RFiD Board User Manual

Index of Contents

Index of figures

1. RFiD Board General Description

This document details the user information about RFiD Board and includes:

- The general Description of the RFiD Board
- The procedure to control the RF emission
- The regulatory User Information

The RFiD Board **is a limited modular transmitter** only for use in EVBox host products and not intended for sale to third parties. The integration instructions in EVBox products are internal confidential manufacturing documents.

The RFiD Board is equipped with an NFC module operating at 13.56 MHz (U2:PN7150B0HN/C11006E) and it is designed to be installed and interfaced with an EVBox manufactured host product (in the specific case an Electric Vehicle Charging System). When installed in the host product the RFiD Board integrates the following functions:

- to start/stop operations of the host product when an external RFID card (or RFID tag, etc.) is presented near the RFiD Board
- (optional) to give an input to the host product depending on the detected light intensity based on the Digital Ambient Light Sensor LTR-303ALS-01(LED1).

The following figure shows the pictures of the unit with indications of main components.

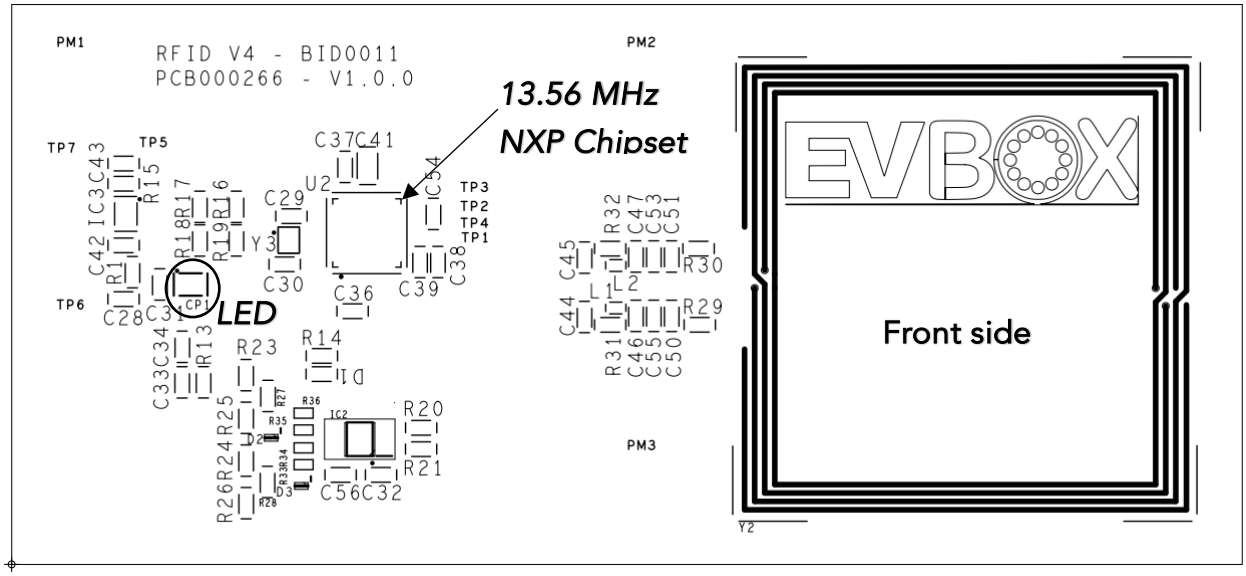

Figure 1 – RFiD Board Assembly Front Schematic

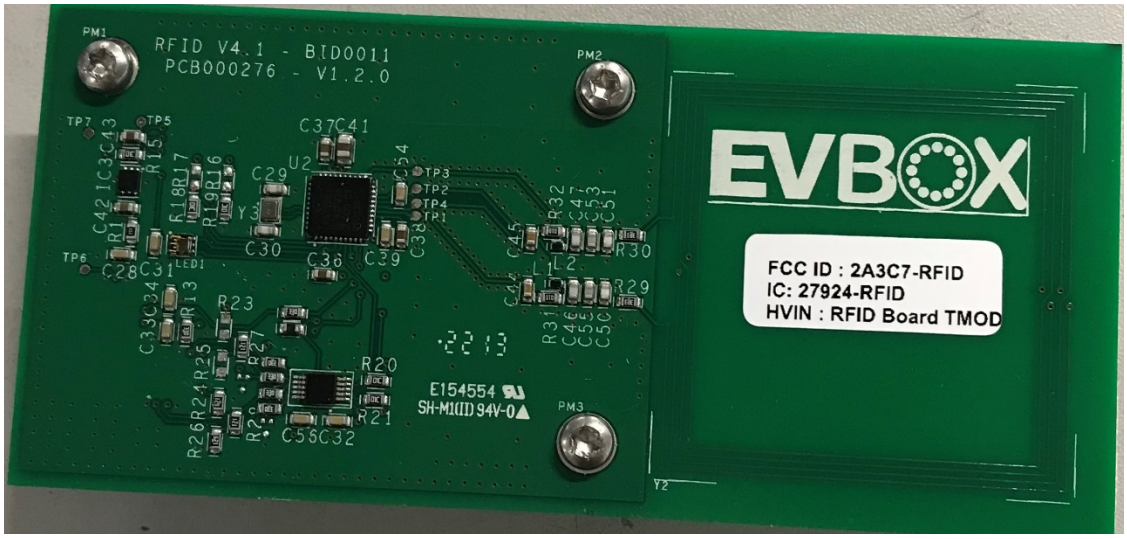

Figure 2 – RFiD Board Front Picture

Figure 3 – RFiD Board Back Picture

2. RFID emission control

Require equipment

Shielded Ethernet Cable
Computer with DLT viewer, PuTTY, WinSCP
EVBOX Success motherboard

Configuration of DLT viewer

To check the RFID badge reading open DLT viewer go to the project tab and click on the load button and select the "config_certif.dlp" file. DLTviewer will then display the following window:

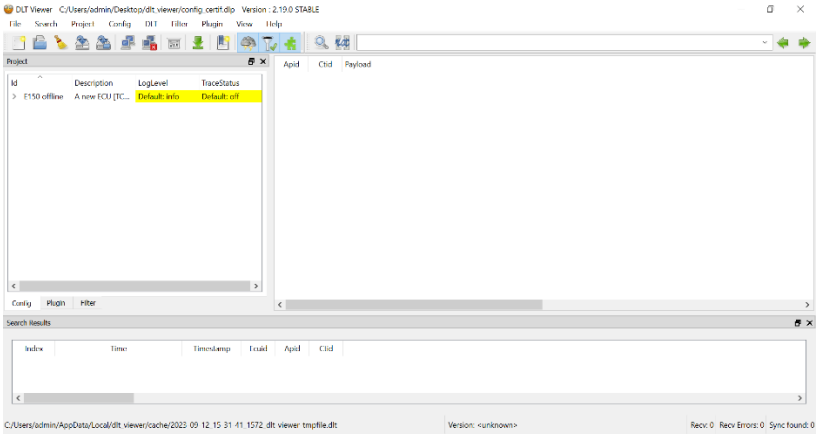

Figure 4: DLTviewer window after "config_certif.dlp" loading

Then click on the connect button, using the filter present in the configuration file previously load DLTviewer will then display the information on the right side as show in the following picture:

