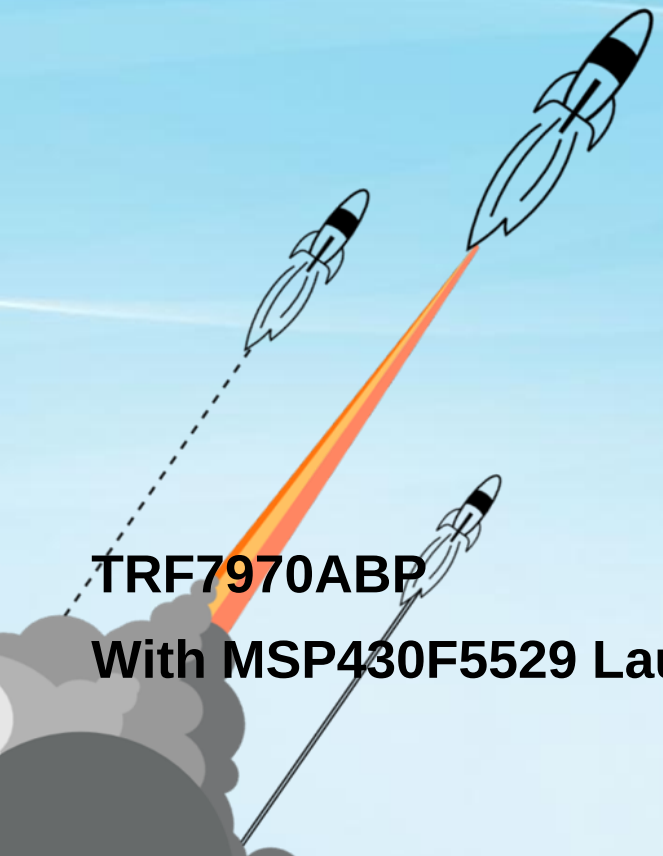


RFID BoosterPack

TRF7970ABP

With MSP430F5529 LaunchPad

Texas Instruments

Table of Contents

Prerequisites

Hardware

1. 1x MSP-EXP430F5529 LaunchPad, orderable from the TI eStore.
2. 1x DLP-7970ABP, orderable through third party vendors.

