

TPM541 series EVK USER GUIDE

Revision 1.4

Oct. 2020

Specifications are subject to change without notice and should not be construed as a commitment by
Sercomm Corporation

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Frequency Bands

- One SKU for all, Supported Bands are configurable (B2/3/4/5/8/12/13/20/25/26/28)
- Only Bands 2/4/12 are enabled and available for this device; all other bands are disabled via software when sold/marketed to the USA

Data

- Data rate:
Max throughput UL/DL (23dBm): UL: 375kbps/DL: 300kbps (peak)
- Protocol stack:
COAP*/IPV4/IPV6/MQTT*/HTTPS*/LWM2M
PPP/UDP/TCP/TLS/DTLS
- Firmware Download Method: UART, FOTA

Electrical Specification

- Maximum RF output power: 23 dBm (tolerance 20.3~25dBm)

Power Consumption

- PSM flow: 1.3uA@3.6V
- eDRX (81.92s): 40uA@3.6V
- I-DRX(1.28s): 1.5mA@3.6V
- Transmission (23dBm): 150mA@3.6V

Interfaces

- 3 x UART port (1 reserve for option)
- 1 x USIM port
- 1 x PCM*
- 18 x GPIO (maximum)*
- 1 x USB 2.0*
- 2 x ADC*
- 1 x I2C

*Reserved for the SKU supporting embedded MCU.

General Features

- LTE eDRX and PSM supported
- Low power consumption for longer battery life

Key Benefits

- Extremely Compact Form-Factor
- Ultra Low Power Consumption
- OpenCPU & Rich Interface Design for System on Module
- Multiple Internet Service Protocols Supported
- LTE-M and NB-IoT Dual Mode Supported
- One for All Design Supporting Multibands
- Embedded GNSS and Cellular Positioning Technology

Temperature Range:

- -40~+85°C

Supply voltage Range:

- 3.1~4.3V

Package:

- LGA, 104 pads
- Dimension: 13.4 x 14.6 x 1.85mm
- Weight: 1.0g

AT command:

- 3GPP Rel.13 LTE Cat-M1 compliant

Applications

- Utilities: Smart Metering, Smart City, Smart Grid
- Tracking: Asset, People, Pet Trackers
- Remote Monitoring: Traffic, Environmental, Agricultural

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1. Introduction

1.1. Document Purpose

The purpose of this document is to introduce TPM541 series EVK and to provide a design reference. EVK also enables users to make a prototype on TPM541 platform which resembles the actual target during the design and build phases of a project. It makes the design efforts of a user simple, cost-effective and fast. Various interfaces which is included on the board make the development board ideal for a wide variety of applications. The EVK leverages the capability of the TPM541 LTE Cat. M1 cellular module and provides access to a variety of interfaces including UART, USB, USIM.

1.2. Kit contents

- Three USB to Micro USB Cables
- TPM541 series EVK
- One SMA-type LTE Dipole Antenna
- One SMA-type GPS Antenna (except TPM541S)



Figure 1.2 Kit contents

2. EVK functions introduce

2.1. EVK Interfaces

Table 2.2 lists TPM541 series available interfaces on EVK for reference .

Interface	Note
UART0/J3	AT commands UART interface, default baud rate: 115200
UART1/J2	Console Log UART interface, default baud rate: 115200
UART2/J7	CLI/Firmware upgrade UART interface, default baud rate: 115200
USIM/J17	SIM card slot, supports 3FF, micro SIM card
JP5	UART0 to USB/external MCU switch jump.
JP2	UART1 to USB/external MCU switch jump.
JP1	UART2 to USB/external MCU switch jump.
J19	Reserved
S2	Power switch when use DC input of J1
J8/J21	RF_GNSS interface
J6/J11	RF_LTE interface
J1	5V DC input

Table 2.2 list of TPM541 series interface

3. Starting with TPM541 series EVK

3.1. Hardware preparation and setup

- Attach the included antenna to the SMA connector J21
- Plug-in the included DC adapter to DC Jack J1
- Or each UART to USB cable.
- Plug-in 3FF SIM card to J17(back side of EVK)
- Switch on S2(Power switch) to turn on the module.
- There is no need to turn on S2 while using USB cable to power up EVK

Module PWR1 LED will be lighted when power EVK successfully. After modem boot up, the three LED will be lighted.



Figure 3.1 LED status

3.2. Software preparation and setup

- Prepare and install Silicon Lab CP210X UART to USB Driver, Version 6.7
(Please access Silicon Lab website to download driver.)
- Prepare Serial Port Terminal Tool (Putty, SecureCRT, Teraterm..etc)

3.3. Starting to access EVK and TPM541

- Turn on EVK
- Connect UART0 to PC via USB cable.
- Setup Terminal tools, please refer figure 3.3
(COM port: com port will be enumerated on Windows device manager)



- Setting Baud rate for UART0: default is 115200.

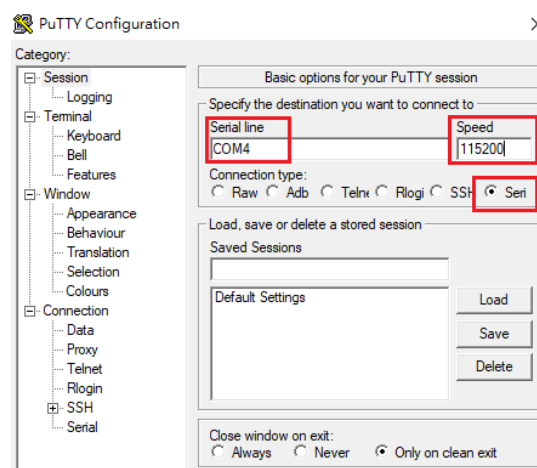
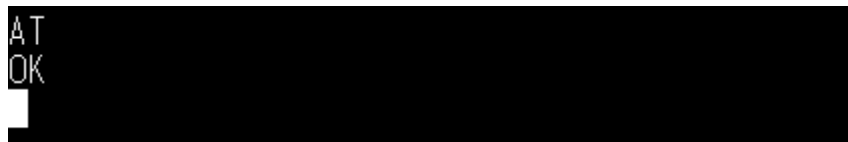


Figure 3.3 for putty setting.

- Opening terminal tools and sending **AT** command from UART.



4. Button/Jumper introduce

4.1. RECOVERY button :

This button is used to enter boot ROM mode for firmware upgrade and recovery system when device cannot boot up by some reason.

Please visit Sercomm technical support website and issue a ticket when you have problem with booting up your TPM541.

4.2. RESET button :

This button is connected to PMU_SHUTDOWN pin for initiating power cycle that resets the device or shutdowns device. (For reset function, please pull low button at least 100ms)

4.3. WAKEUP Jumper :

This jumper is connected to PMU_WAKEUP pin and is used to wakeup TPM541 while device is under power saving mode.

When there is no traffic, TPM541 will get into power saving mode immediately when remove the jumper and TPM541 cannot receive and deal any commands from host. Please plugin the jumper to wakeup module and send AT commands.

4.4. JP18 :

This jumper is usage to power by USB or DC(J1) when plugin. When user want to measure the current consumption, please remove this jumper and connect to HV_BAT&GND pin header with current meter for monitoring the current log of module.

5. LED status

5.1. Module_PWR1 LED:

For VCC status indication.

- ON: VCC is present.
- OFF: VCC is absent.
- VCC is provided by 5V to 3.3V LDO.

5.2. Module_LED1:

This LED is controlled by PMU_EXT_ALARM pin, it can be used for alarming an external host.

Output	Conditions
High	Active , LS, DS
Low	DH0, DH1 and DH2

5.3. Module_LED2:

Reserved

6. Special hardware configuration pins

6.1. SWD(JP17):

TBD

6.2. Isolation control(JP3):

3.3V to 1.8V level shift ICs(U3,U10,U11) control :

- H: Turn off level shift ICs
- L: Turn on level shift ICs

Default is connected to Low.

6.3. Debug Selection(JP12):

HW pin for EJTAG chain select :

- PD for MIPS chain.
- PU for ARM chain.

Default setting is internal PD in TPM541.