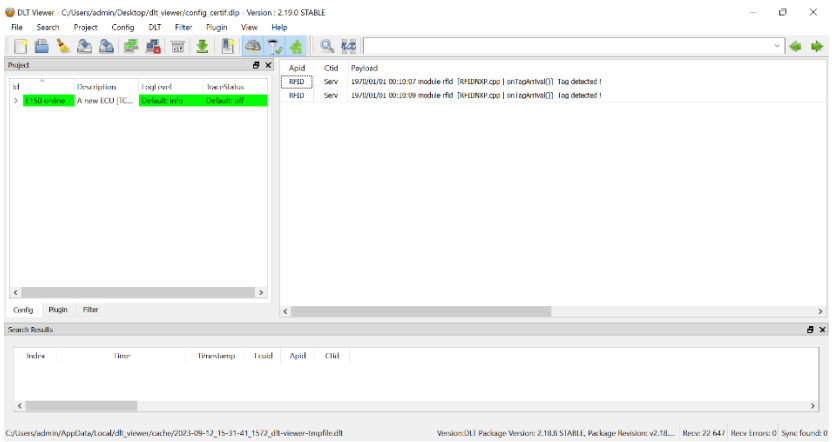

Figure 5: DLTviewer after recovery of the log link to the tag identification by the RFID

3. PuTTY command

All the commands present in the chapter can be sent to the desired apparatus using terminal generate by PuTTY.

Activation of RFID emission

To activate the RFID, send a stop command in the associate PuTTY windows.

```
systemctl start module-rfid
```

Deactivation of RFID emission

To deactivate the RFID, send a stop command in the associate PuTTY windows.

```
systemctl stop module-rfid
```

Note the following kill command can also be used:

```
Killall module-rfid
```

To stop the execution of the script, go in the associate PuTTY terminal and type on the touch Ctrl+c

Surveillance of RFID

To activate surveillance of the RFID **firstly the RFID emission must be deactivated**. Then send the following command in the associate PuTTY windows.

```
CertifRfidTool
```

- This command will execute the "certifrfid" script which will activate and deactivate the RFID module.
- Once the script is launched the RFID radio surveillance can be realized using the application DLTViewer by filtering on the RFID tag.
- If the RFID emission is activated before executing the "certirfid.sh" the system will crash during the test requiring either to kill the process or to manually restart the board by restart the power ON/OFF of the board.

4. RFID tag detection time out

During the test if no tag is detected the SW enters an infinite loop indicating that no tag was found and a request timeout. In this case even if a new badge is present to the RFID the SW keeps displaying the same error time out message as present in the following figure.

