WHMxx0A_EVK User Manual

Rev 1.0

SJIT

Apr. 23, 2024

Contents

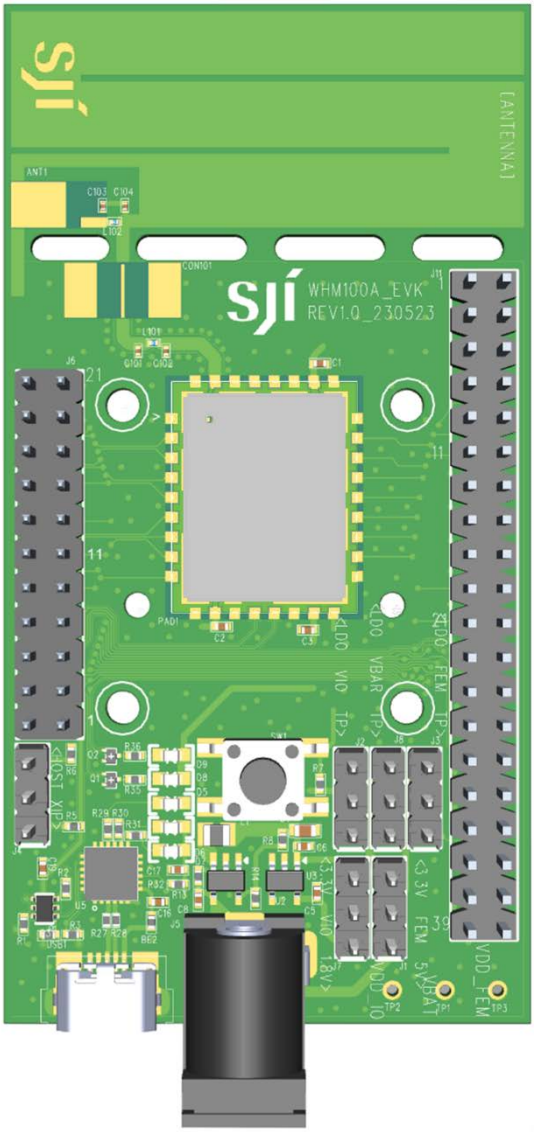
Copyright SJIT | All Rights Reserved | www.sjit.company

History

Date	Contents	Version	
2024-04-23	Create	V1.0	

1. Hard Ware

1.1 Evaluation Kit Component



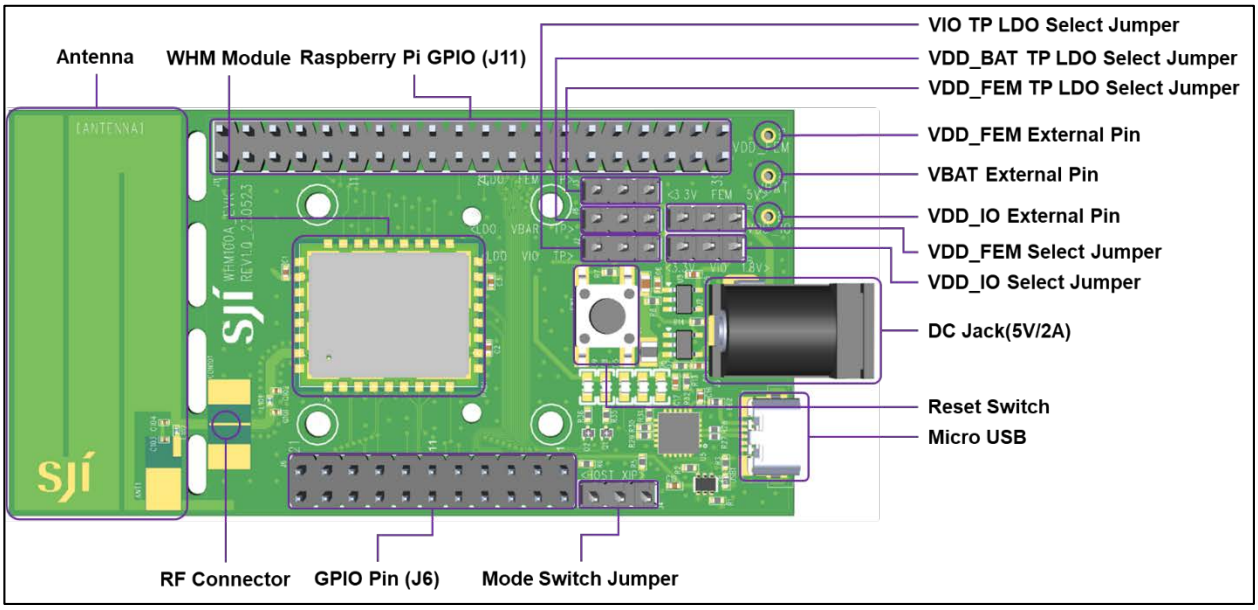
EVB WHM

[Fig. Evaluation Kit Component]