Software

1. Download NFCLink installation file.
2. Download Uniflash installation file.

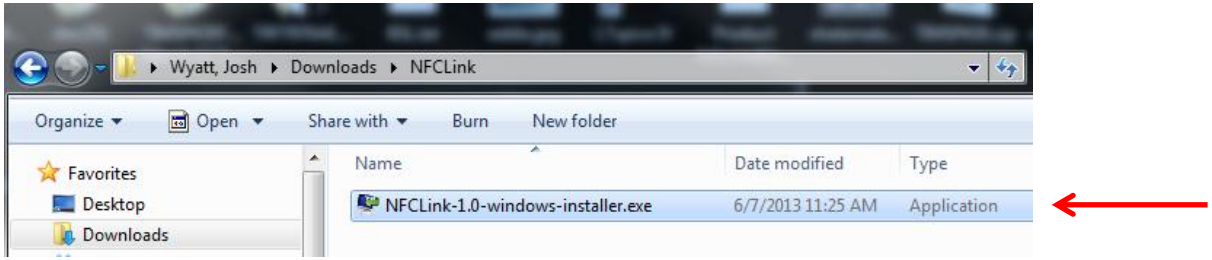
Assumptions & Knowledge Base

1. The user should have knowledge of or be familiar with:
    - MSP430F5529 LaunchPad

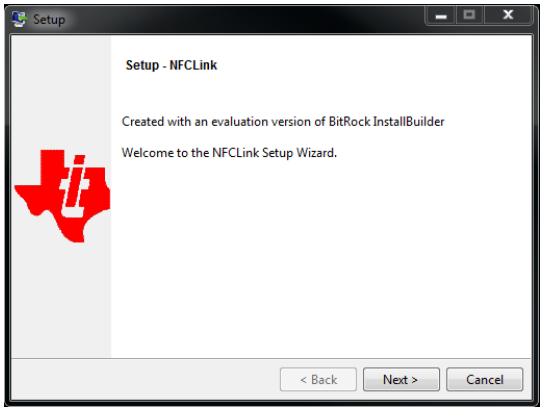
Basic Installation

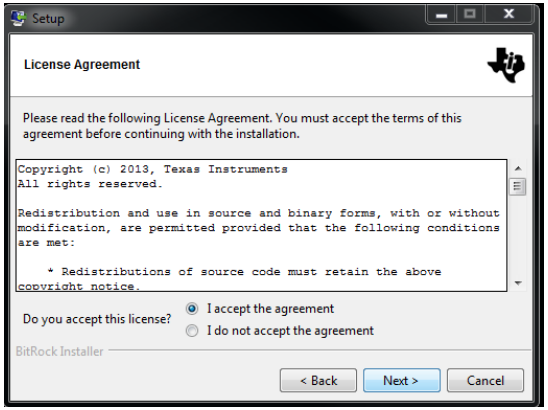
Install NFCLink

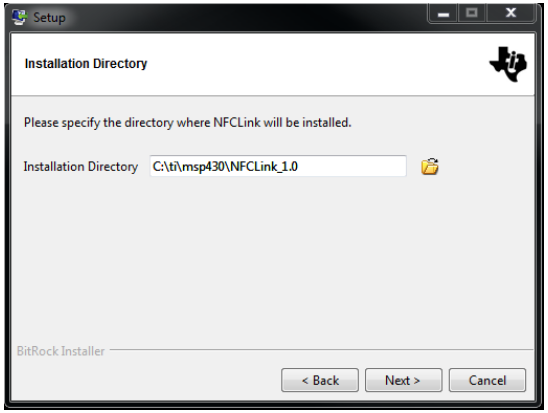
- Use the downloaded NFCLink Installer executable to get the firmware code project and the NFCPlayer GUI loaded onto PC.



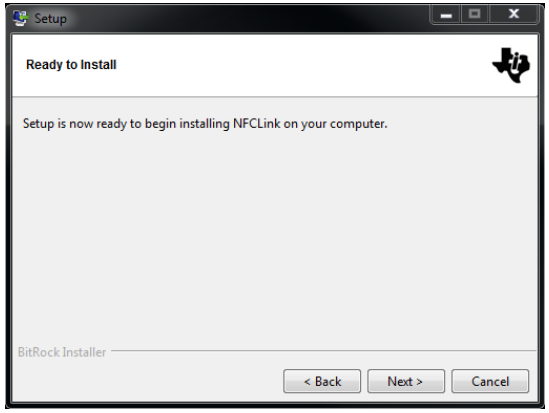
- Double click installer and follow instructions.

