MTI RFID ME User Manual

Version 1.2

Dec 09, 2011

MICROELECTRONICS TECHNOLOGY INC.

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 must not be co-located or operating in conjunction with any other antenna or transmitter.

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 device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 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 can not 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 can not 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.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: MAD-RU-827”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

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.

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1. Getting Started

1.1. Introduction

This manual provides you with the information needed to install and operate the MTI RFID ME. A description on how to install the MTI RFID ME is provided in Section 2. Section 3, presents information on how to configure the MTI RFID ME to read and write tags and discusses advanced RFID configuration settings. Section 4 describes how to read tags (scanning and inventory runs). Section 5 presents information on Advanced Tag Settings including changing EPC, Kill, Lock and advanced feature settings.

1.2. Contact Information

Contact “rfid_support@mti.com.tw“ for any questions regarding MTI RFID ME and hardware support issues.

2. Initial Setup

2.1. Software Installation

2.1.1. Double-click “MTI RFID ME.exe” in the installation disk, then click “Next” to continue the installation, or click “Cancel” to exit the setup as shown in Figure 1.

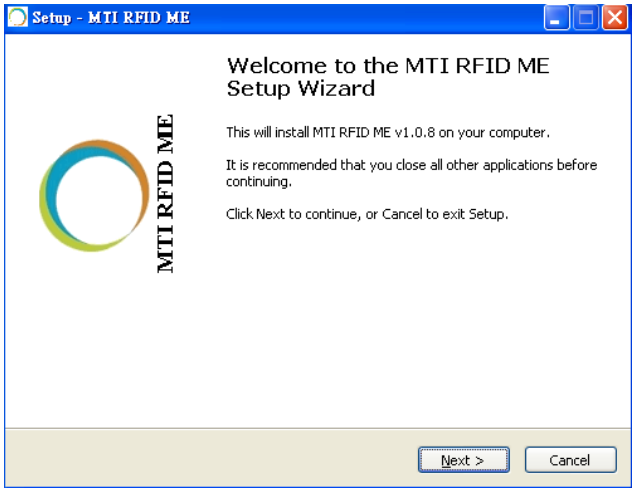

Figure 1

2.1.2. Read the license agreement and select “I accept the agreement” as shown in Figure 2 to accept.

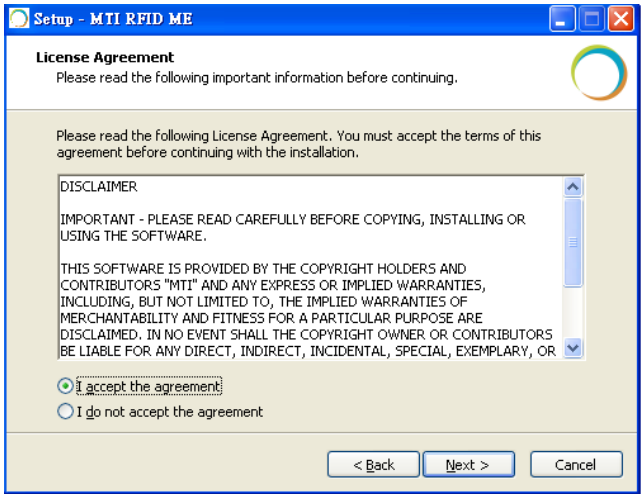

Figure 2

2.1.3. Select a Destination Folder. To select a different folder, click “Browse” and choose one of the available options as shown in Figure 3.

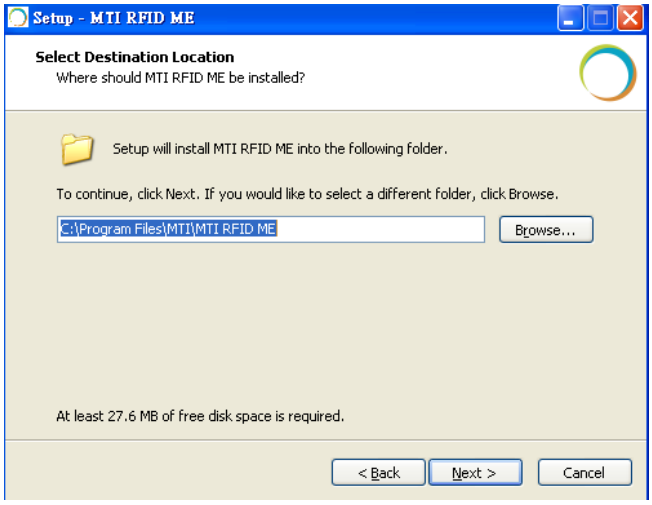

Figure 3

2.1.4. Select a destination for the program’s shortcut. To select a different folder, click “Browse” and choose one of the available options as shown in Figure 4.