WHMxx0A Evaluation Kit Component

1) EVB WHMxx0A: 1EA

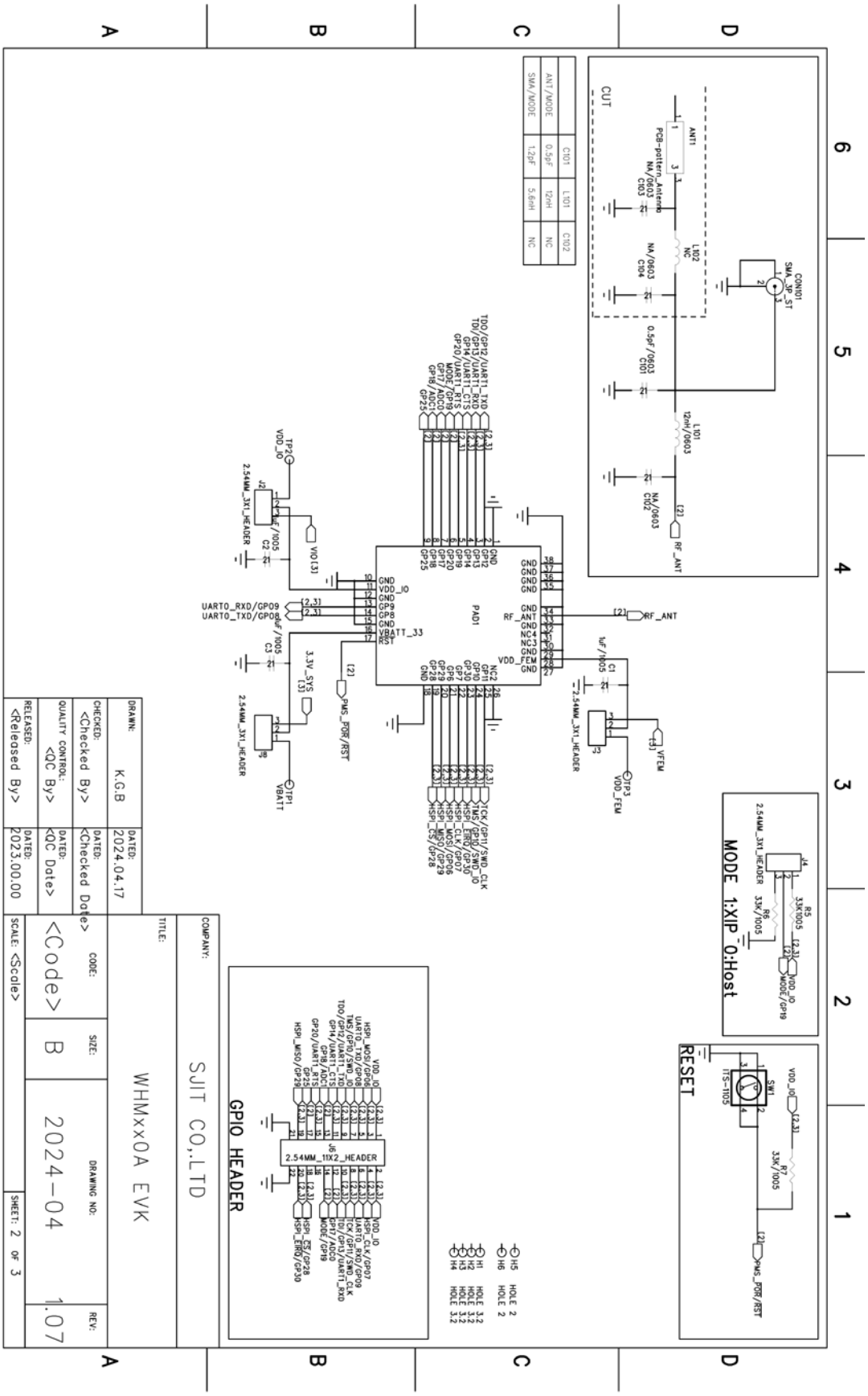
1.2 EVB WHMxx0A Board

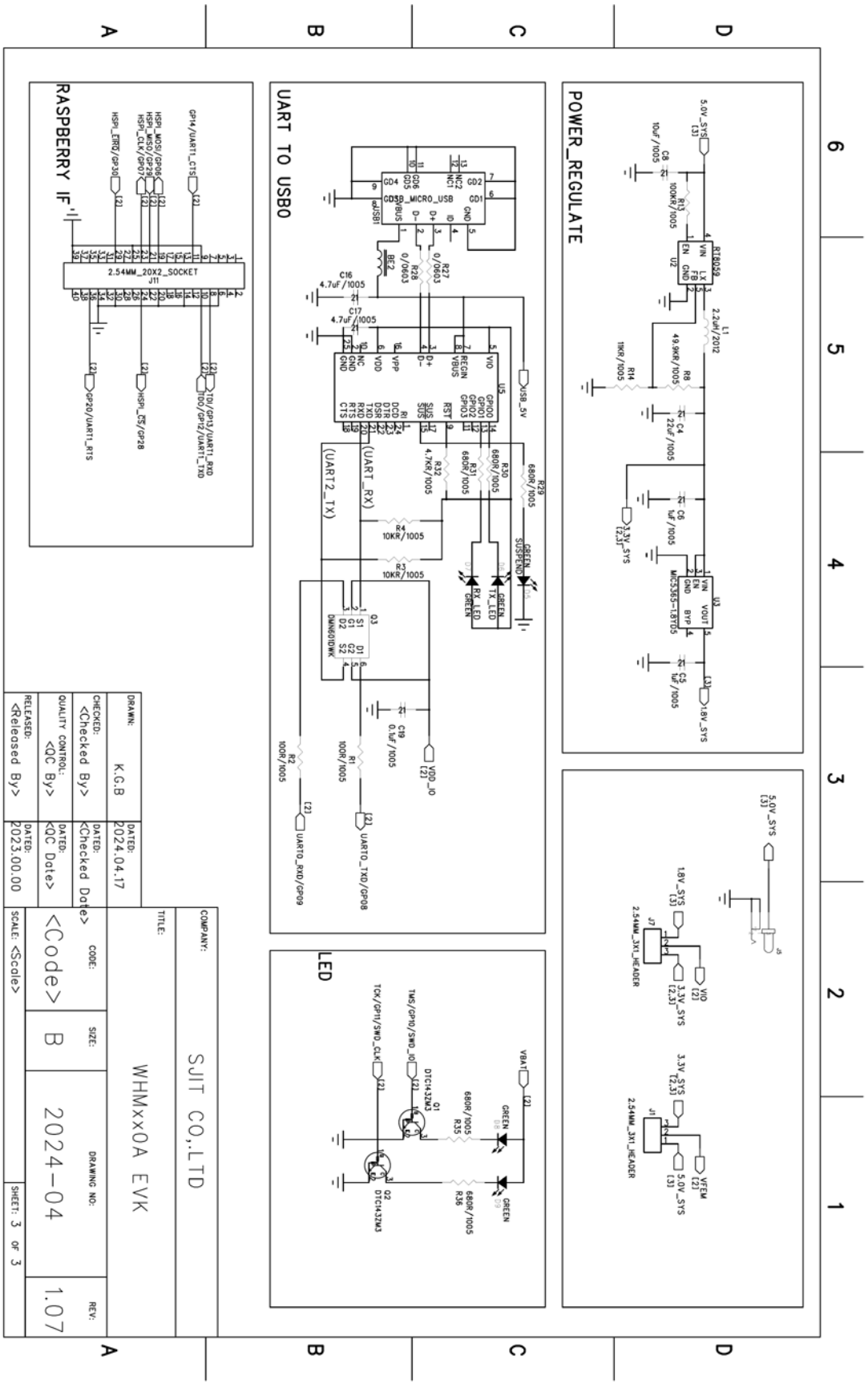


[Fig. EVB WHM]

- **RF Connector:** RF connector for Antenna
- **WHM:** Wi-Fi Halow module
- **Mode Switch Jumper:** mode Switch Low/High Jumper
  - 1-2 : XIP Mode
  - 2-3 : Host Mode(F/W D/L)
- **Module reset switch:** EVB H/W reset switch
- **Micro USB receptacle**: Micro USB connector
- **DC JACK:** Input DC 5V/2A
- **VDD_FEM Select Jumper**
  - 1-2 : Input VDD FEM 5V
  - 2-3 : Input VDD FEM 3.3V
- **VDD_IO Select Jumper**
  - 1-2 : Input VDD IO 1.8V
  - 2-3 : Input VDD IO 3.3V
- **TP LDO Select Jumper**
  - 1-2 : Use External Pin
  - 2-3 : Use LDO
- **External Pin :** External Power Supply
- **Raspberry Pi GPIO:** Raspberry Pi Connctor
- **GPIO Pin:** GPIO Jumper