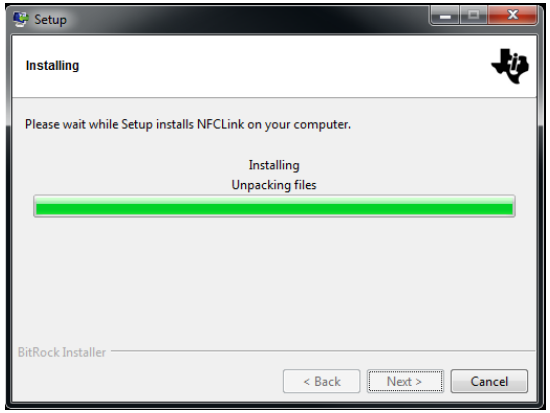


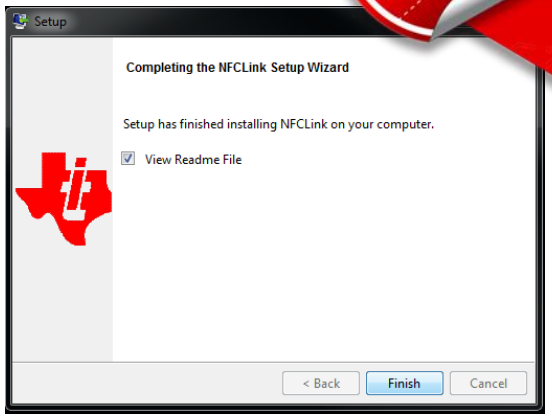




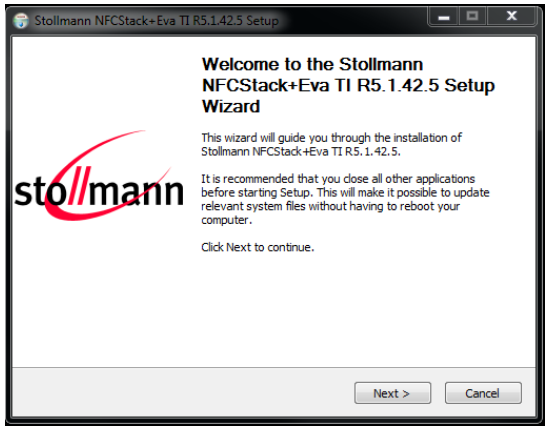
Install NFCLink

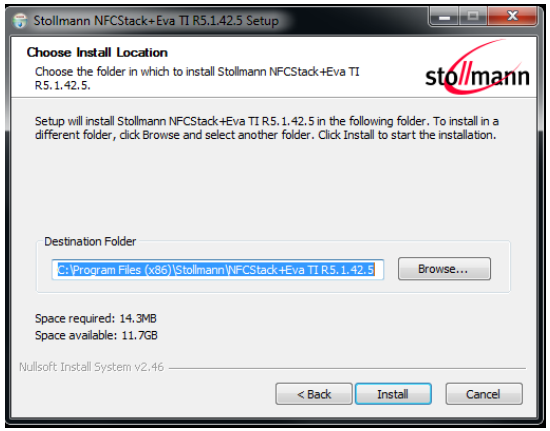


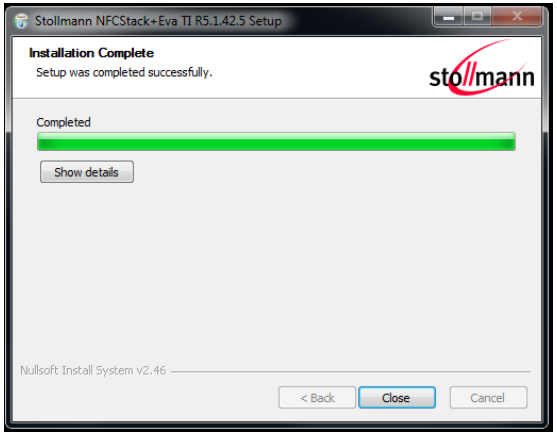




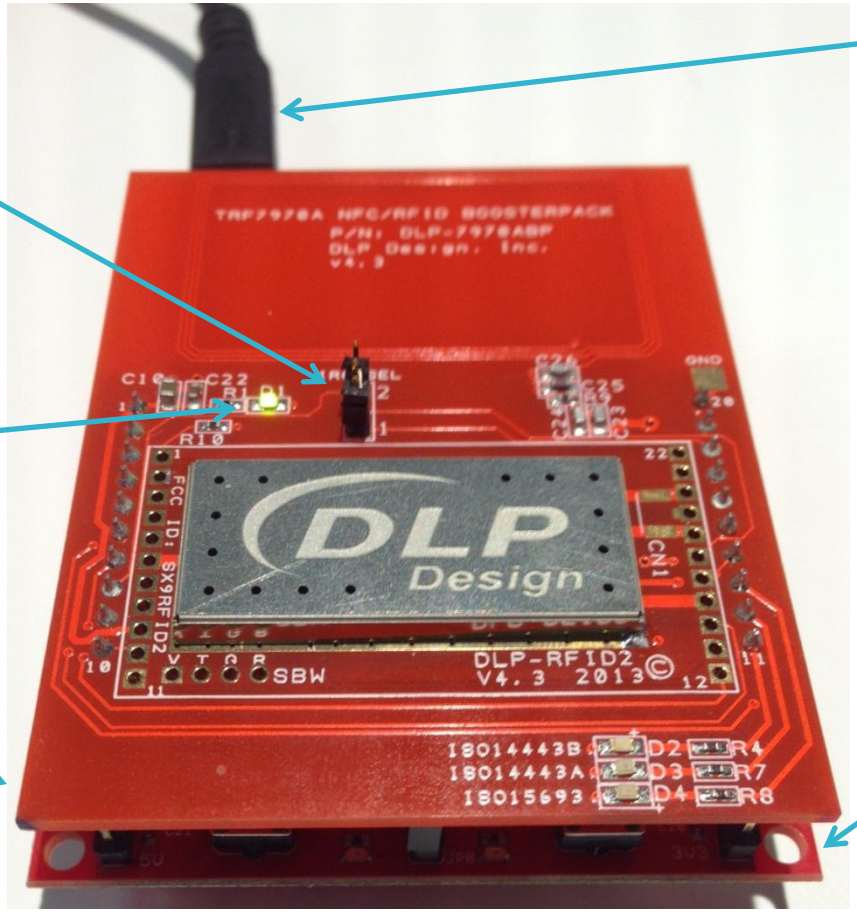
- The NFCPlayer GUI will begin installation automatically.