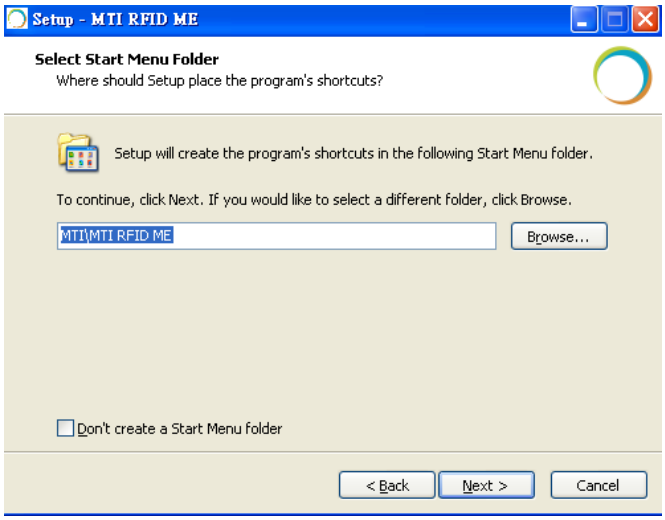

Figure 4

2.1.5. To add additional icons, “Check” desired boxes as shown in Figure 5.

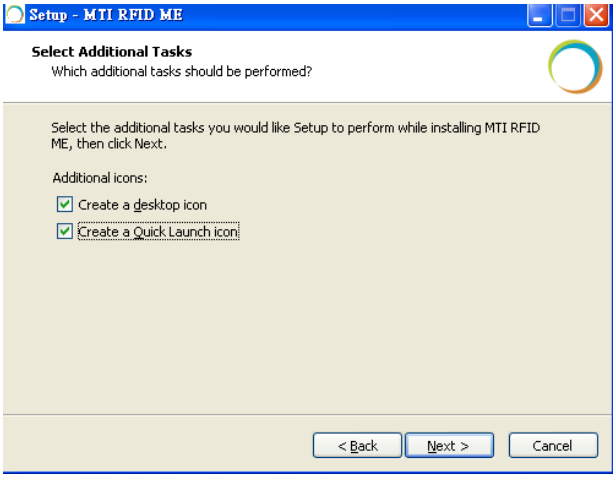

Figure 5

- “Checking” the ‘Create a desktop icon’ will generate an additional desktop icon;
- “Checking” the ‘Create a Quick Launch icon’ will generate an Additional Quick Launch icon located in the “Start” menu.

2.1.6. Press “Install” to begin software installation as shown in Figure 6.

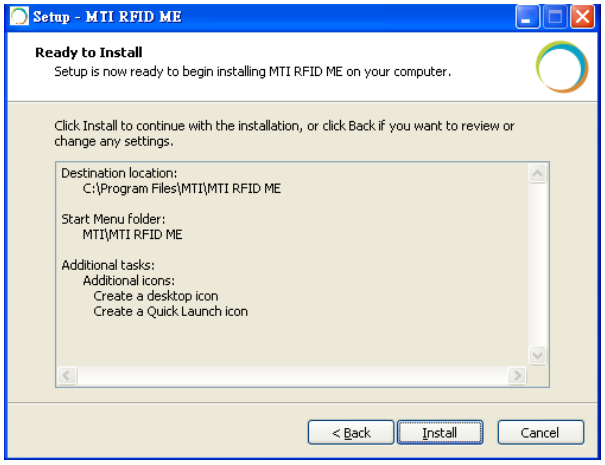

Figure 6

2.1.7. Congratulations! You have completed the MTI RFID ME software installation. Press "Finish" to close the window. Select any of the installed icons to launch the MTI Reader Suite program as shown in Figure 7.

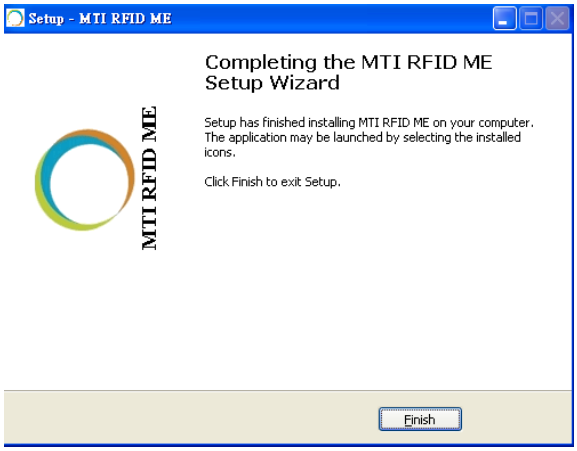

Figure 7

2.2. Hardware Setup

Insert the reader into the USB port, open the installed program, and make sure the status/state reads "Online" as shown in Figure 8.

The Module Name is described in the Hardware column as below.

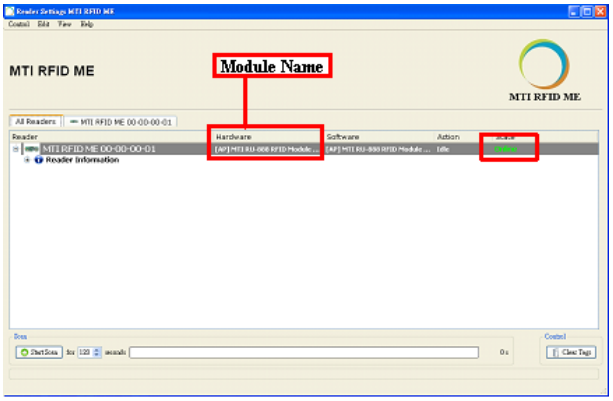

Figure 8

3. Reader Settings

3.1. Introduction

After opening MTI RFID ME program, “Right Click” on the MTI RFID ME to access the “Advanced Reader Settings”. This will allow you to see specific configuration settings and information of the reader, including default and recommended settings as shown in Figure 9 and Figure 10.