1.3 Schematic



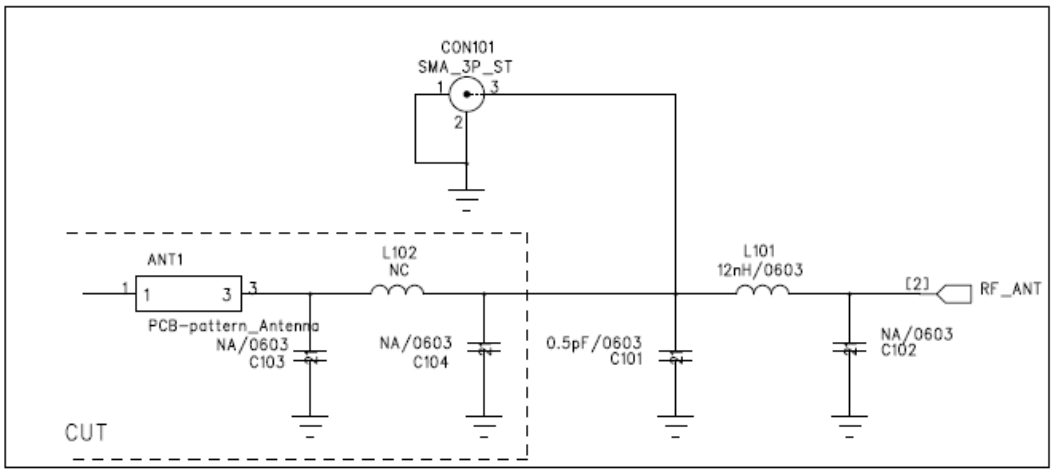

POWER_REGULATE
UART TO USB0
LED
RASPBERRY IF
WHMxx0A EVK
SJIT CO,.LTD
2024-04
1.07

1.4 Connector PIN Description

Connector	Pin No.	Pin name	Function	Pin No.	Pin name	Function
J11	1	NC	-	2	NC	-
	3	NC	-	4	NC	-
	5	NC	-	6	GND	Ground
	7	NC	-	8	TDI/GP13/UART1_RXD	UART channel1 Rx data
	9	GND	Ground	10	TDO/GP12/UART1_TXD	UART channel1 Tx data
	11	GP14/UART1_CTS	UART channel1 clear to send	12	NC	-
	13	NC	-	14	GND	Ground
	15	NC	-	16	NC	-
	17	NC	-	18	NC	-
	19	HSPI_MOSI/GP06	Host SPI – master out slave in	20	GND	Ground
	21	HSPI_MISO/GP29	Host SPI – master in slave out	22	NC	-
	23	HSPI_CLK/GP07	Host SPI – clock	24	HSPI_CS/GP28	Host SPI – chip select (active low)
	25	GND	Ground	26	NC	-
	27	NC	-	28	NC	-
	29	HSPI_EIRQ/GP30	Host SPI – interrupt (active low)	30	GND	Ground
	31	NC	-	32	NC	-
	33	NC	-	34	GND	Ground
	35	NC	-	36	GP20/UART1_RTS	UART channel1 request to send
	37	NC	-	38	NC	-
	39	GND	Ground	40	NC	-

Connector	Pin No.	Pin name	Function	Pin No.	Pin name	Function
J6	1	VDD_IO	WHM I/O power input	2	VDD_IO	WHM I/O power input
	3	HSPI_MOSI/GP06	Host SPI – master out slave in	4	HSPI_CLK/GP07	Host SPI – clock
	5	UART0_TXD/GP08	UART channel0 Tx data	6	UART0_RXD/GP09	UART channel0 Rx data
	7	TMS/GP10/SWD_IO	SWD data	8	TCK/GP11/SWD_CLK	SWD clock
	9	TDO/GP12/UART1_TXD	UART channel1 Tx data	10	TDI/GP13/UART1_RXD	UART channel1 Rx data
	11	GP14/UART1_CTS	UART channel1 clear to send	12	GP17/ADC0	Auxiliary ADC channel 0
	13	GP18/ADC1	Auxiliary ADC channel 1	14	MODE/GP19	Boot mode (0: ROM boot, 1: XIP boot)
	15	GP20/UART1_RTS	UART channel1 request to send	16	NC	-
	17	GP25	GPIO	18	HSPI_CS/GP28	Host SPI – chip select (active low)
	19	HSPI_MISO/GP29	Host SPI – master in slave out	20	HSPI_EIRQ/GP30	Host SPI – interrupt (active low)
	21	GND	Ground	22	GND	Ground