192.168.1.150 - PuTTY

```
Event: new tag detected !
RFID ID: C448F6C7Type: NFA_PROTOCOL_MIFARE
1970:01:01-00:25:54.844 NxpExtns:   Error Sending msg to Extension Thread
Mifare Authenticate command sent Response C448F6C74000
Mifare Authenticate command sent Response C448F6C7400010000000000000000000000000000000000
1970:01:01-00:25:54.880 NxpFunc:    RoutingManager::nfaEeCallback: unknown event=9 ????
1970:01:01-00:25:54.888 NxpFunc:    RoutingManager::nfaEeCallback: unknown event=2 ????
1970:01:01-00:25:56.230 NxpFunc:    nativeNfcManager_disableDiscovery: Nfc not initialized.
1970:01:01-00:25:56.817 NxpHal:     phNxpNciHal_deriveChipType HwVersion : 0x88
1970:01:01-00:25:56.819 NxpHal:     phNxpNciHal_deriveChipType NxpNci > Product : PN548C2
1970:01:01-00:25:56.824 NxpHal:     i2c_fragmentation_status existing
1970:01:01-00:25:56.824 NxpFwDnld:  Ignoring Config :NFC FW Binary Path:
1970:01:01-00:25:56.824 NxpFwDnld:  Ignoring Config:NFC FW Binary :libpn548ad
1970:01:01-00:25:56.824 NxpFwDnld:  NFC FW Binary :/libpn548ad_fw.so
1970:01:01-00:25:56.824 NxpFwDnld:  NULL handler : unable to load the binary file, verify binary path
1970:01:01-00:25:56.824 NxpFwDnld:  Image extraction Failed - invalid imginfo or imginfolen!!
1970:01:01-00:25:56.824 NxpFwDnld:  Error loading libpn54x_fw !!
1970:01:01-00:25:56.824 NxpFwDnld:  Freeing Mem for Dnld Context..
1970:01:01-00:25:56.837 NxpHal:     phNxpNciHal_deriveChipType HwVersion : 0x88
1970:01:01-00:25:56.837 NxpHal:     phNxpNciHal_deriveChipType NxpNci > Product : PN548C2
1970:01:01-00:25:56.842 NxpFwDnld:  Clock frequency value is wrong in config file, setting it as default
1970:01:01-00:25:56.908 NxpFunc:    initialize:HOST_LISTEN_TECH_MASK=7;
1970:01:01-00:25:56.910 NxpFunc:    RoutingManager::nfaEeCallback: unknown event=9 ????
Waiting for tag
No tag found request timeout
1970:01:01-00:26:01.001 NxpFunc:    RoutingManager::nfaEeCallback: unknown event=9 ????
1970:01:01-00:26:01.006 NxpFunc:    RoutingManager::nfaEeCallback: unknown event=2 ????
1970:01:01-00:26:02.350 NxpFunc:    nativeNfcManager_disableDiscovery: Nfc not initialized.
1970:01:01-00:26:02.937 NxpHal:     phNxpNciHal_deriveChipType HwVersion : 0x88
1970:01:01-00:26:02.938 NxpHal:     phNxpNciHal_deriveChipType NxpNci > Product : PN548C2
1970:01:01-00:26:02.944 NxpHal:     i2c_fragmentation_status existing
1970:01:01-00:26:02.944 NxpFwDnld:  Ignoring Config :NFC FW Binary Path:
1970:01:01-00:26:02.944 NxpFwDnld:  Ignoring Config:NFC FW Binary :libpn548ad
1970:01:01-00:26:02.944 NxpFwDnld:  NFC FW Binary :/libpn548ad_fw.so
1970:01:01-00:26:02.944 NxpFwDnld:  NULL handler : unable to load the binary file, verify binary path
1970:01:01-00:26:02.944 NxpFwDnld:  Image extraction Failed - invalid imginfo or imginfolen!!
1970:01:01-00:26:02.944 NxpFwDnld:  Error loading libpn54x_fw !!
1970:01:01-00:26:02.944 NxpFwDnld:  Freeing Mem for Dnld Context..
1970:01:01-00:26:02.957 NxpHal:     phNxpNciHal_deriveChipType HwVersion : 0x88
1970:01:01-00:26:02.957 NxpHal:     phNxpNciHal_deriveChipType NxpNci > Product : PN548C2
1970:01:01-00:26:02.962 NxpFwDnld:  Clock frequency value is wrong in config file, setting it as default
1970:01:01-00:26:03.028 NxpFunc:    initialize:HOST_LISTEN_TECH_MASK=7;
1970:01:01-00:26:03.030 NxpFunc:    RoutingManager::nfaEeCallback: unknown event=9 ????
Waiting for tag
```

Figure 6: RFID tag detection time out

To resolve this issue the user must stop the surveillance using Ctrl+c in the PuTTY terminal and and launch again an RFID scanning session.

5. RFID tag detection example

An example of the Success RFID tag detection on a random badge command is present in the following figure:

192.168.1.150 - PuTTY

```
login as: root
root@192.168.1.150's password:
root@evbox:~# systemctl stop module-rfid
root@evbox:~# ./certifrfid.sh
-sh: ./certifrfid.sh: No such file or directory
root@evbox:~# pwd
/home/root
root@evbox:~# ls
certifRfid.sh
root@evbox:~# ./certifRfid.sh
rfid enable
1970:01:01-00:05:23.452 NxpHal:     phNxpNciHal_deriveChipType HwVersion : 0x88
1970:01:01-00:05:23.454 NxpHal:     phNxpNciHal_deriveChipType NxpNci > Product
: PN548C2
1970:01:01-00:05:23.459 NxpHal:     i2c_fragmentation_status existing
1970:01:01-00:05:23.459 NxpFwDnld:  Ignoring Config :NFC FW Binary Path:
1970:01:01-00:05:23.459 NxpFwDnld:  Ignoring Config:NFC FW Binary :libpn548ad
1970:01:01-00:05:23.459 NxpFwDnld:  NFC FW Binary :/libpn548ad_fw.so
1970:01:01-00:05:23.459 NxpFwDnld:  NULL handler : unable to load the binary fil
e, verify binary path
1970:01:01-00:05:23.459 NxpFwDnld:  Image extraction Failed - invalid imginfo or
 imginfolen!!
1970:01:01-00:05:23.459 NxpFwDnld:  Error loading libpn54x_fw !!
1970:01:01-00:05:23.459 NxpFwDnld:  Freeing Mem for Dnld Context..
1970:01:01-00:05:23.472 NxpHal:     phNxpNciHal_deriveChipType HwVersion : 0x88
1970:01:01-00:05:23.472 NxpHal:     phNxpNciHal_deriveChipType NxpNci > Product
: PN548C2
1970:01:01-00:05:23.477 NxpFwDnld:  Clock frequency value is wrong in config fil
e, setting it as default
1970:01:01-00:05:23.573 NfcHcpX:8103
1970:01:01-00:05:23.581 NfcHcpR:8180
1970:01:01-00:05:23.581 NfcHcpX:810103020304
1970:01:01-00:05:23.589 NfcHcpR:8180
1970:01:01-00:05:23.589 NfcHcpX:8101019c6f666696f6666
1970:01:01-00:05:23.603 NfcHcpR:8180
1970:01:01-00:05:23.751 NfcHcpX:810204
1970:01:01-00:05:23.759 NfcHcpR:818000
1970:01:01-00:05:23.763 NxpFunc:    initialize:HOST_LISTEN_TECH_MASK=7;
1970:01:01-00:05:23.763 NxpFunc:    RoutingManager::nfaEeCallback: unknown event
=9 ????
Waiting for tag
Event: new tag detected !
RFID ID: C448F6C7Type: NFA_PROTOCOL_MIFARE
1970:01:01-00:05:37.514 NxpExtns:   Error Sending msg to Extension Thread
```

Figure 7: Success RFID tag detection on a random badge

6. User information for integration in the host product

Instructions for installing the module in EVBox products are internal confidential manufacturing documents. See guide reported in the submitted Operational Description document.

Specific info related to FCC approval of the RFiD Board as Limited Modular Transmitter:

- **FCC ID**: 2A3C7-RFID

Specific info related to ISED approval of the RFiD Board as Limited Modular Transmitter[1]:

- **ISED Certification Number**: 27924-RFID
- **HVIN**: RFID Board TMOD
- **PMN:** RFID Board TMOD

The module is just for use by EVBox in its own products/product and not intended to be sold to third parties.

When the RFiD Board is integrated in a host product, the following compliance tests, to be executed in an accredited laboratory, **are recommended** to guarantee continuity of compliance (and test results to be properly reported in a traceable test report):

- NFC Radiated spurious emissions
- Transmitter Fundamental Field Strength & Spectrum Mask in host product

When the module is co-located with other transmitters that operate simultaneously – the host product is to be evaluated using the FCC multi-transmitter procedures.

FVIN: Not Applicable (the product software does not control the radio parameters)

7. FCC/IC Statement

FCC ID: 2A3C7-RFID

IC: 27924-RFID

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.

Note: 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 to 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.

Changes or modifications to this product not authorized by EVBox could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product.

This device complies with Industry Canada licence-exempt RSS standards.
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.

Le présent appareil est conforme aux CNR d' Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:

1. le dispositif ne doit pas produire de brouillage préjudiciable, et
2. ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.