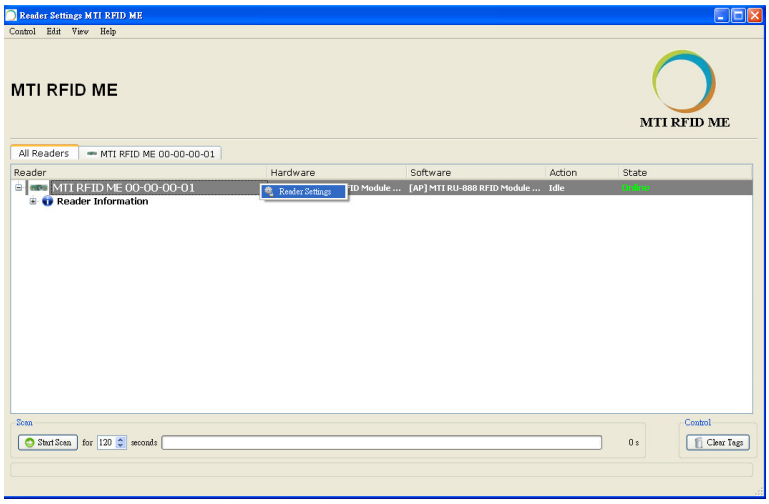

Figure 9

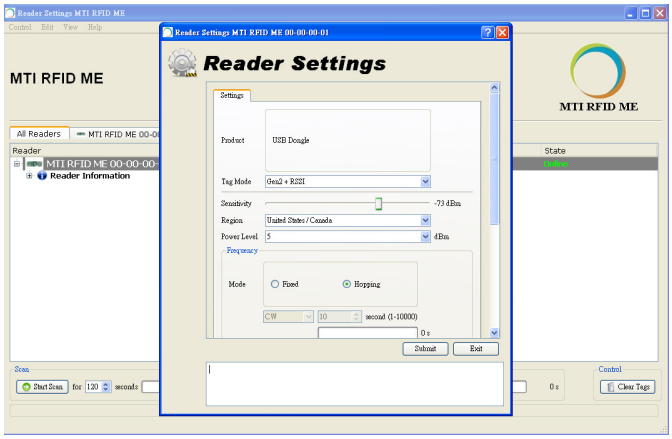

Figure 10

3.2. Advanced Reader Settings

3.2.1. Tag Mode: Gen2, Gen2+ RSSI, ISO6

- Gen2： ISO 18000-6C Tag
- Gen2 + RSSI：ISO 18000-6C Tag and provides the Received Signal Strength Indication (RSSI), channel Q, and channel I- path readings
- ISO6B：ISO 18000-6B Tag

3.2.2. Region Settings

MTI RFID ME program will sense and detect the correct region of your reader.

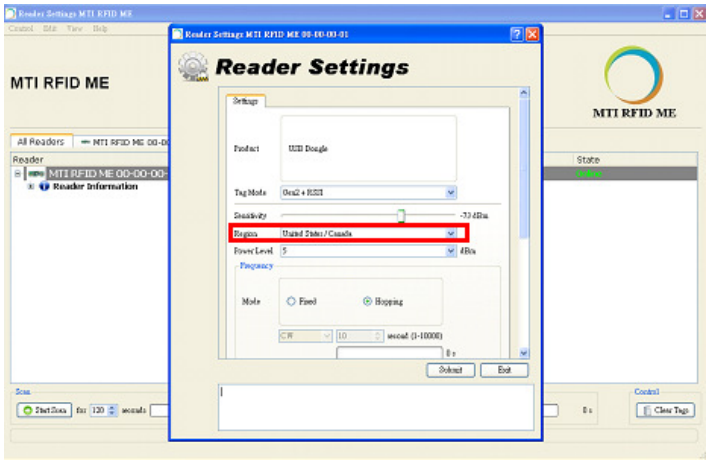

Figure 11

3.2.3. Transmit Power Level

- To achieve the longest reading or writing range, set the power to the maximum allowable level of +18dBm as shown in Figure 12.
- To reduce the reading or writing range and minimize energy consumption, set the power to the minimum allowable level of +10 dBm.

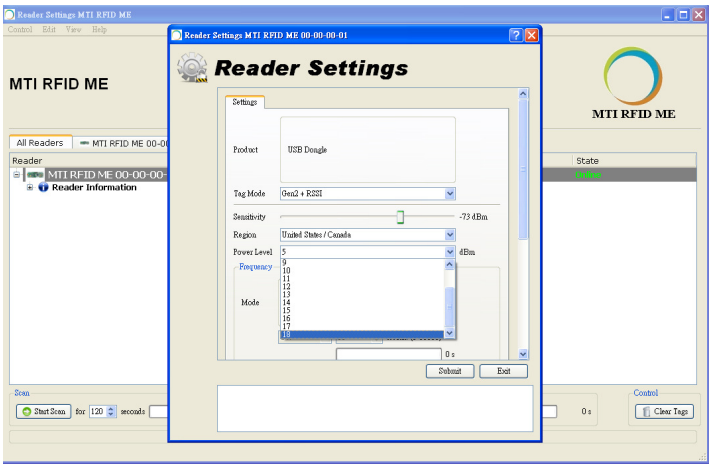

Figure 12

3.2.4. Frequency Setting (Fixed vs. Hopping)

- Hopping：Select frequency hopping to perform an Inventory Run (Start Scan) as shown in Figure 13.