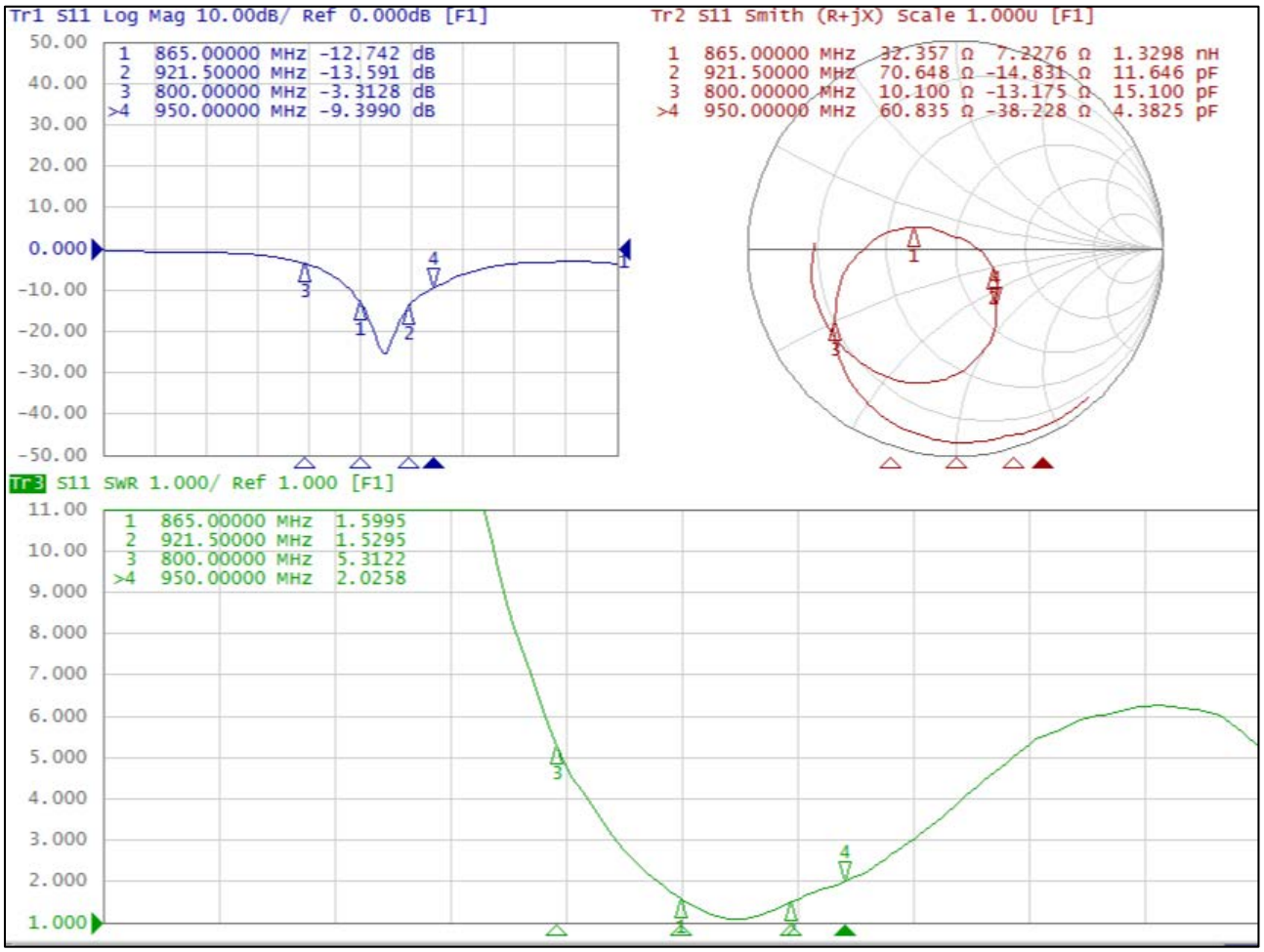
1.5 Antenna Matching



	C101	L101	C102
ANT/MODE	0.5pF	12nH	NC
SMA/MODE	1.2pF	5.6nH	NC

[Matching]