6.4. Anti Tamper(JP11): TBD

User can connect PMU_AT_OUT to PMU_AT_IN in order to protect its device or module from tampering.

Default setting is floating on EVK.

7. RF matching diagram example

LTE_ANT port is the primary (main) antenna pin and carries TX and RX signals. Connect 50 Ohm transmission lines from this pins to the 50 Ohm Primary Antenna/Antenna-connector. Figure 7.1 shows the connection between LTE_ANT port and the antenna connectors please also follow up matching network to fine tune antenna matching.

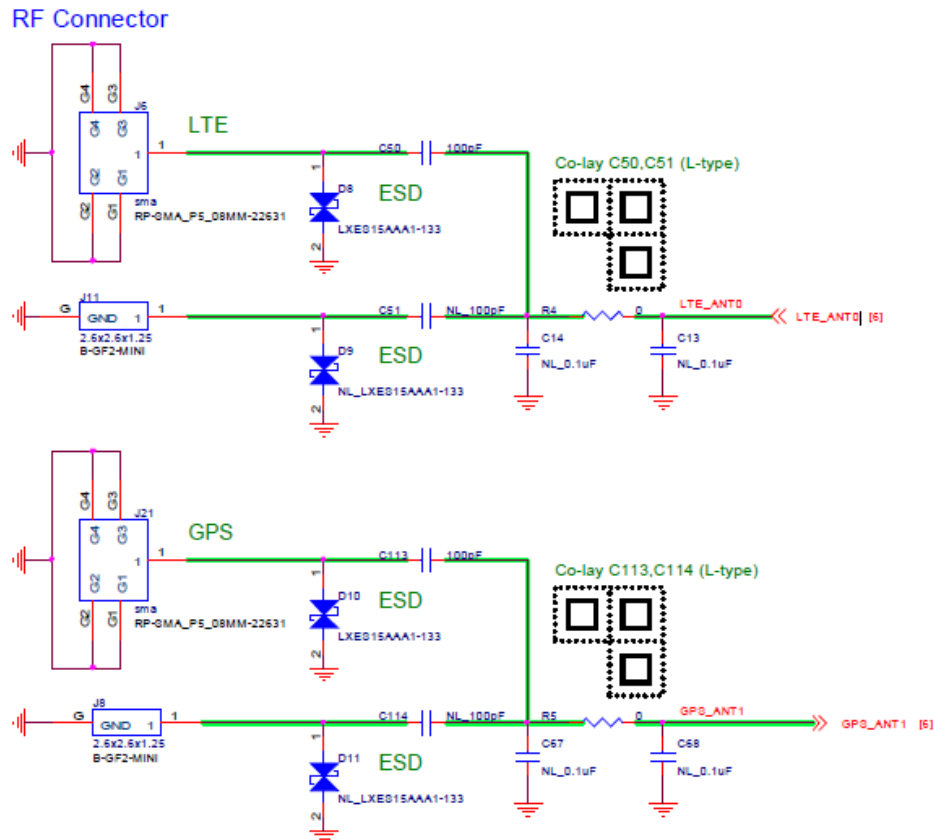


Figure 7.1 RF matching typical circuit.

8. Firmware Upgrade

Please access <https://supportiot.sercomm.com/> to download and install PC Tools for local firmware upgrade. And you will find **ImageBurnTool** in program after finish installation.

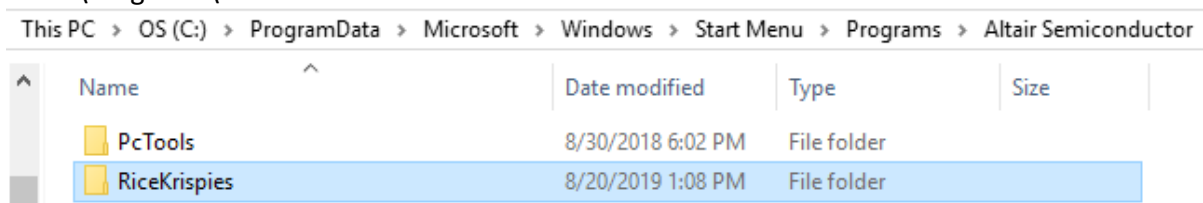
ImageBurnTool is used for local firmware upgrade via UART_2

In the mean time, please also download images that have two parts need to be installed in your PC/Laptop.

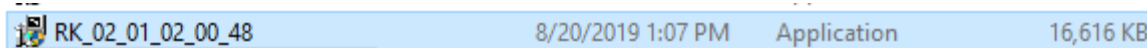
- RK_02_01_02_00_xx
- TPM540G_05.00x

8.1. Install RK firmware image

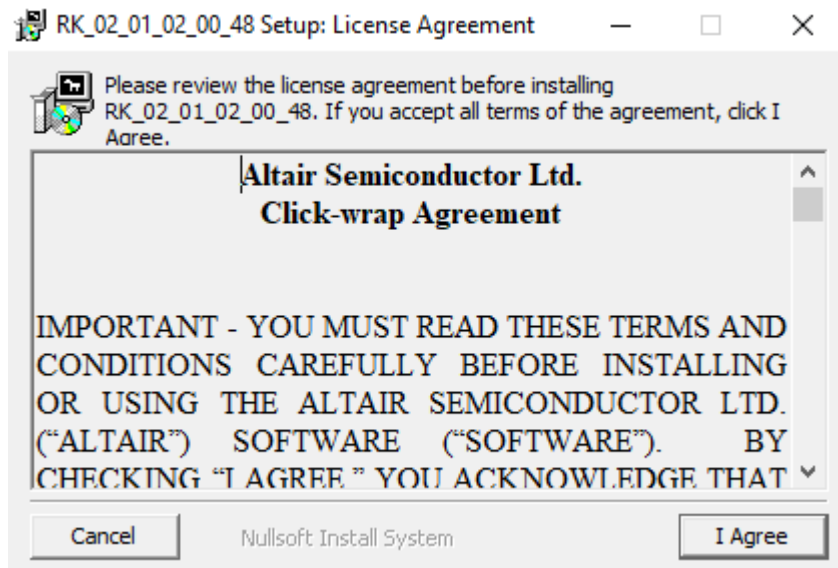
1. Please create folder **"RiceKrispies"** under C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Altair Semiconductor



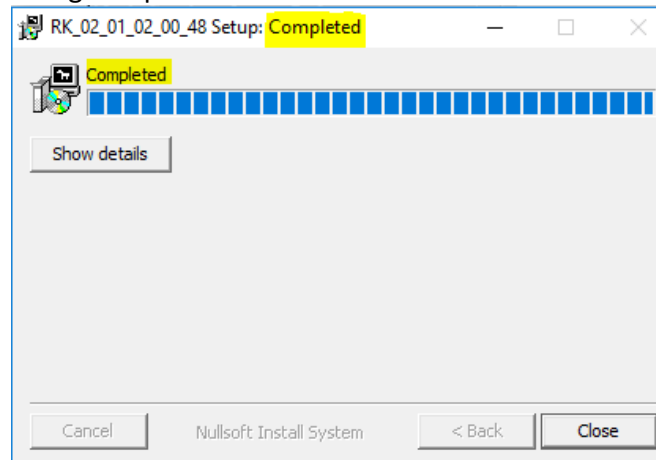
2. Install RK_02_01_02_xx which downloaded from Sercomm support IOT website



3. Click Agree button.



4. Click Close after installing completed



5. Unzip Sercomm firmware image “TPM540G_05.00x.zip” that downloaded from Sercomm support IoT website.

Name	Date modified	Type	Size
AppFW_flash.bin	7/31/2019 5:40 PM	BIN File	3,660 KB
ConfigFS.bin	7/31/2019 5:40 PM	BIN File	512 KB
partmap.bin	7/31/2019 5:40 PM	BIN File	4 KB
sysHeader.bin.alt1250	7/31/2019 5:40 PM	ALT1250 File	4 KB
sysHeader_backup.bin.alt1250	7/31/2019 5:40 PM	ALT1250 File	1 KB
u-boot.bin	7/31/2019 5:40 PM	BIN File	380 KB
ue_lte.fw	7/31/2019 5:40 PM	FW File	3,671 KB
ue_lte.fw2	7/31/2019 5:40 PM	FW2 File	2,730 KB