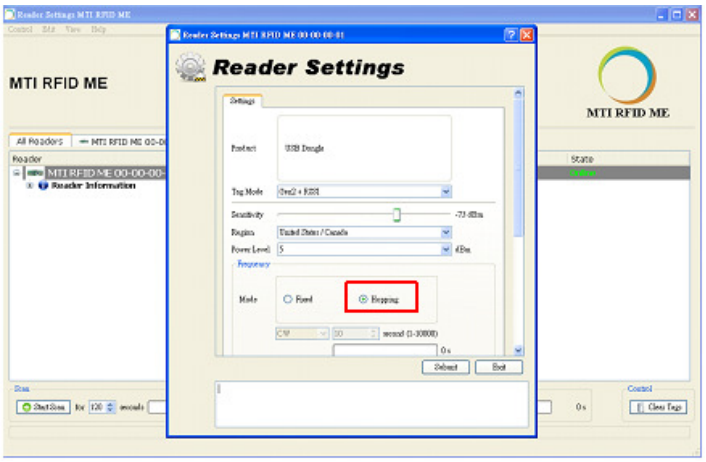

Figure 13

- Fixed Frequency：A setting typically used for testing and evaluation
- CW/Modulation/Pulse shown in Figure 14 used for engineering evaluation.

CW：To test Output Power Linearity for the desired frequency.

Modulation：To test the Mask for the desired frequency.

Pulse：To test ETSI 302 208 v1.3.1

- Time- only used for modulation setting

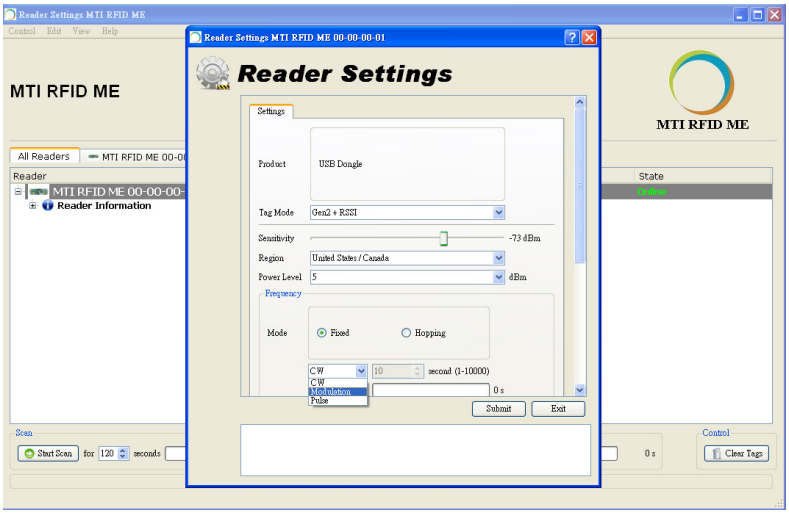

Figure 14

3.2.5. Gen2 Setting

Figure 15 illustrates how to change or modify the Gen2 profile of the MTI RFID ME and EPC tag. For more details regarding definitions Gen2 settings, parameters and limits please reference the Class 1 Generation 2 UHF Air Interface Protocol Standard “Gen 2” (http://www.epcglobalinc.org/standards/uhfc1g2)

- MTI RFID ME HW GUI Default Settings
  - Link Frequency：160KHz
  - Session：S0
  - Coding：Miller 2
  - Q_Begin：4

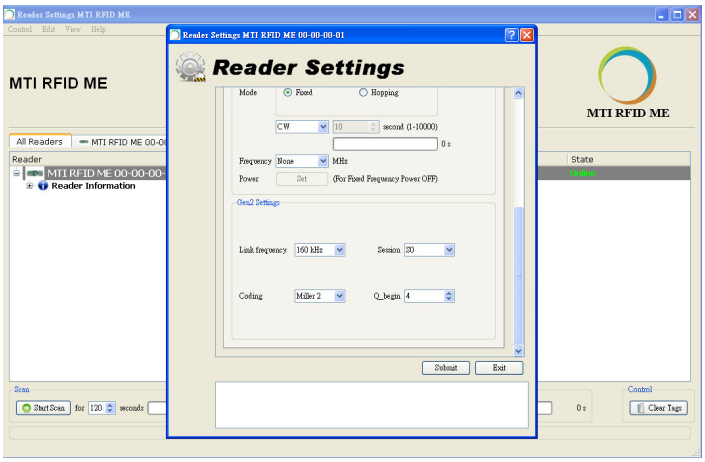
Reader Settings MTI RFID ME
Reader Settings MTI RFID ME 00-00-00-01
Reader Settings
MTI RFID ME
Mode
Fixed
Hopping
CW
second (1-10000)
Frequency
None
MHz
Power
Set
(For Fixed Frequency Power OFF)
Gen2 Settings
Link frequency
160 kHz
Session
S0
Coding
Miller 2
Q_begin
4
Submit
Exit
All Readers
Reader
Reader Information
State
Scan
Start Scan
for
120
seconds
Control
Clear Tags

Figure 15

4. Inventory Run

After configuring the MTI RFID ME settings as described in Section 3, you are ready to start an inventory run. Select the “Start Scan” button located in the lower left corner of the window as shown in Figure 16.

