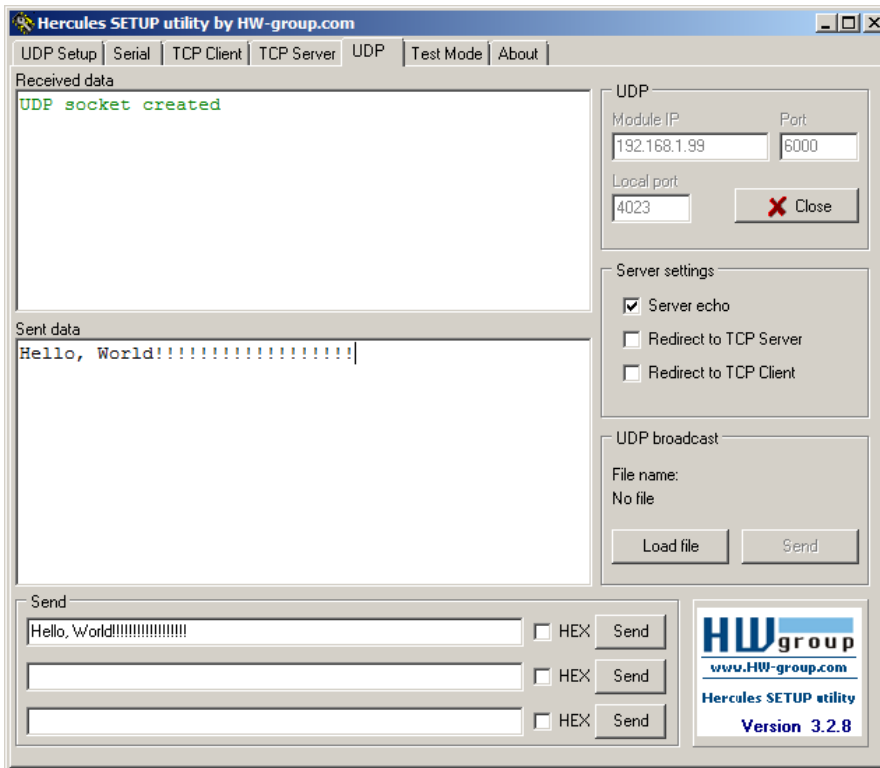
7B 41 00 08 74 1D 00 17 70 FF FF 7D

RMWIFI_M3 response:

7B 41 00 07 75 1D 00 00 C3 F0 7D

Example communication sequence:

2. Send data packet to RMWIFI as following:

RMWIFI will receive data packet:

7B 41 00 2B 75 21 00 00 C0 A8 01 86 0F B7 48 65 6C 6C 6F 2C 20 57 6F 72 6C 64 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 A1 37 7D

8.2   Send data packet to remote using UDP:

1. RMWIFI will need to create virtual connection to get a connection ID.

Host command:

7B 41 00 0C 74 1C 00 C0 A8 01 86 0F B7 FF FF 7D

RMWIFI response:

7B 41 00 07 75 1C 00 00 D4 70 7D

Example communication sequence:

2. Send data packet" Hello, World!!!!!!!!!!!!!!!!!!" to remote:

 Host command:

7B 41 00 2C 74 20 00 00 01 C0 A8 01 86 0F B7 48 65 6C 6C 6F 2C 20

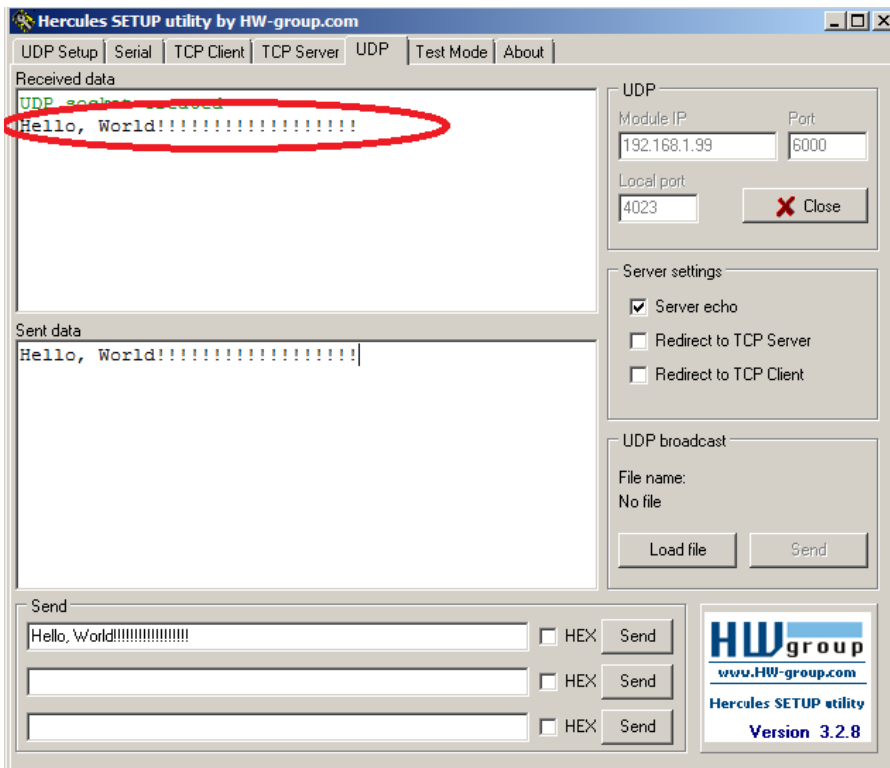**57 6F 72 6C 64 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21**

21 ff ff 7D

RMWIFI response:

7B 41 00 07 75 20 00 00 E4 73 7D

Example communication sequence:

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Socket test tool will receive the data packet:

9. Reference:

1. 904-E800-xxx RAE Wi-Fi communication Protocol.doc

2. Rev2 EVB board -Datasheet.docx

10. Caution:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

MPE Reminding

To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

Region Selection

Limited by local law regulations, version for North America does not have region selection option.

Information for the OEM Integrators

This device is intended for OEM integrators only. Please see the full grant of equipment document for restrictions.

Label Information to the End User by the OEM or Integrators

If the FCC ID of this module is not visible when it is installed inside another device, then the outside of the device into which the module is into which the module is installed must be label with "Contains FCC ID: SU3RMWIFI".

For detachable antennas:

This device is tested together with a PCB and a Pole antenna. The client can use an antenna with the same type of the two antennas, but must make sure that the maximum gain of PCB antenna is 0dBi and the maximum gain of Pole antenna is 1.5dBi.