6. COPY all files and replace files under folder path: C:\Program Files (x86)\Altair Semiconductor\RiceKrispies\RK_02_01_02_00_XX\Images

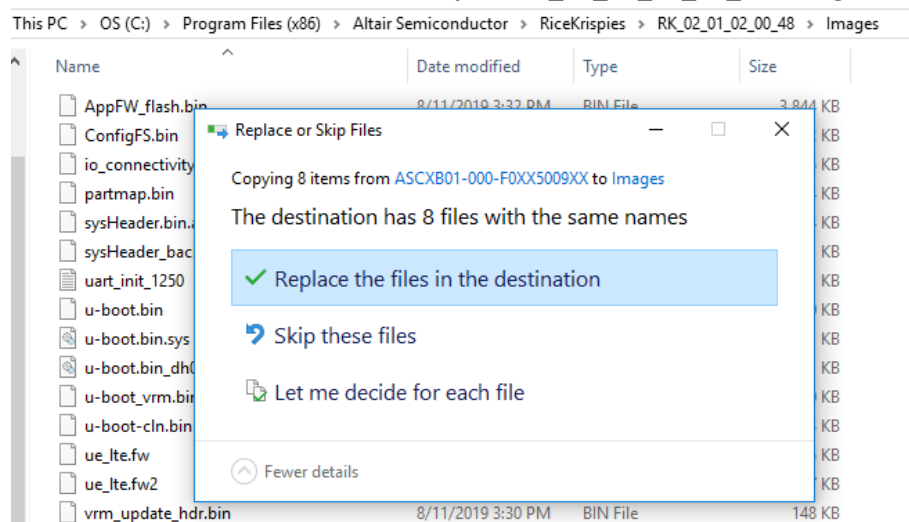
Note :

a).For 64bit windows OS, the folder path is

“C:\Program Files (x86)\Altair Semiconductor\RiceKrispies\RK_02_01_02_00_XX\Images”

b).For 32bit windows OS, the folder path is

“C:\Program Files\Altair Semiconductor\RiceKrispies\RK_02_01_02_00_XX\Images”



Now, all the necessary firmware images are installed well in your PC/Laptop.

8.2. Environment setup

Local upgrade is flashed the firmware through local UART_2 port.

Please follow this instruction step by step to setup your environment for upgrade.

8.2.1. Open your UART_0 with terminal tools.

- Turn on EVK
- Connect UART_0 to PC via USB cable.
- Setup Terminal tools, please refer figure 7.2.1. COM port: com port will be enumerated on Windows device manager



- Setting Baud rate for UART0: default is 115200.

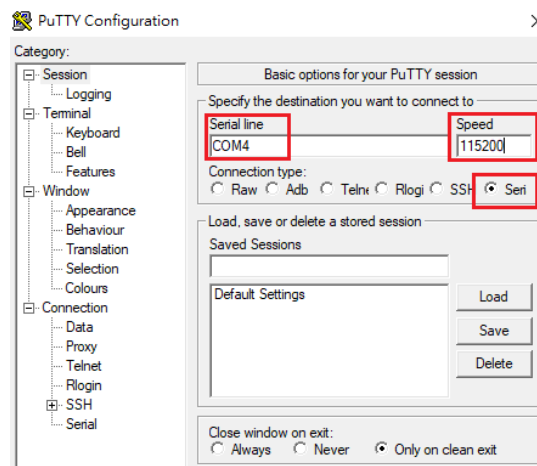


Figure 7.2.1 for putty setting

8.2.2. Setup BootDelay time to 10s

Before we start to upgrade firmware, TPM541 need to be configured the boot delay time to 10s by sending AT%SETBDelay=10 through AT port(UART_0) to make sure Image Burn Tool has enough time to put TPM541 into UBOOT mode for firmware upgrade.

```
at
OK
at%setbdelay=10
OK
```

8.2.3. Connect UART_2 to PC

UART_2 is also used to upgrade TPM541 firmware, be sure UART_2 is connected well with USB cable between PC and EVK.

8.2.4. Enter U-BOOT mode

- TPM541 series firmware upgrade need to be executed under u-boot mode. So user shall login UART2 to interrupt boot-up procedure and force TPM541 into u-boot mode for flashing image. After reboot the modem, the modem boot delay will be 10sec. Please process the steps as below.

- b. After power to the module. User need to **“Hit any key to stop autoboot”** within 10s and you will see “#” prompt that means TPM541 is successfully into U-BOOT mode.

```
U-Boot 2012.10-svn148 (Aug 07 2019 - 20:01:55)

Board: ALT1250 Ver: 0.32-TG-D0 (PMP CPU Speed 120 MHz)
DRAM: 2.5 MiB
Now running in RAM - U-Boot at: 902a8000
Boot mode 3
Flash Manufacturer/Device ID is: 0xc86018
Enable QUAD mode
Flash: 16 MiB
map import OK
In: serial
Out: serial
Err: serial
Configuring Flash Write Protection (offset 0x1e00)
new_cs_val = 0x2a0001f0
Hit any key to stop autoboot: 1
map import OK
In: serial
Out: serial
Err: serial
Configuring Flash Write Protection (offset 0x1e00)
Hit any key to stop autoboot: 0
#
#
#
```

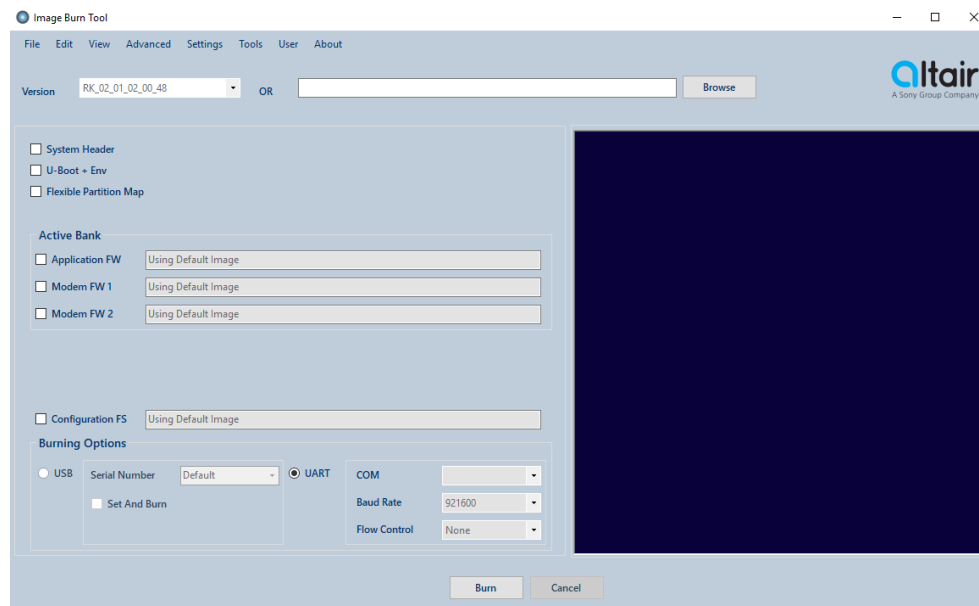
Before starting flashing image, User need to disconnect the connection between UART2 and terminal tool.

8.3. Firmware upgrade with ImageBurnTool

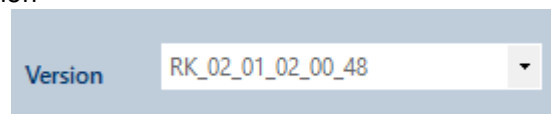
This chapter is introduced how to setup configuration of ImageBurnTool. ImageBurnTool is used to upgrade your TPM541 through UART_2, please make sure all steps are done.