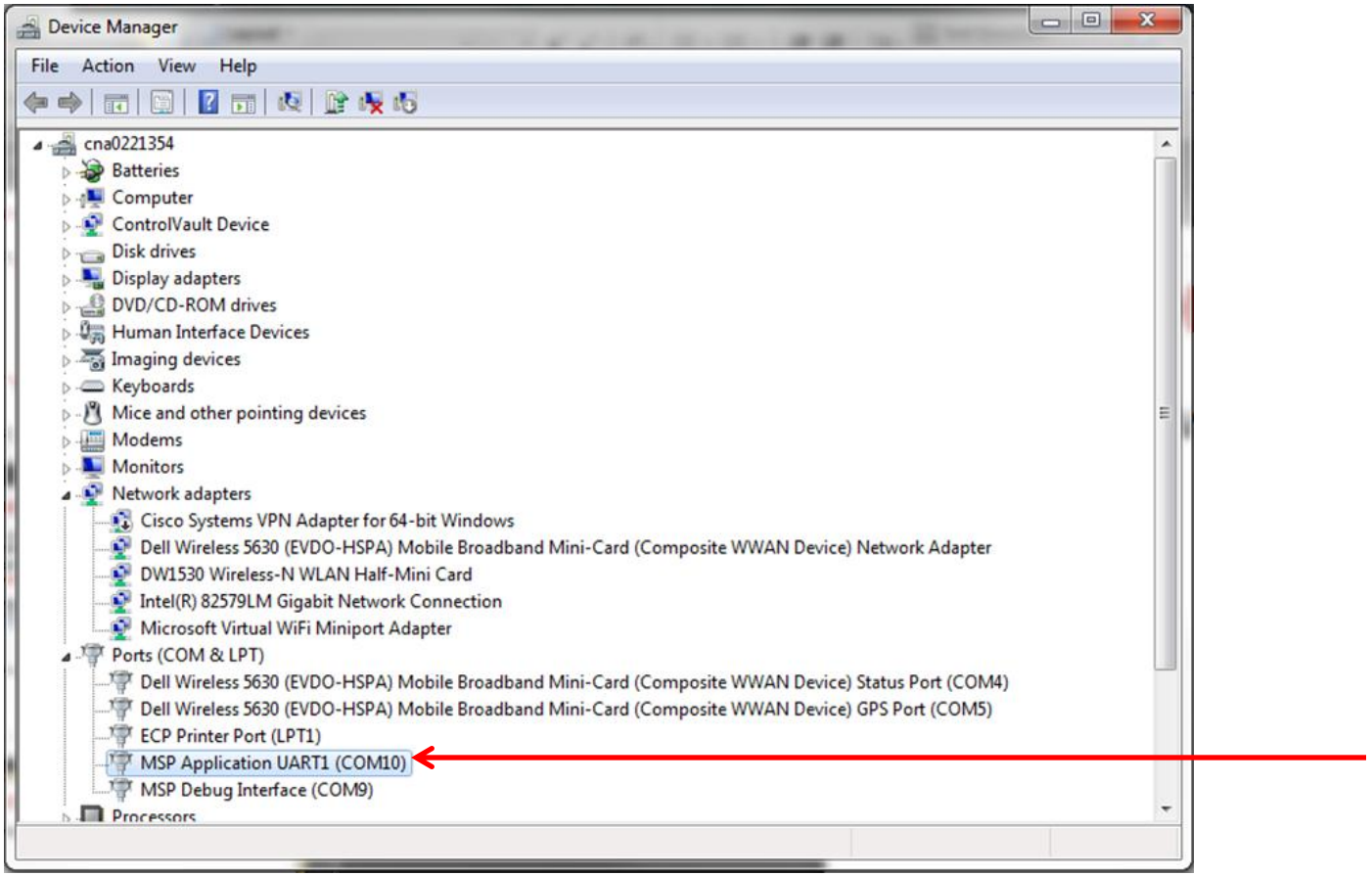


Hardware Setup



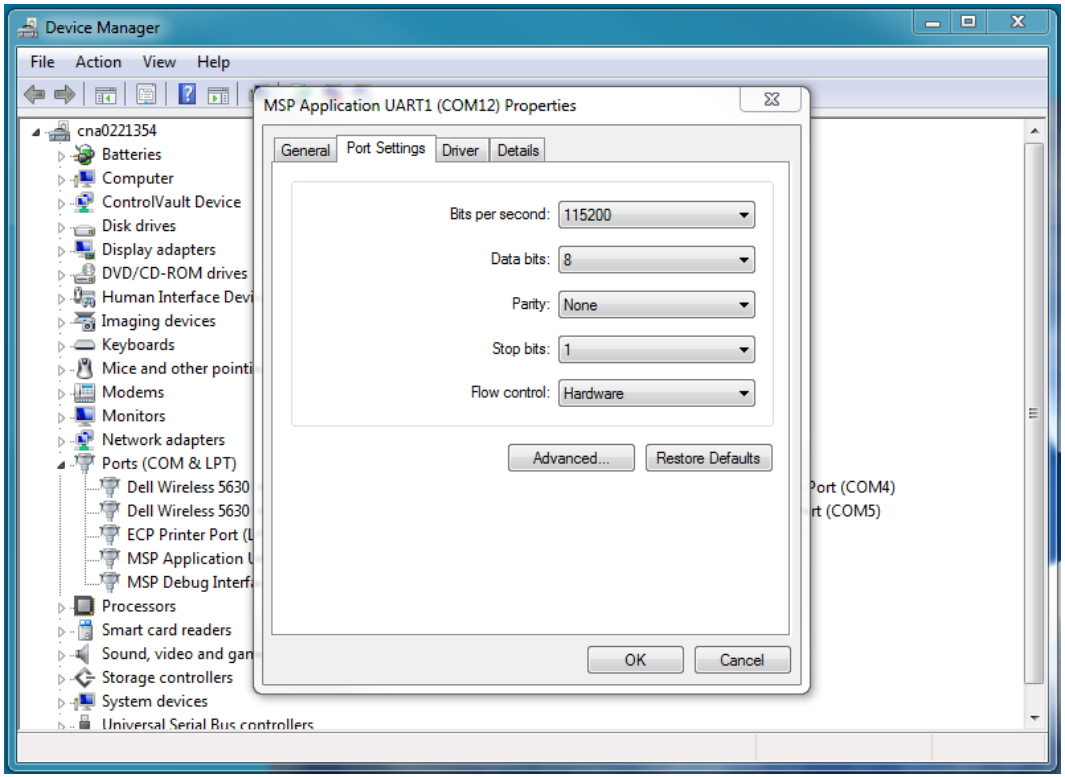
Detect COM Port

- Open Device Manager from Control Panel
- Determine COM Port from Ports Menu (MSP Application UART)