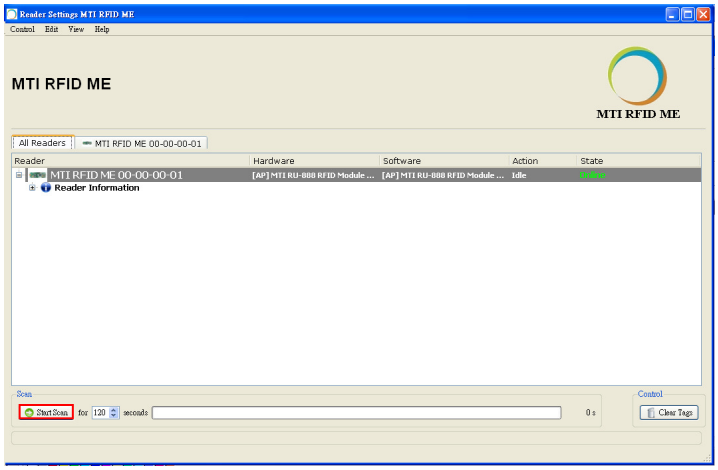

Figure 16

Figure 17 shows the results of a “Start Scan” operation and where the MTI RFID ME is reading one tag. As illustrated below, the EPC for each of the tags and Relative Signal Strength Indicator (RSSI) is presented. In this example EPC tag 33-33-33-33-33-33-33-33-33-33-33-33 has a RSSI of 67%. The RSSI varies during the period of measurement based on the received signal strength.

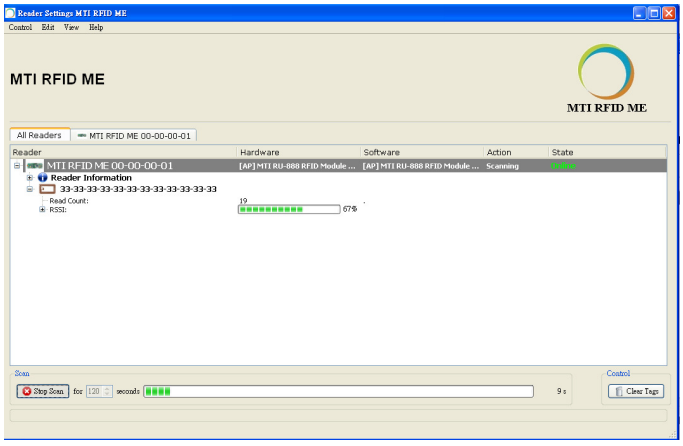

Figure 17

5. Tag Settings

To configure the tag (write to the tag), first stop the scan (Stop Scan), then Right Click on the EPC of the tag you want to modify, to access the “Advanced Tag Settings”. This will allow you set the parameters of the tag as shown in Figure 18 (this example has a single tag).

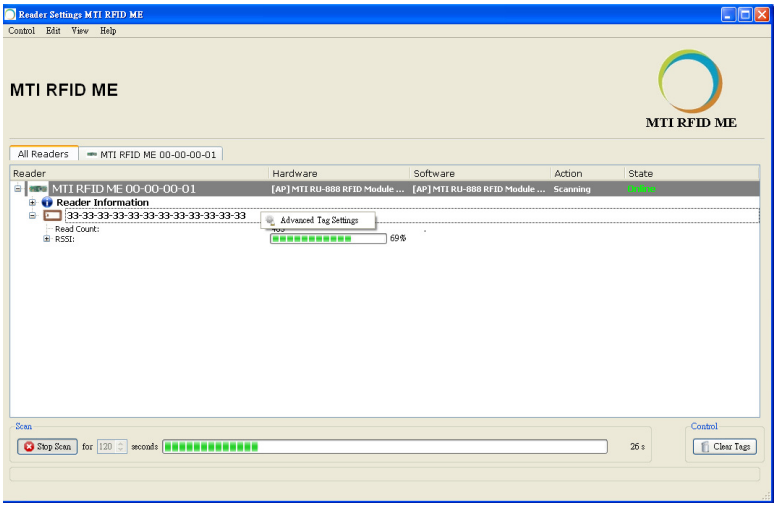

Figure 18

Next, move into the functions section, where you will be able to set tasks for your tags as described in the following points as shown in Figure 19.