8.3.1. Setup “ImageBurnTool”

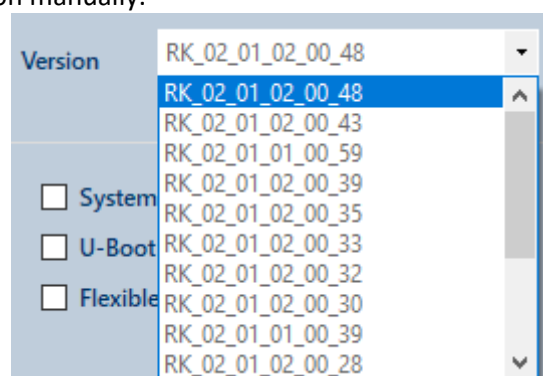
- a. Execute C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Altair Semiconductor\PcTools\ImageBurnTool.exe



- b. If you already have installed RK image well, ImageBurnTool will detect latest RK image automatically in “Version”



- c. Please go through all steps of chapter 7.1 again if tool cannot detect firmware version. Or you can select the version manually.



Then you need to select images that need to be upgraded.

Here we recommend to upgrade all parts **EXCEPT “Configuration FS”**.

Be Caution, to upgrade “Configuration FS” that will cause all calibration data are erased after firmware upgrade.

- d. Please select “System Header, U-Boot+Env and Flexible Partition Map”, above three images would be auto select, once your click any of each.
And Application FW, Modem FW1 and Modem FW2 SHALL be selected as well, Modem FW1 is used for CAT-M1 firmware and Modem FW2 is for NB-IoT.

System Header
U-Boot + Env
Flexible Partition Map

Active Bank

Application FW Using Default Image
Modem FW 1 Using Default Image
Modem FW 2 Using Default Image

Configuration FS Using Default Image

Warning, DO NOT select Configuration FS, in case the calibration data will be erased after firmware upgrade.

8.3.2. Setup “Burn Options”

Currently TPM541 series only supports Firmware upgrade through UART, USB hasn't supported yet. Please select COM NO. With UART_2 and also enable Flow Control with RTS_CTS.

Burning Options

USB Serial Number Default Set And Burn

UART COM COM163 Baud Rate 921600 Flow Control RTS_CTS

Burn

8.3.3. Start to upgrade firmware

- Click “Burn” to start firmware upgrade

Burning Options

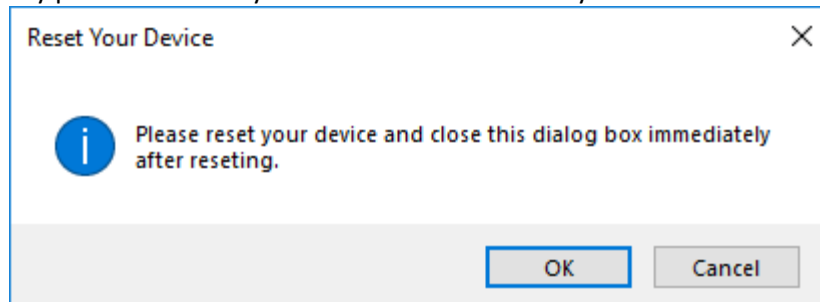
USB Serial Number Default Set And Burn

UART COM COM163 Baud Rate 921600 Flow Control RTS_CTS

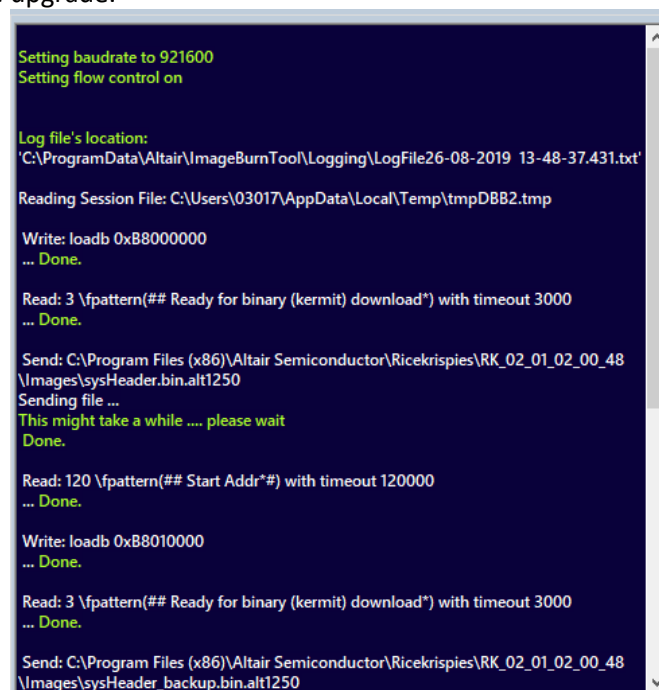
Burn

- After click “Burn”, ImageBurnTool will pop-out tip to inform user to reset TPM541.

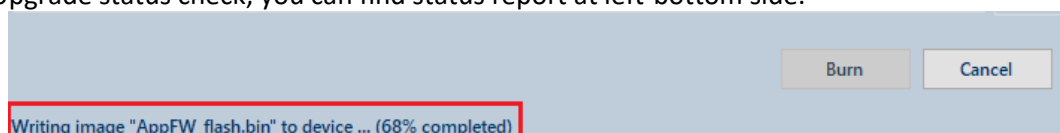
Please reset EVK by push "RESET" key and close box immediately



c. Starting firmware upgrade.



d. Upgrade status check, you can find status report at left-bottom side.



- e. TPM541 will reboot automatically after upgrade complete, and it will take around 3mins to do configuration. Please check AT commands response in UART_0 COM port.

```
Write: loadb modem_fw2
... Done.

Read: 3 \fpattern(## Ready for binary (kermit) download*) with timeout 3000
... Done.

Send: C:\Program Files (x86)\Altair Semiconductor\Ricekrispies\RK_02_01_02_00_48
\Images\ue_lte.fw2
Sending file ...
This might take a while .... please wait
Done.

Read: 120 \fpattern(## Start Addr*#) with timeout 120000
... Done.

--- Second phase completed ---

SUCCESS:
The burning process completed successfully

***** Complete *****

Resetting device ...
```

9. Message view and Debug view usage

This chapter is introduced how to use message and debug view to investigate and collect log from TPM541. The message view is used for monitoring the Network message and debug view is used to collect TPM541 modem log for Sercomm debug.

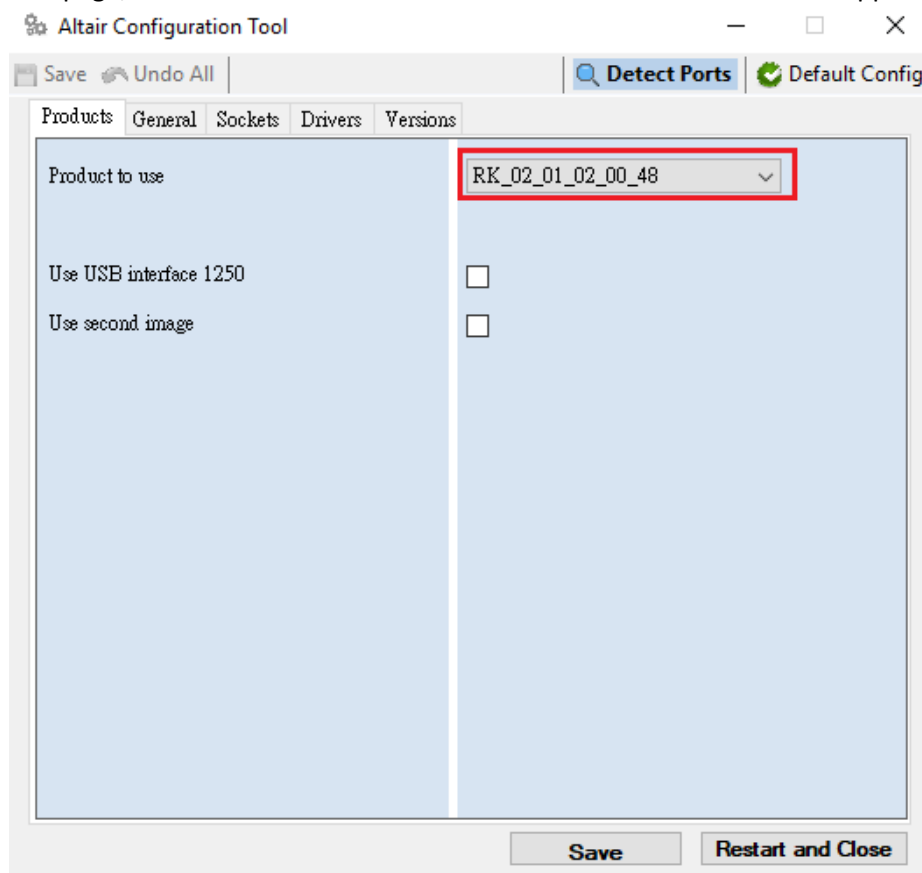
Before starting to use message and debug view, user need to setup "Configuration Tool" by follow instruction step by step. And both tools are using UART_1 for collecting logs.