1.6 Return loss & VSWR



1.7 3D Efficiency

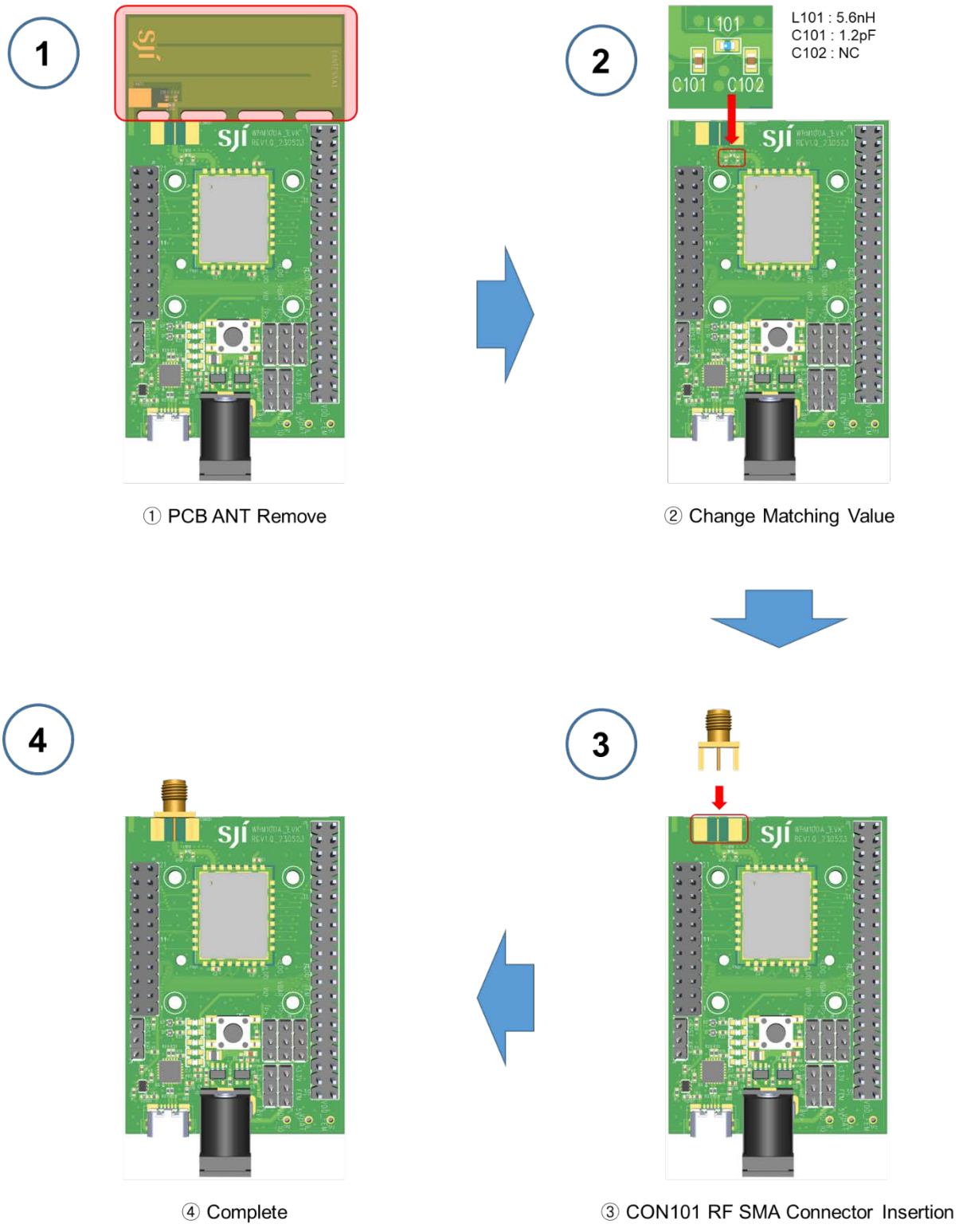
Antenna Pattern & Gain Report

Manufacturer	WIFI_HALOW_800~950MHz
Model Name	WIFI_HALOW_800~950MHz
Tester Name	Airlink
Test Date	2024-04-17 오후 2:28:29
IF BW	100 Hz
Port Power	0.00 dBm
Meas Step	15 `

Photo

Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
800.000000 MHz	30.9 %	-12.4 dBi	-6.0 dBi	-5.1 dBi	-7.3 dBi	-2.6 dBi	-1.7 dBi	Theta90/Pie90	3.38 dB
810.000000 MHz	32.1 %	-12.5 dBi	-5.8 dBi	-4.9 dBi	-7.7 dBi	-2.5 dBi	-1.7 dBi	Theta90/Pie90	3.26 dB
820.000000 MHz	41.9 %	-11.5 dBi	-4.6 dBi	-3.8 dBi	-6.7 dBi	-1.4 dBi	-0.6 dBi	Theta90/Pie90	3.19 dB
830.000000 MHz	50.5 %	-10.9 dBi	-3.7 dBi	-3.0 dBi	-5.9 dBi	-0.6 dBi	0.1 dBi	Theta105/Pie90	3.03 dB
840.000000 MHz	65.2 %	-9.8 dBi	-2.6 dBi	-1.9 dBi	-4.7 dBi	0.5 dBi	1.2 dBi	Theta105/Pie90	3.05 dB
850.000000 MHz	62.4 %	-10.0 dBi	-2.8 dBi	-2.0 dBi	-4.9 dBi	0.5 dBi	1.1 dBi	Theta105/Pie90	3.10 dB
860.000000 MHz	80.1 %	-8.9 dBi	-1.7 dBi	-1.0 dBi	-3.8 dBi	1.7 dBi	2.3 dBi	Theta60/Pie135	3.27 dB
865.000000 MHz	83.0 %	-8.7 dBi	-1.6 dBi	-0.8 dBi	-3.6 dBi	2.0 dBi	2.6 dBi	Theta60/Pie135	3.38 dB
870.000000 MHz	82.0 %	-8.7 dBi	-1.6 dBi	-0.9 dBi	-3.7 dBi	2.0 dBi	2.6 dBi	Theta60/Pie135	3.50 dB
880.000000 MHz	84.0 %	-8.5 dBi	-1.6 dBi	-0.8 dBi	-3.5 dBi	2.3 dBi	3.0 dBi	Theta60/Pie135	3.72 dB
890.000000 MHz	82.4 %	-8.4 dBi	-1.7 dBi	-0.8 dBi	-3.5 dBi	2.4 dBi	3.0 dBi	Theta60/Pie135	3.89 dB
900.000000 MHz	79.3 %	-8.3 dBi	-1.9 dBi	-1.0 dBi	-3.6 dBi	2.2 dBi	3.0 dBi	Theta60/Pie135	3.99 dB
910.000000 MHz	64.3 %	-9.0 dBi	-2.9 dBi	-1.9 dBi	-4.3 dBi	1.4 dBi	2.2 dBi	Theta75/Pie135	4.12 dB
920.000000 MHz	61.7 %	-8.9 dBi	-3.1 dBi	-2.1 dBi	-3.9 dBi	1.5 dBi	2.3 dBi	Theta75/Pie135	4.45 dB
930.000000 MHz	56.9 %	-9.1 dBi	-3.5 dBi	-2.4 dBi	-3.7 dBi	1.4 dBi	2.2 dBi	Theta75/Pie135	4.67 dB
940.000000 MHz	55.1 %	-9.2 dBi	-3.7 dBi	-2.6 dBi	-3.4 dBi	1.3 dBi	2.2 dBi	Theta75/Pie135	4.75 dB
950.000000 MHz	46.3 %	-10.0 dBi	-4.4 dBi	-3.3 dBi	-4.0 dBi	0.5 dBi	1.4 dBi	Theta75/Pie135	4.72 dB