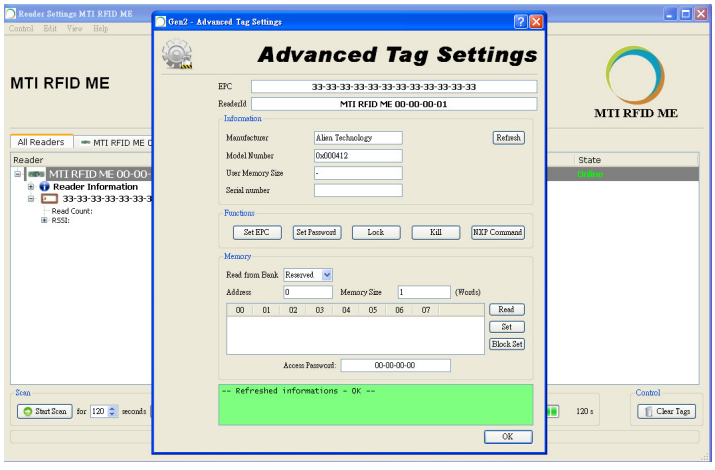

Figure 19

5.1. Tag Setting Function

5.1.1. Set EPC :

To modify or change a tag's EPC, select "New EPC" modify with a value of the new desired EPC value, then press "OK" to rewrite the EPC as shown in Figure 20.

Note: The default setting for the "Current Access Password" is 00-00-00-00. For any other "Current Access Password" settings other then 00-00-00-00, please reference the Class 1 Generation 2 UHF Air Interface Protocol Standard "Gen 2" at http://www.epcglobalinc.org/standards/uhfc1g2.

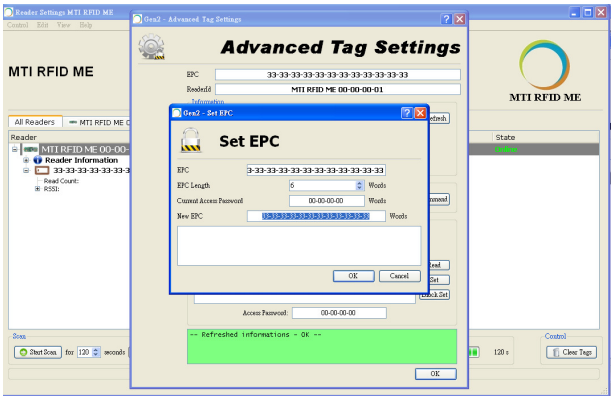

Figure 20

- EPC Tag Write Successful Message :

  When the tag is re-written successfully, you will see a confirmation message response "Set EPC to New Tag value "as shown in Figure 21.

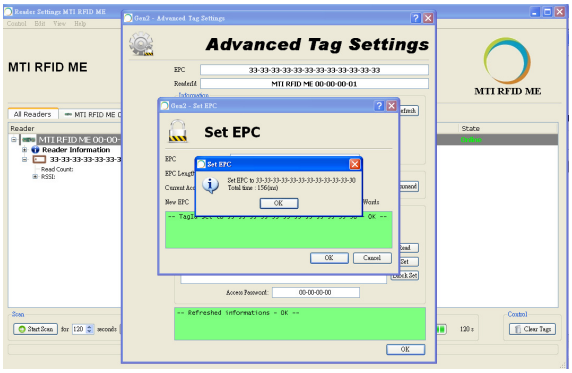

Figure 21

- EPC Tag Write Failed Message：

  In the event the EPC Tag has not successfully been re-written, a failure message box like the one shown below in Figure 22 will be displayed. Simply repeat the Set EPC process over until you have successfully write the new EPC. Note: It may help to move the tag closer to the reader during the re-write process, and/or increase the Transmit Output Power to a higher setting.

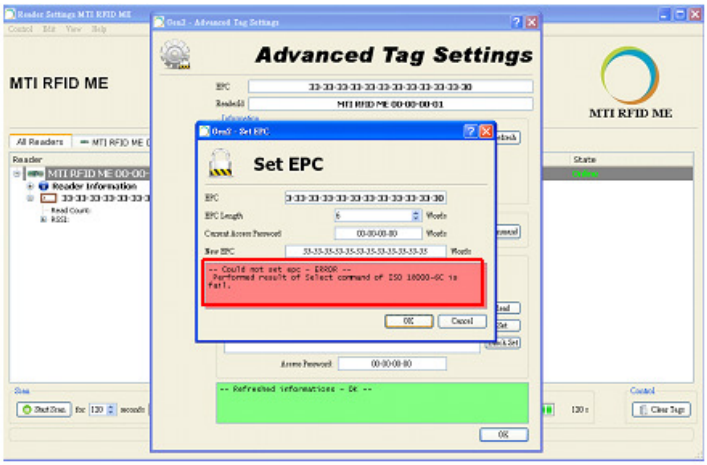

Figure 22

5.1.2. Set Password :

Set Kill or Access password as shown in Figure 23. The default Current Access Password is 00-00-00-00. For more detailed information regarding Password settings please reference the Class 1 Generation 2 UHF Air Interface Protocol Standard “Gen 2” at http://www.epcglobalinc.org/standards/uhfc1g2