9.1. Configuration Tool Setup

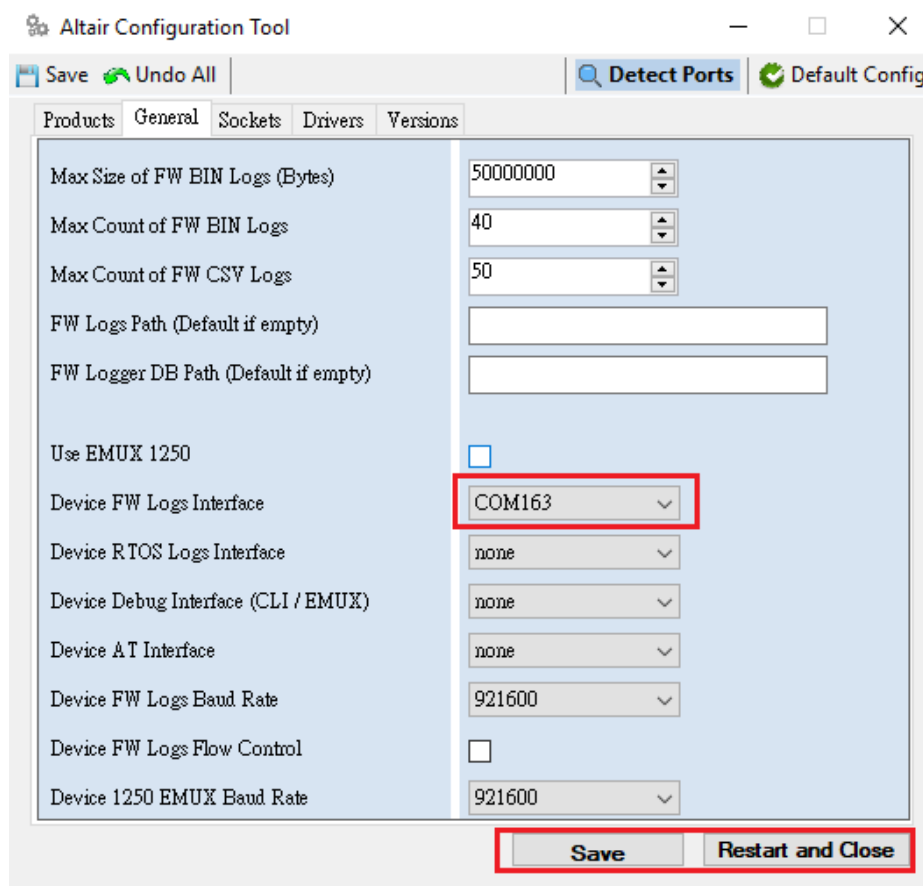
Please connect UART_1 port via USB cable between TPM541 EVK and PC well.

Execute "C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Altair Semiconductor\PcTools\Configuration Tool.exe

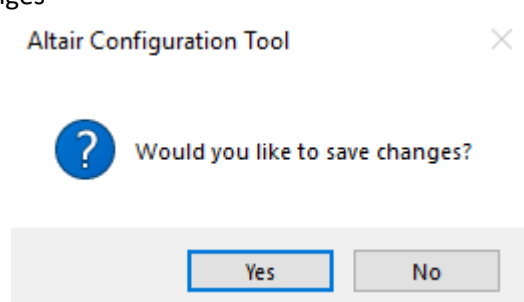
- a. In Products page, select correct RK version that downloaded from Sercomm supportIoT website.



- b. In General Page, select UART_1 COM port NO, Click “SAVE” button then clicking “Restart and Close”



- c. Click “Yes” to save changes



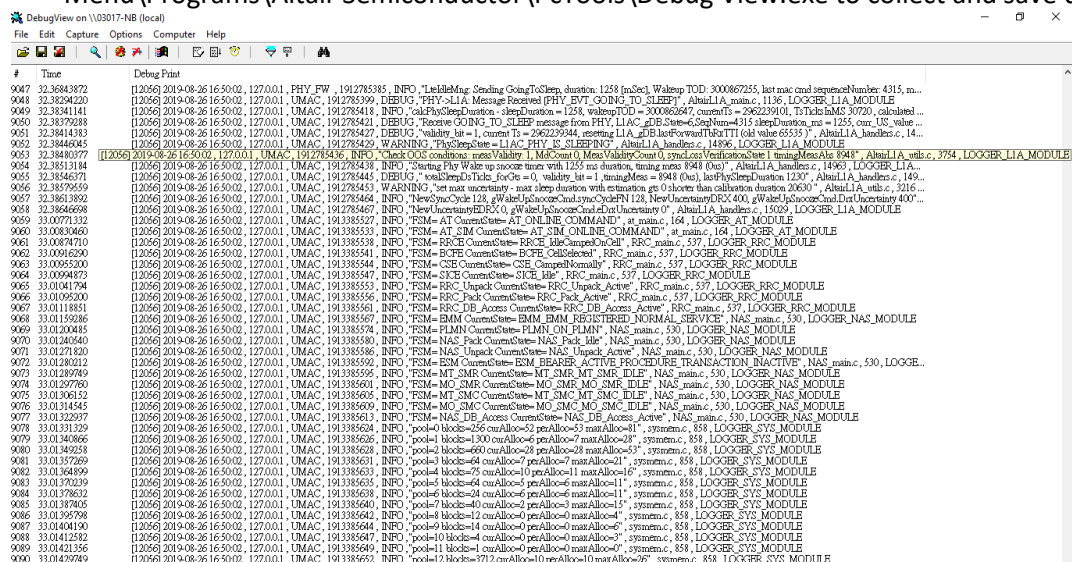
9.2. Debug view

a. Please execute the clear all session file first

"C:\Program Files (x86)\Altair Semiconductor\PcTools\RemoveDebugData\RemoveDebugData.exe"
to make sure that the logs is latest and press "Y" for processing.