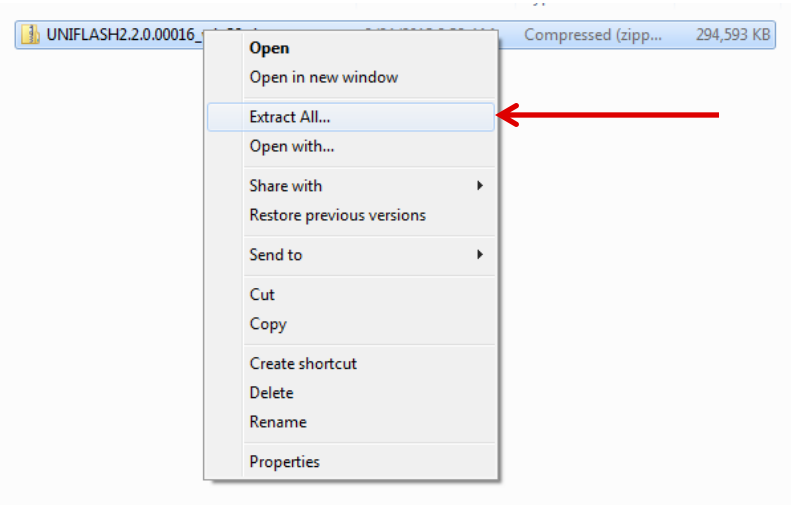
COM Port Settings

- Right click on MSP430 Application UART Port, select Properties, and visit Port Settings tab
- Adjust Virtual COM Port settings to115200, 8, None, 1, Hardware
  - Note that COM port numbers vary between systems



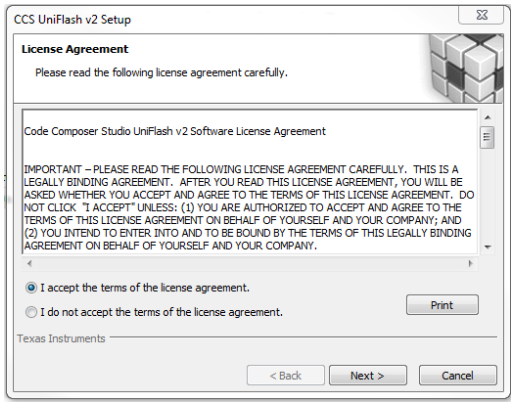
Install UniFlash

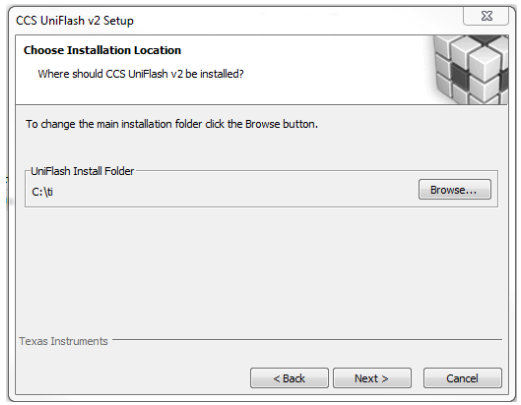
- Download UniFlash zip file to preferred download location.
- Extract all files from UniFlash zip file (note: UniFlash revision numbers vary).
- The file path will depend on where the zip file has been downloaded.

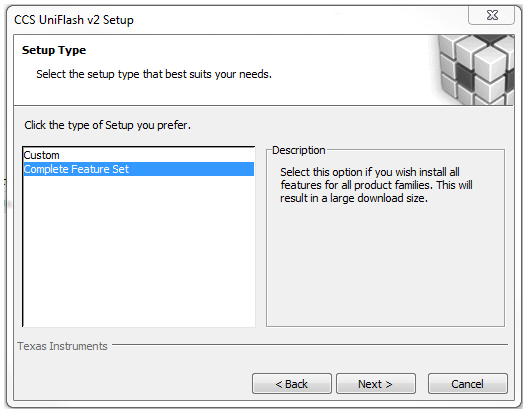


Install UniFlash

- Execute UniFlash installation file (.exe file extension).
- The installation file can be found in the extracted file folder.
- Follow installation instructions.
- Note location of installation folder.