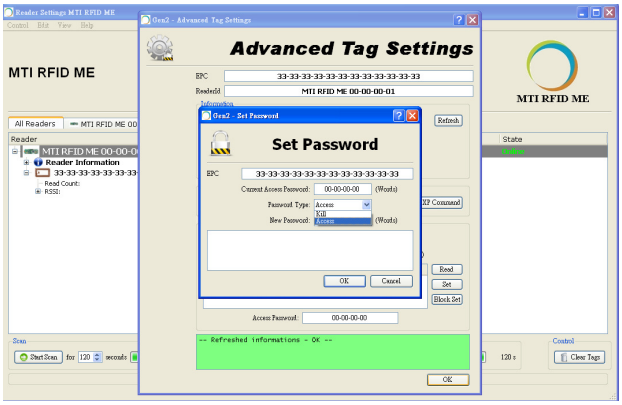

Figure 23

5.1.3. Lock :

To lock the desired memory bank for each action reference Figure 24. For more information regarding Lock and Associated Memory Banks please reference the Class 1 Generation 2 UHF Air Interface Protocol Standard “Gen 2” at http://www.epcglobalinc.org/standards/uhfc1g2

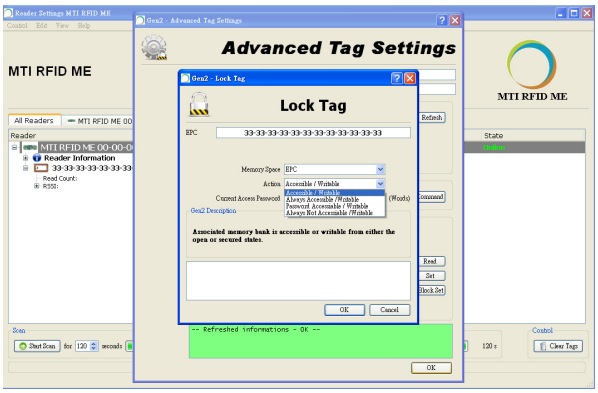

Figure 24

5.1.4. Kill :

To kill a tag, typing in a kill password as shown in Figure 25. For more information about Kill and Kill Passwords please reference the Class 1 Generation 2 UHF Air Interface Protocol Standard "Gen 2" at http://www.epcglobalinc.org/standards/uhfc1g2

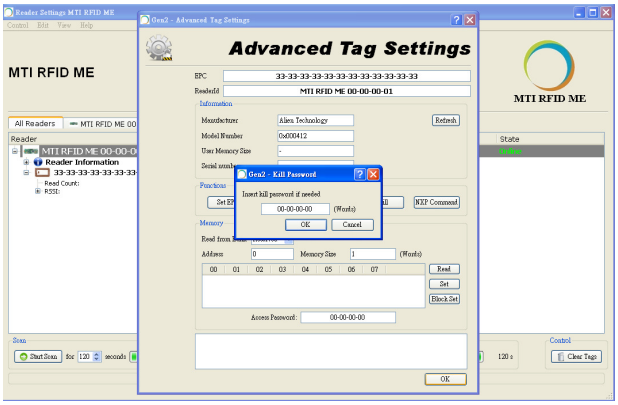

Figure 25

5.1.5. NXP Command

To perform NXP command for NXP tag, select "Command" to configure with access password as shown in Figure 26. Otherwise, if you select "ChangeConfig 09-00", you must set "Configuration" item. For more information about NXP command, please reference the SL3ICS1002/1202 UCODE G2xM and G2XL at http://www.nxp.com/documents/data_sheet/SL3ICS1002_1202_139036.pdf

- NXP Command
  - Set Read Protect 02-01: Enable reliable read protection of the entire G2X memory.
  - Unset Read Protect 02-00: Reset the ReadProtect-bit and re-enables reading of the G2X memory content according the EPCglobal specification.
  - Change EAS ON 01-01: An EAS-Alarm bit set to '1' the tag will reply to an EAS_Alarm command by backscattering a 64 bit alarm code.
  - Change EAS OFF 01-00: An EAS-Alarm bit set to '0' the tag will not reply to an EAS_Alarm command by backscattering a 64 bit alarm code.
  - Trigger EAS Alarm: Reply an EAS_Alarm command by backscattering a 64

bit alarm code without the need of a Select or Query.

- ChangeConfig 09-00: Configures the additional features of the tag like Read-Protect, EAS Alarm etc.

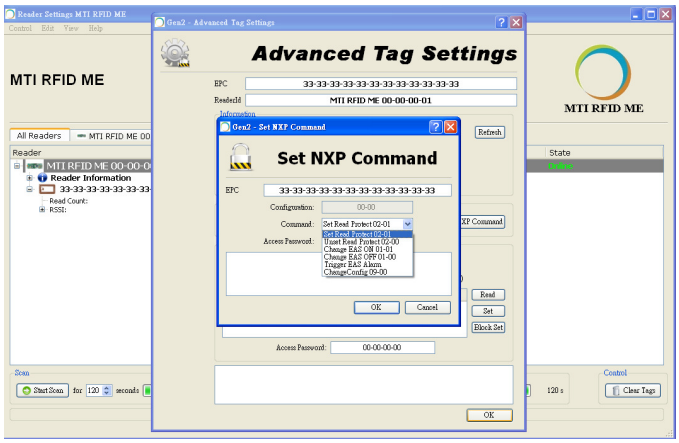

Figure 26

5.2. Memory Bank Setting

To read from Reserved, EPC, TID, and TID Bank select “Read“ button as shown in Figure 27. Otherwise, The “BlockSet” command allows an interrogator to write multiple words in a Tag’s Reserved, EPC,TID , or User memory using a single command. The memory size will automatically be displayed. For more information about how to configure Memory Bank Settings for your use case, please reference the Class 1 Generation 2 UHF Air Interface Protocol Standard “Gen 2” at http://www.epcglobalinc.org/standards/uhfc1g2