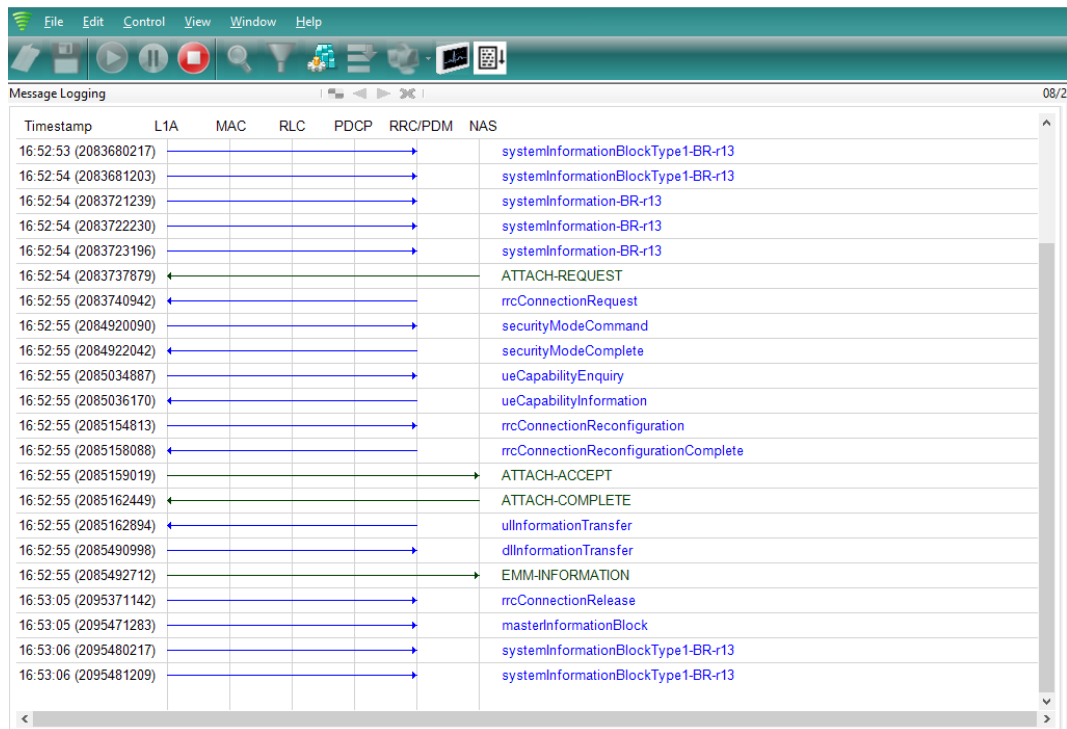


- b. After setting up configuration tool, user can execute "C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Altair Semiconductor\PcTools\Debug View.exe to collect and save debug log.



9.3. Message view

After setting up configuration tool, user can execute "C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Altair Semiconductor\PcTools\Msg View.exe to collect and save message log.



Timestamp	L1A	MAC	RLC	PDCP	RRC/PDM	NAS
16:52:53 (2083680217)						systemInformationBlockType1-BR-r13
16:52:54 (2083681203)						systemInformationBlockType1-BR-r13
16:52:54 (2083721239)						systemInformation-BR-r13
16:52:54 (2083722230)						systemInformation-BR-r13
16:52:54 (2083723196)						systemInformation-BR-r13
16:52:54 (2083737879)						ATTACH-REQUEST
16:52:55 (2083740942)						rrcConnectionRequest
16:52:55 (2084920090)						securityModeCommand
16:52:55 (2084922042)						securityModeComplete
16:52:55 (2085034887)						ueCapabilityEnquiry
16:52:55 (2085036170)						ueCapabilityInformation
16:52:55 (2085154813)						rrcConnectionReconfiguration
16:52:55 (2085158088)						rrcConnectionReconfigurationComplete
16:52:55 (2085159019)						ATTACH-ACCEPT
16:52:55 (2085162449)						ATTACH-COMplete
16:52:55 (2085162894)						ullInformationTransfer
16:52:55 (2085490998)						dllInformationTransfer
16:52:55 (2085492712)						EMM-INFORMATION
16:53:05 (2095371142)						rrcConnectionRelease
16:53:05 (2095471283)						masterInformationBlock
16:53:06 (2095480217)						systemInformationBlockType1-BR-r13
16:53:06 (2095481209)						systemInformationBlockType1-BR-r13

9.4. WiresharkMSGview

9.4.1. Install Python and Wireshark tool

WiresharkMSGview tool can be used to collect packets with the installed Wireshark tool on the user's PC.

Before executing WiresharkMSGview, the user needs to install Python and Wireshark tools on the PC.

For Python, the user can access the website below to download Python 2.7 version.

<https://www.python.org/downloads/release/python-2716/>

9.4.2. Enable Wireshark configuration by sending AT command

- After installing Python and Wireshark, the user needs to enable TPM541 All2msgv configuration by sending the AT command `at%exe="config -s modem_apps.LteSniff.All2msgv 1"` via UART_0 port.

```
at%exe="config -s modem_apps.LteSniff.All2msgv 1"
Done

OK
atz
OK
```

- Then performing ATZ to restart TPM541 to enable All2msgv configuration.

9.4.3. Execute AltairWiresharkMSGview

User can execute following path to run program.

C:\Program Files (x86)\Altair Semiconductor\PcTools\AltairPyTools\AltairWiresharkMsgview

No.	Time	TTI	TimeStampTs	Source	Destination	Length	Protocol	CID	Info
21	17:14:55.089000	4229	877055319	4.4.4.4	4.4.4.4	63	LTE RRC UL_DCCH/NAS-EPS		RRCConnectionSetupCompl
22	17:14:55.168000	4272	877099026	7.7.7.7	7.7.7.7	63	LTE RRC DL_DCCH		SecurityModeCommand
23	17:14:55.230000	4274	877100964	4.4.4.4	4.4.4.4	58	LTE RRC UL_DCCH		SecurityModeComplete
24	17:14:55.293000	4336	877163034	7.7.7.7	7.7.7.7	85	LTE RRC DL_DCCH		RRCConnectionReconfigur
25	17:14:55.496000	4339	877166080	4.4.4.4	4.4.4.4	58	LTE RRC UL_DCCH		RRCConnectionReconfigur
26	17:14:55.589000	4853	877680138	8.8.8.8	10.59.62...	136	ICMP		1 Echo (ping) reply id
27	17:15:05.556000	4850	887917315	7.7.7.7	7.7.7.7	58	LTE RRC DL_DCCH		RRCConnectionRelease [c
28	17:15:06.556000	4941	888006451	7.7.7.7	7.7.7.7	59	LTE RRC BCCH_BCH		MasterInformationBlock
29	17:15:06.869000	4949	888015378	7.7.7.7	7.7.7.7	153	LTE RRC DL_SCH_BR		SystemInformationBlockT
30	17:15:07.118000	4951	888016525	7.7.7.7	7.7.7.7	153	LTE RRC DL_SCH_BR		SystemInformationBlockT
31	17:15:24.490000	3224	906943843	10.59.62...	8.8.8.8	109	DNS		1 Standard query 0x5db4 A
32	17:15:24.552000	3224	906944748	4.4.4.4	4.4.4.4	52	NAS-EPS		Service request
33	17:15:24.755000	3224	906947629	4.4.4.4	4.4.4.4	62	LTE RRC UL_CCCH		RRCConnectionRequest
34	17:15:24.834000	3436	906982888	7.7.7.7	7.7.7.7	105	LTE RRC DL_CCCH		RRCConnectionSetup
35	17:15:25.036000	3440	906986217	4.4.4.4	4.4.4.4	63	LTE RRC UL_DCCH/NAS-EPS		RRCConnectionSetupCompl
36	17:15:25.099000	3499	907046057	7.7.7.7	7.7.7.7	63	LTE RRC DL_DCCH		SecurityModeCommand
37	17:15:25.162000	3501	907048010	4.4.4.4	4.4.4.4	58	LTE RRC UL_DCCH		SecurityModeComplete
38	17:15:25.224000	3536	907083057	7.7.7.7	7.7.7.7	85	LTE RRC DL_DCCH		RRCConnectionReconfigur
39	17:15:25.412000	3539	907086083	4.4.4.4	4.4.4.4	58	LTE RRC UL_DCCH		RRCConnectionReconfigur
40	17:15:25.505000	3985	907532166	8.8.8.8	10.59.62...	141	DNS		1 Standard query response
41	17:15:25.568000	3987	907533966	10.59.62...	104.28.1...	96	TCP		1 64656 → 80 [SYN] Seq=0
42	17:15:25.771000	4609	908156211	104.28.18...	10.59.62...	96	TCP		1 80 → 64656 [SYN, ACK] S
43	17:15:25.833000	4610	908157036	10.59.62...	104.28.1...	92	TCP		1 64656 → 80 [ACK] Seq=1
44	17:15:25.896000	4611	908157869	10.59.62...	104.28.1...	146	HTTP		1 GET /json HTTP/1.1
45	17:15:26.146000	4993	908540146	104.28.18...	10.59.62...	92	TCP		1 80 → 64656 [ACK] Seq=1
46	17:15:26.568000	5441	908988053	104.28.18...	10.59.62...	635	HTTP		1 HTTP/1.1 200 OK (appli
47	17:15:26.646000	5487	909033898	10.59.62...	104.28.1...	92	TCP		1 64656 → 80 [ACK] Seq=55
48	17:15:36.970000	5561	919348304	7.7.7.7	7.7.7.7	58	LTE RRC DL_DCCH		RRCConnectionRelease [c
49	17:15:38.001000	5671	919456486	7.7.7.7	7.7.7.7	59	LTE RRC BCCH_BCH		MasterInformationBlock
50	17:15:38.313000	5679	919465393	7.7.7.7	7.7.7.7	153	LTE RRC DL_SCH_BR		SystemInformationBlockT
51	17:15:38.532000	5681	919466517	7.7.7.7	7.7.7.7	153	LTE RRC DL_SCH_BR		SystemInformationBlockT
52	17:15:56.544000	4504	938989196	10.59.62...	104.28.1...	92	TCP		1 64656 → 80 [FIN, ACK] S

9.5. Collect Logs of modem

It is the modem logs of Altair format. User can capture the logs via UATR2 and provide the files to SERCOMM AE for analysis.