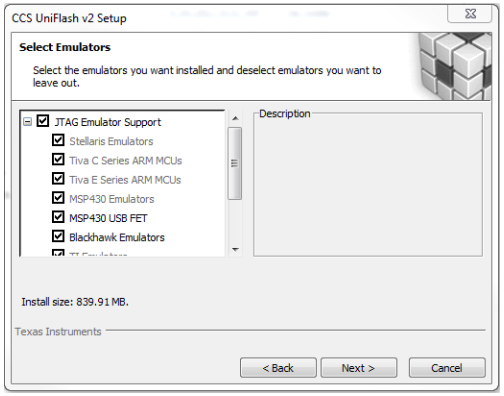


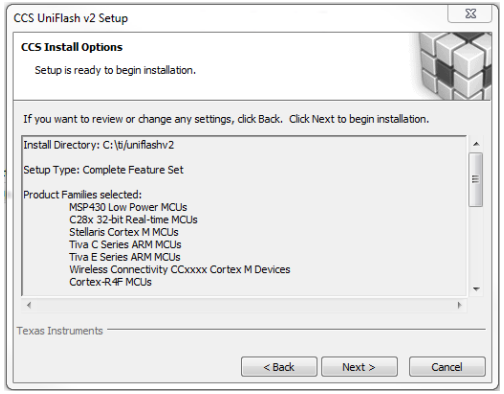


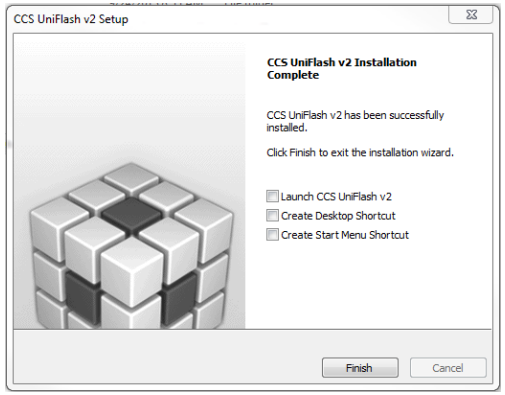


Install UniFlash

- Continue to follow installation instructions, installing the appropriate drivers for the application.