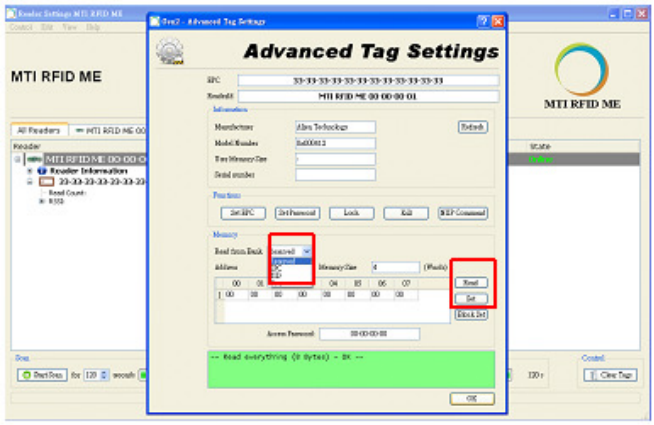

Figure 27

- Memory Bank Pass Message：

  When the read memory command is successful, a confirmation message “Read everything (8 Bytes) – OK - -“ as shown in Figure 28 will be displayed.

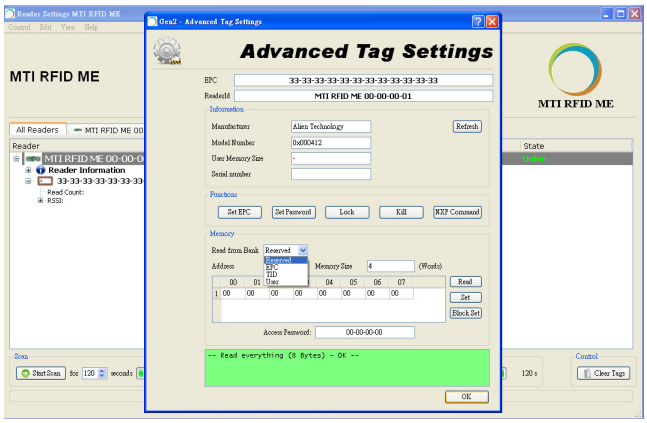

Figure 28

- Memory Bank Fail Message：

  If the read memory bank process fails, a message box like the one shown below in Figure 28 will be displayed. Repeat the read memory bank process over until you successfully read the memory bank successfully.

  Note: One remedy that can increase your read memory bank successfully, is to move the tag closer to the reader, or increase the Transmit Output Power to a higher setting.

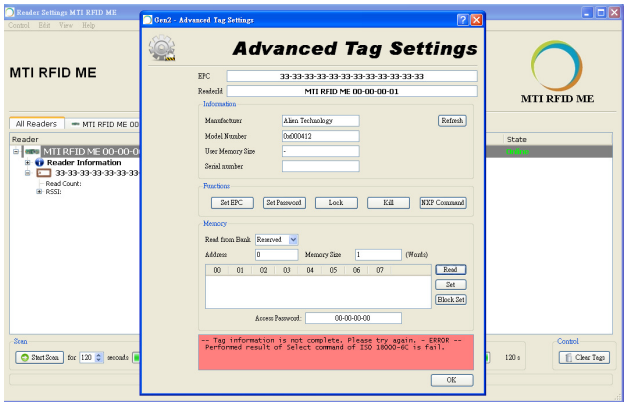

Figure 29

6. Troubleshooting/ FAQs

6.1. Initial Setup/ Software

If the software fails to install as shown in Figure 29, repeat the installation process over again, first uninstall the prior MTI RFID ME installation, and then re-install again using the same steps listed in section 2.1.

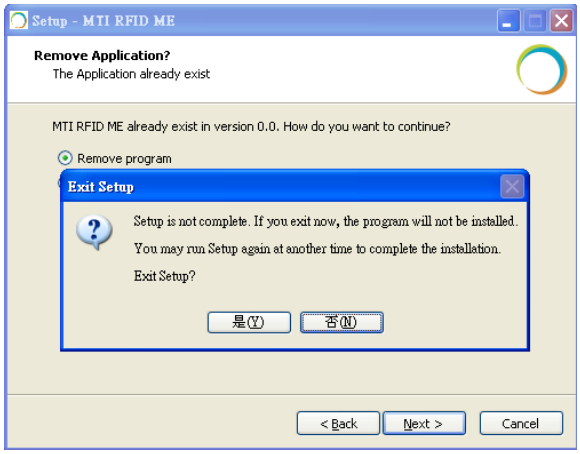

Figure 30

6.2. Reading Tags

If reader is “Offline” and does not identify tags, make sure the state/status of the MTI RFID ME is “Online” reference Figure 9 which shows “Online” status).

In general, reading tags depends on a lot of different conditions, please verify that there are no metal or liquid objects surrounding the RFID reader and/or near the tags (such as a metal table, or glass of water).

6.3. Writing Tags

If tag status displays “ERROR”, make sure the tag and reader proximity is very close (touching if necessary), and try again.