Note :

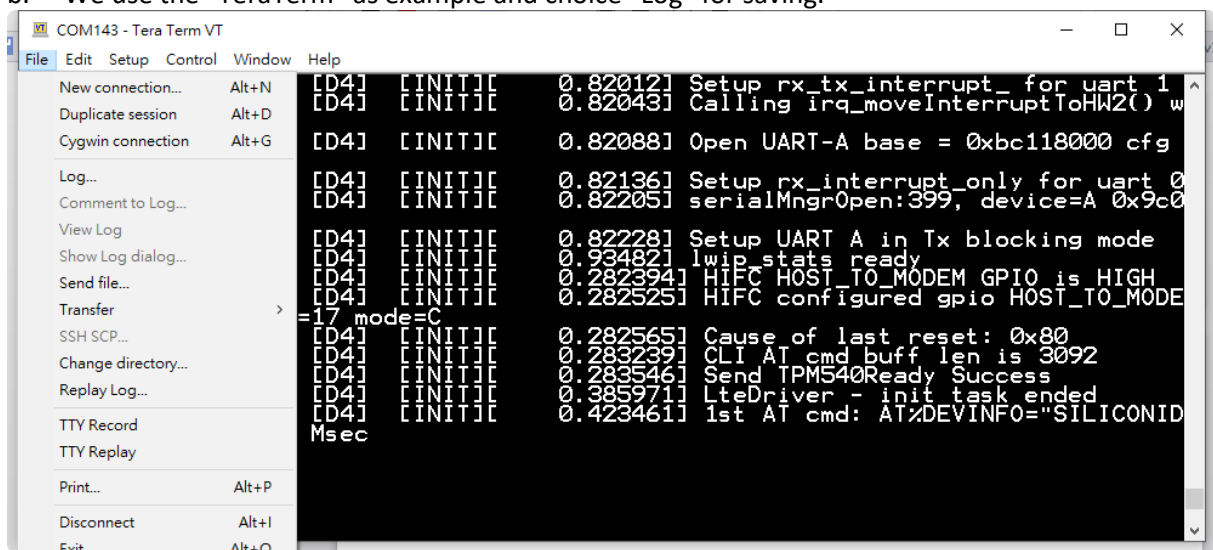
- The logs should start at modem boot-up to the end of test and save it. You can press "ENTER" bottom and get ">" symbol to make sure that the modem is work.

```

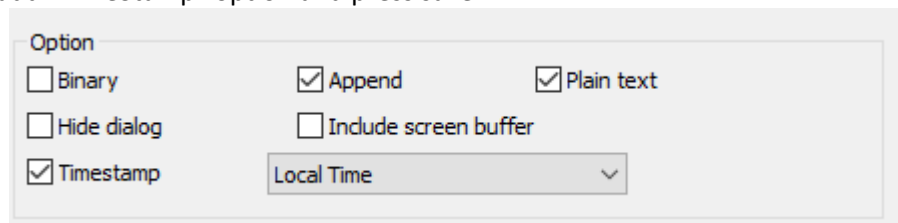
COM143 - Tera Term VT
File Edit Setup Control Window Help
Mar 03 00:28:32.050 [D4] [INIT][ 0.82012] Setup rx_tx_interrupt_for uart 1
Mar 03 00:28:32.050 [D4] [INIT][ 0.82043] Calling irq_moveInterruptToHW2() w
ith uart id=1
Mar 03 00:28:32.050 [D4] [INIT][ 0.82088] Open UART-A base = 0xbc118000 cfg
=0x0 intrp=72
Mar 03 00:28:32.050 [D4] [INIT][ 0.82136] Setup rx_interrupt_only for uart 0
Mar 03 00:28:32.050 [D4] [INIT][ 0.82205] serialMngrOpen:399, device=A 0x9c0
bld0
Mar 03 00:28:32.050 [D4] [INIT][ 0.82228] Setup UART A in Tx blocking mode
Mar 03 00:28:32.061 [D4] [INIT][ 0.93482] lwip_stats ready
Mar 03 00:28:32.250 [D4] [INIT][ 0.282394] HIFC HOST_TO_MODEM GPIO is HIGH
Mar 03 00:28:32.250 [D4] [INIT][ 0.282525] HIFC configured gpio HOST_TO_MODE
M=61, MODEM TO HOST=17 mode=C
Mar 03 00:28:32.250 [D4] [INIT][ 0.282565] Cause of last reset: 0x80
Mar 03 00:28:32.251 [D4] [INIT][ 0.283239] CLI AT cmd buff len is 3092
Mar 03 00:28:32.251 [D4] [INIT][ 0.283546] Send TPM540Ready Success
Mar 03 00:28:32.354 [D4] [INIT][ 0.385971] LteDriver - init task ended
Mar 03 00:28:32.391 [D4] [INIT][ 0.423461] 1st AT cmd: AT+DEVIDF0="SILICONID
" - sent/rcv -> 0/0 Msec
>
>

```

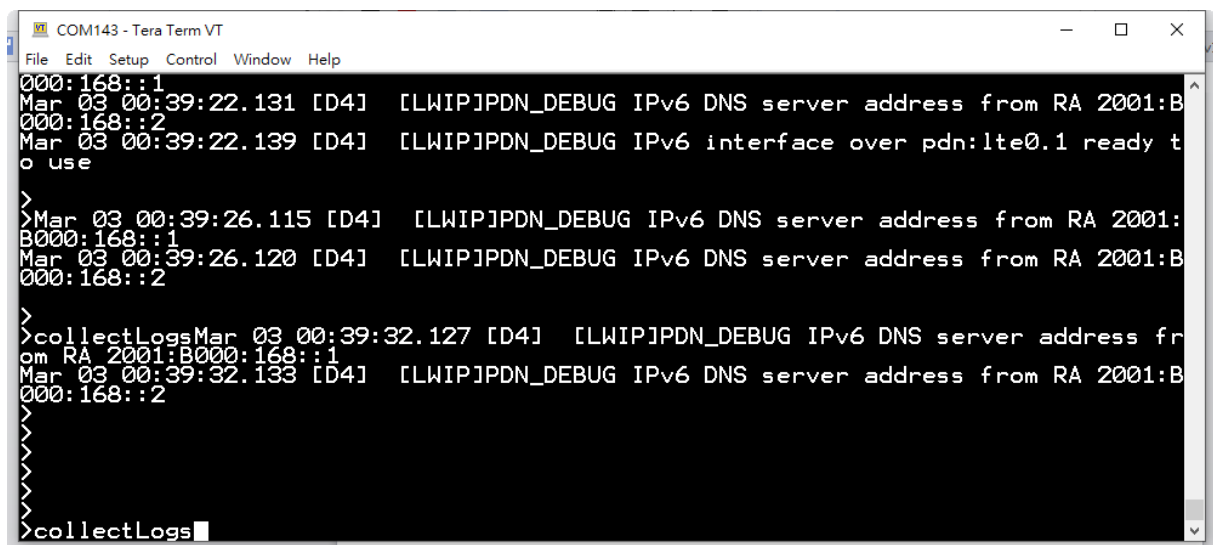
- b. We use the “TeraTerm” as example and choice “Log” for saving.



- c. Please add “TimeStamp” option and press save.