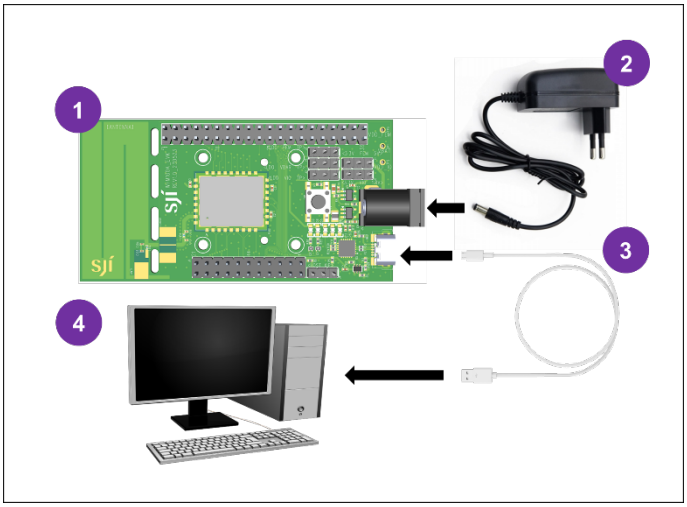
1.8 EVB Radiation → Conduction Change



2. Test Program

2.1 Evaluation board Connection

1) EVB_WHMxx0A connect to Window PC by USB cable.



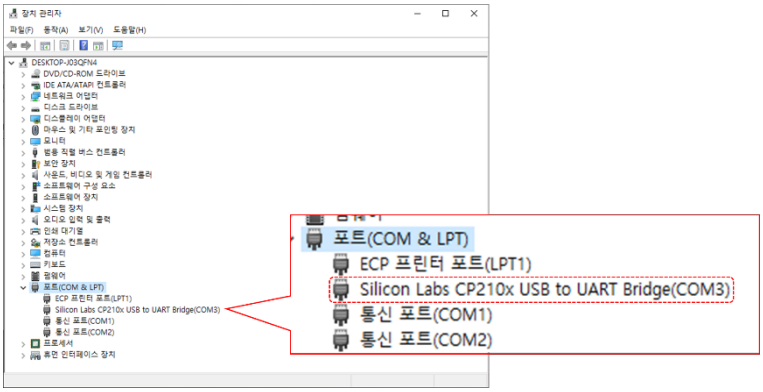
① EVB WHMxx0A
② DC Adapter (5V/2A)(∅5.5, ∅2.1)
③ Micro USB Cable
④ Window PC

[Fig. EVB_WHMxx0A connection]

2.2 Program execution

1) EVB_WHM connected serial-port in Windows PC, and then check the COM-port number in device manager.