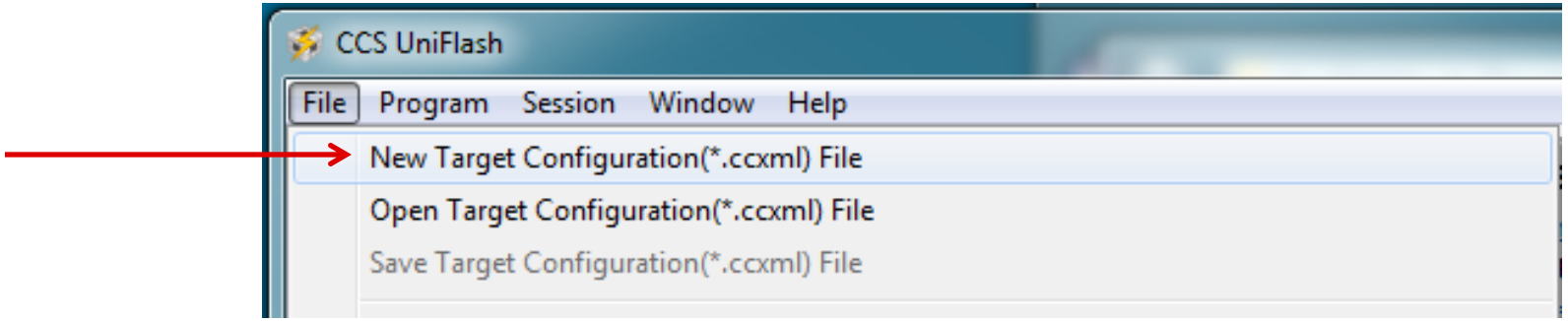




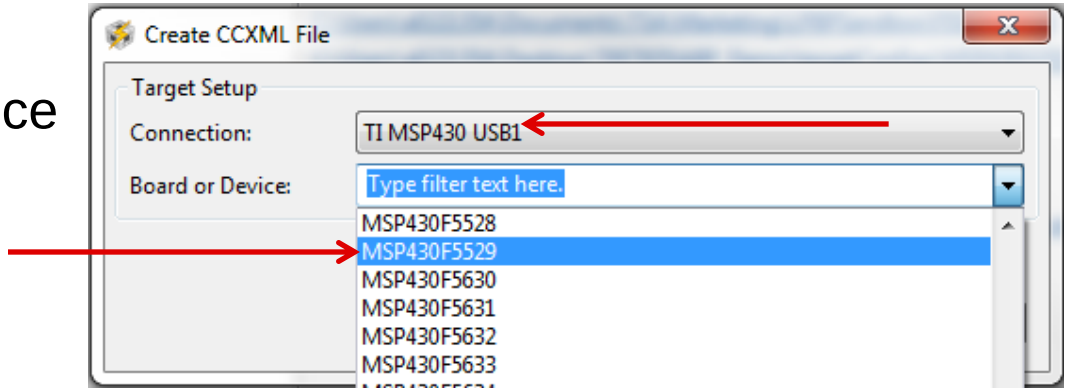


Install the MSP430F5529 Target Configuration

- Click File
- Choose New Target Configuration

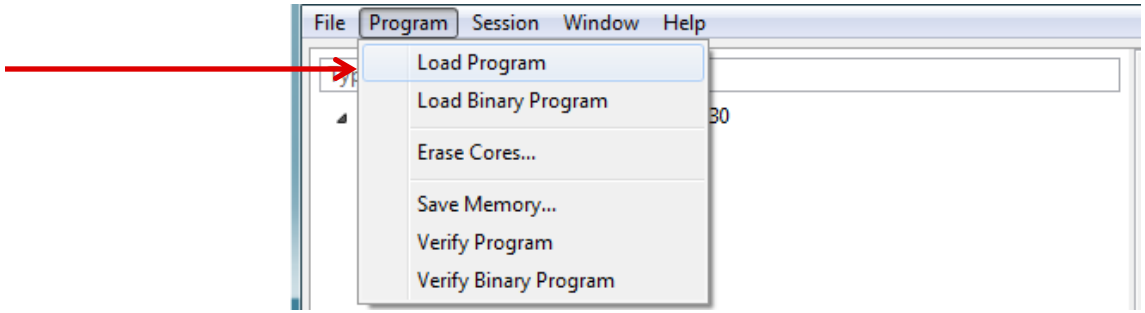


- Select Connection (USB1)
- Select MSP430F5529 Device

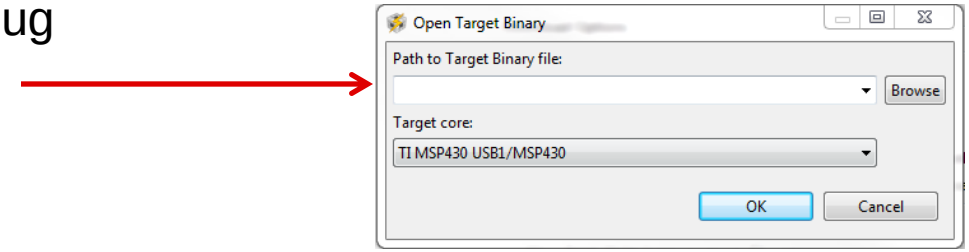


Load the Target Binary

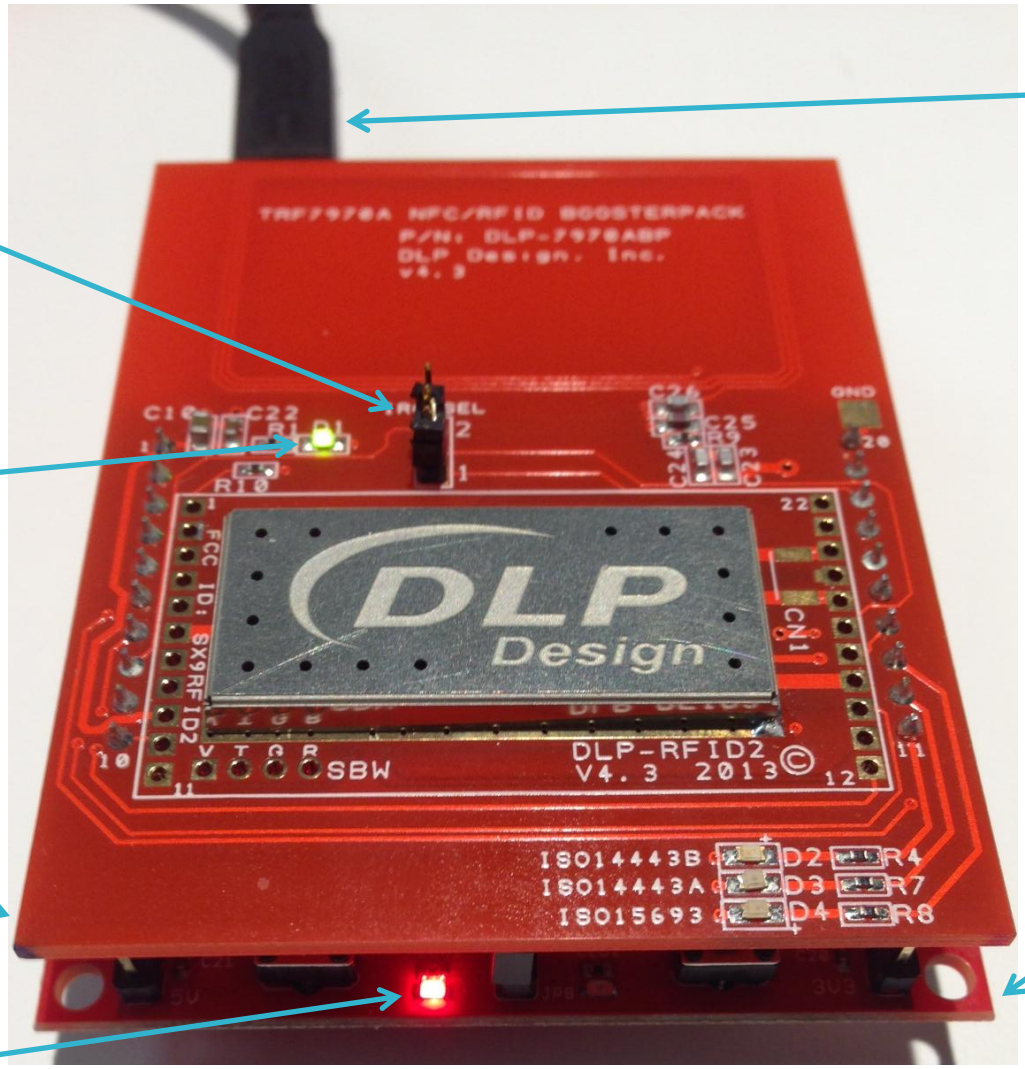
- Click Program
- Choose Load Program