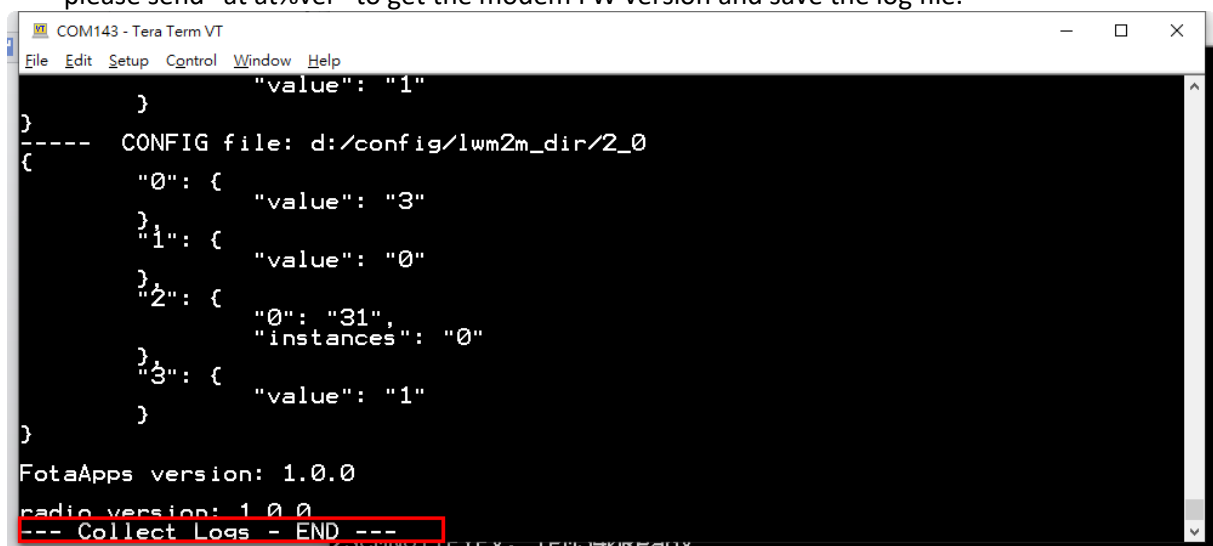
- d. Please send “collectLogs” to do the logs capturing.



```

COM143 - Tera Term VT
File Edit Setup Control Window Help
000:168::1
Mar 03 00:39:22.131 [D4] [LWIP]PDN_DEBUG IPv6 DNS server address from RA 2001:B
000:168::2
Mar 03 00:39:22.139 [D4] [LWIP]PDN_DEBUG IPv6 interface over pdn:lte0.1 ready t
o use
>
>Mar 03 00:39:26.115 [D4] [LWIP]PDN_DEBUG IPv6 DNS server address from RA 2001:
B000:168::1
Mar 03 00:39:26.120 [D4] [LWIP]PDN_DEBUG IPv6 DNS server address from RA 2001:B
000:168::2
>
>collectLogsMar 03 00:39:32.127 [D4] [LWIP]PDN_DEBUG IPv6 DNS server address fr
om RA 2001:B000:168::1
Mar 03 00:39:32.133 [D4] [LWIP]PDN_DEBUG IPv6 DNS server address from RA 2001:B
000:168::2
>
>
>
>
>collectLogs
  
```

- e. When the processed done, you will can get the “=== Collect Logs - END ===” string. Finally, please send “at+at%ver” to get the modem FW version and save the log file.

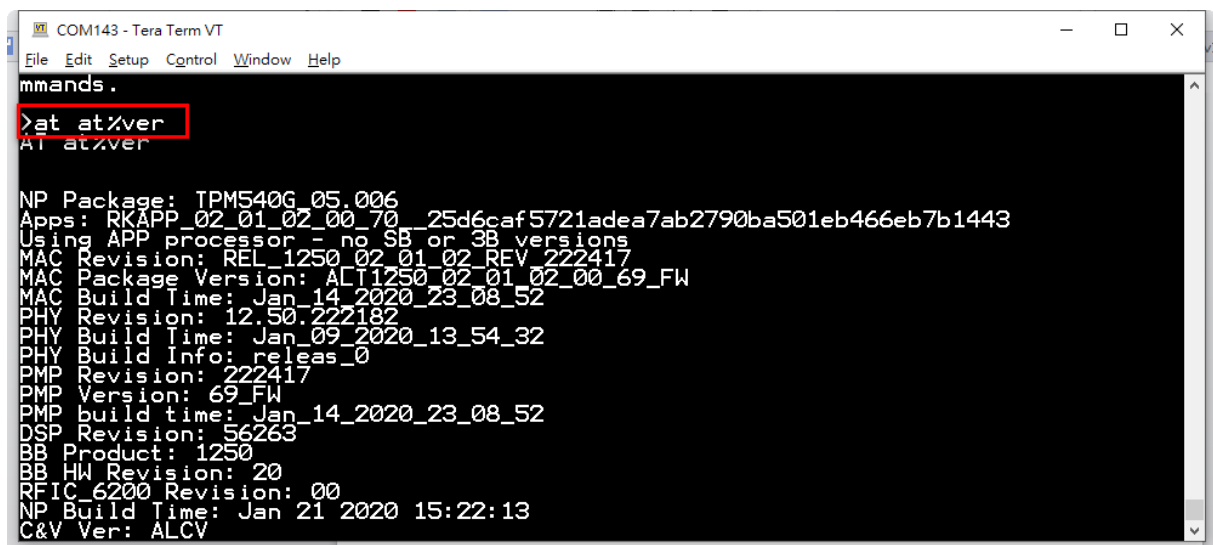


```

COM143 - Tera Term VT
File Edit Setup Control Window Help
    "value": "1"
}
}
---- CONFIG file: d:/config/lwm2m_dir/2_0
{
  "0": {
    "value": "3"
  }
  "1": {
    "value": "0"
  }
  "2": {
    "0": "31",
    "instances": "0"
  }
  "3": {
    "value": "1"
  }
}
}
FotaApps version: 1.0.0
radio version: 1 0 0
--- Collect Logs - END ---
%SCN0141EV: TPM340ready
  
```

TPM541 series

Cat-M1/NB Module



```
COM143 - Tera Term VT
File Edit Setup Control Window Help
mmands.
>at+at%ver
AT+at%ver

NP Package: TPM540G_05_006
Apps: RKAPP_02_01_02_00_70_25d6caf5721adea7ab2790ba501eb466eb7b1443
Using APP processor - no SB or 3B versions
MAC Revision: REL_1250_02_01_02_REV_222417
MAC Package Version: ALI1250_02_01_02_00_69_FW
MAC Build Time: Jan_14_2020_23_08_52
PHY Revision: 12.50.222182
PHY Build Time: Jan_09_2020_13_54_32
PHY Build Info: releas_0
PMP Revision: 222417
PMP Version: 69_FW
PMP build time: Jan_14_2020_23_08_52
DSP Revision: 56263
BB Product: 1250
BB HW Revision: 20
RFIC_6200 Revision: 00
NP Build Time: Jan 21 2020 15:22:13
C&V Ver: ALCV
```

Federal Communication Commission Interference Statement

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.

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 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.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter is certified under the standalone operation condition and may not be installed to co-transmission with other transmitter without separate reassessment. It is OEM/Host manufacturer's responsibility to conduct a separate compliance reevaluation for confirming that final system continuously complies with the applicable FCC rules under that circumstance.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This module is intended for OEM integrators only. Per FCC KDB 996369 D03 OEM Manual v01 guidance, the following conditions must be strictly followed when using this certified module:

This module has been tested for compliance to FCC Part 24, 27.

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) or being used in a portable condition will need a separate reassessment through a class II permissive change application or new certification.

Any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

The antenna must be installed such that 20 cm can be maintained between the antenna and users, and the maximum antenna gain allowed for use with this device is 1.7dBi for band 2 and 4, 1.2dBi for band 12. Only dipole antenna can be used for this device.

The final end product must be labeled in a visible area with the following: "Contains FCC ID: P27-TPM541". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule

requirements if applicable.

As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.