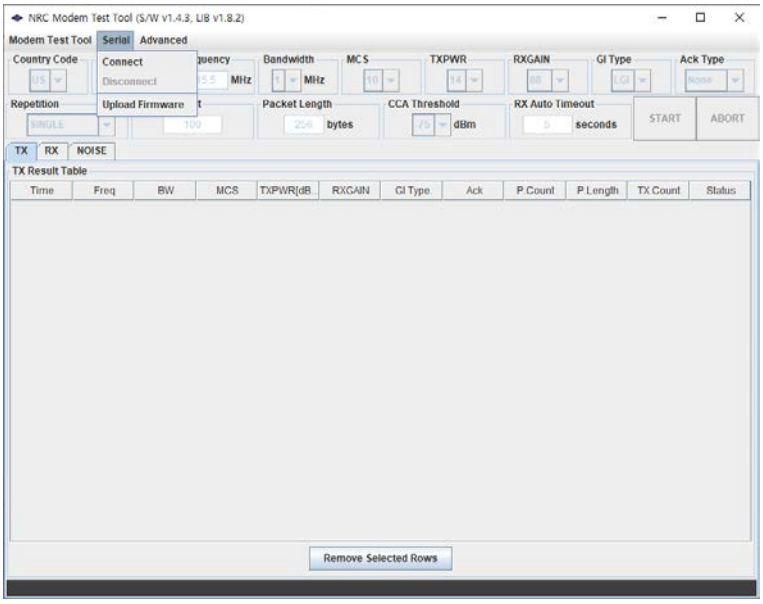
➔ Silicon Labs CP210x USB to UART Bridge(Com□□)



[Fig. EVB_WHM serial port]

2) Run serial communication program "ModemTestTool.exe"

3) ‘Serial’ – ‘Upload Firmware’ click.



[Fig. ModemTool_1]

4) Upload Firmware

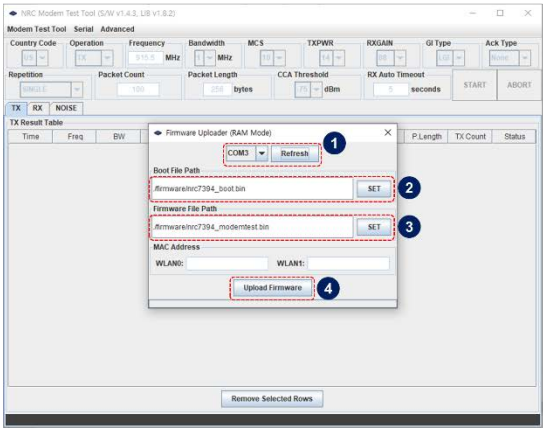
① Find Serial Port Number

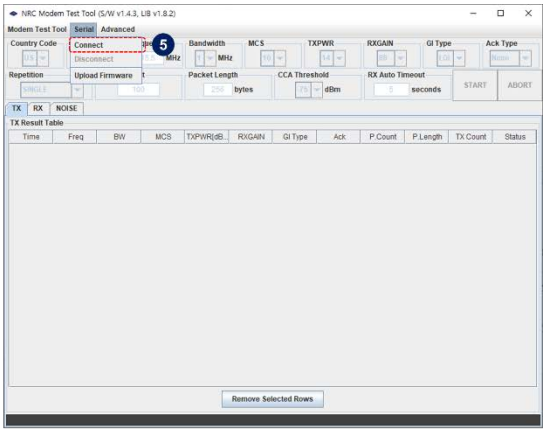
② Boot file : nrc7394_boot.bin

③ Firmware file : nrc7394_modemtest.bin

④ Firmware upload

⑤ Connect





[Fig. ModemTool_2]

5) USE Modem Tool

① Set Country Code

I. KR1 : WHM110A, WHM300A

II. US : WHM200A, WHM210A

III. JP : WHM400A

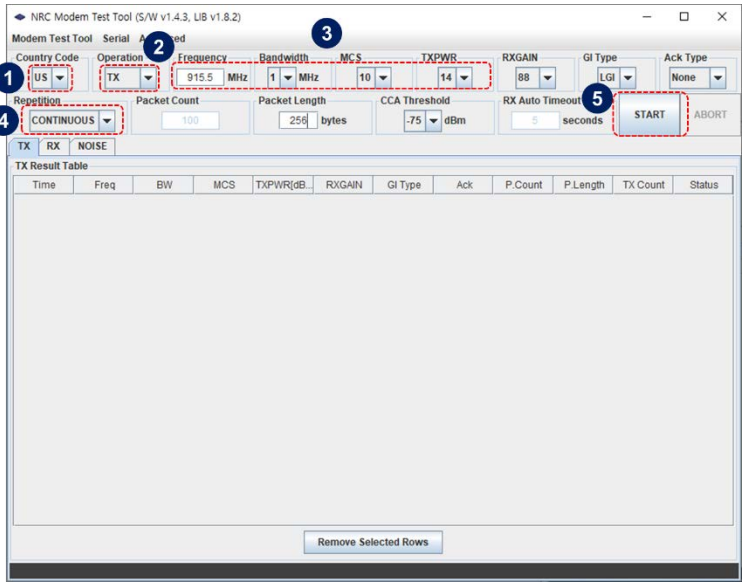
IV. EU : WHM500A

② Set TX/RX

③ Set Frequency, Bandwidth, MCS, Power

④ Set LBT

⑤ Test Start



[Fig. ModemTool_3]