- Select path to “RW_P2P_CE_2.out” within TRF7970ABP software folder, targeting MSP430 LaunchPad Core.
- Default location for program file is:
  - C:\TI\msp430\NFCLink_1.0.0.1\examples\allModes\RW_P2P_CE_2\ccs\Debug



Hardware



USB Connection to PC

Jumper in position 1 for MSP430F5529 LaunchPad

D1 (green when powered)

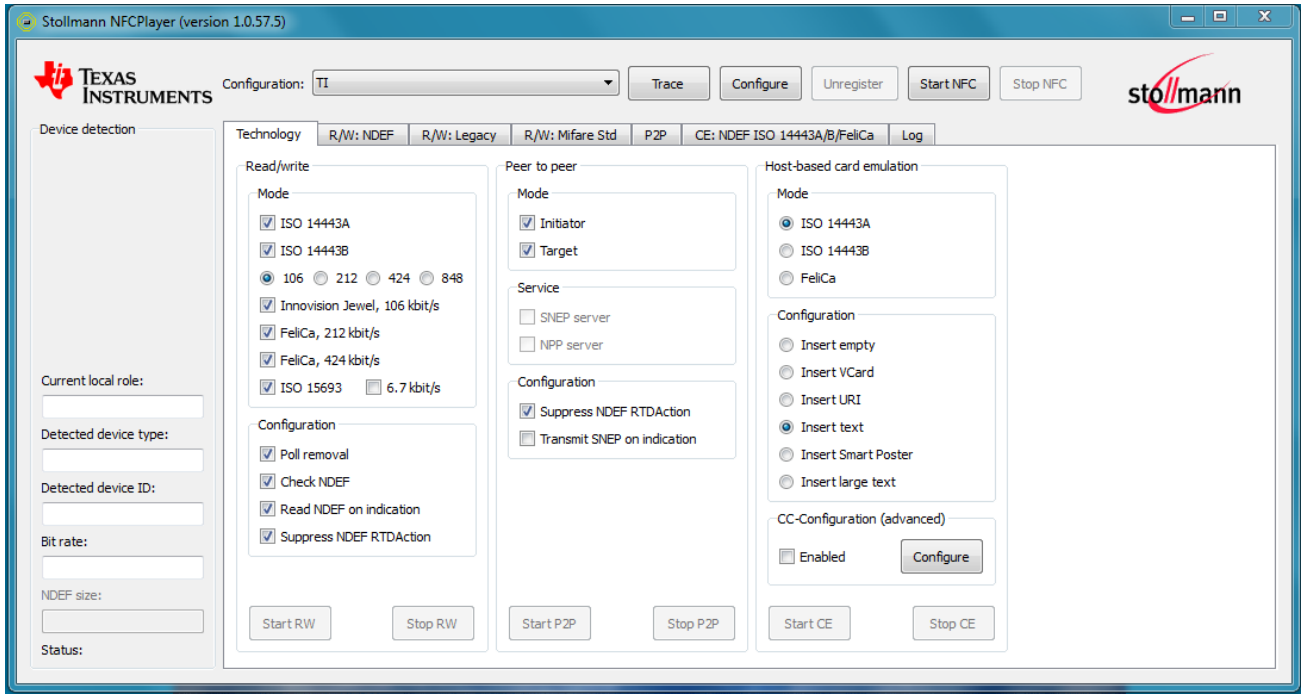
TRF7970ABP

MSP430F5529 LaunchPad

Heartbeat LED (will be blinking when TRF7970A it is initialized after using Uniflash)

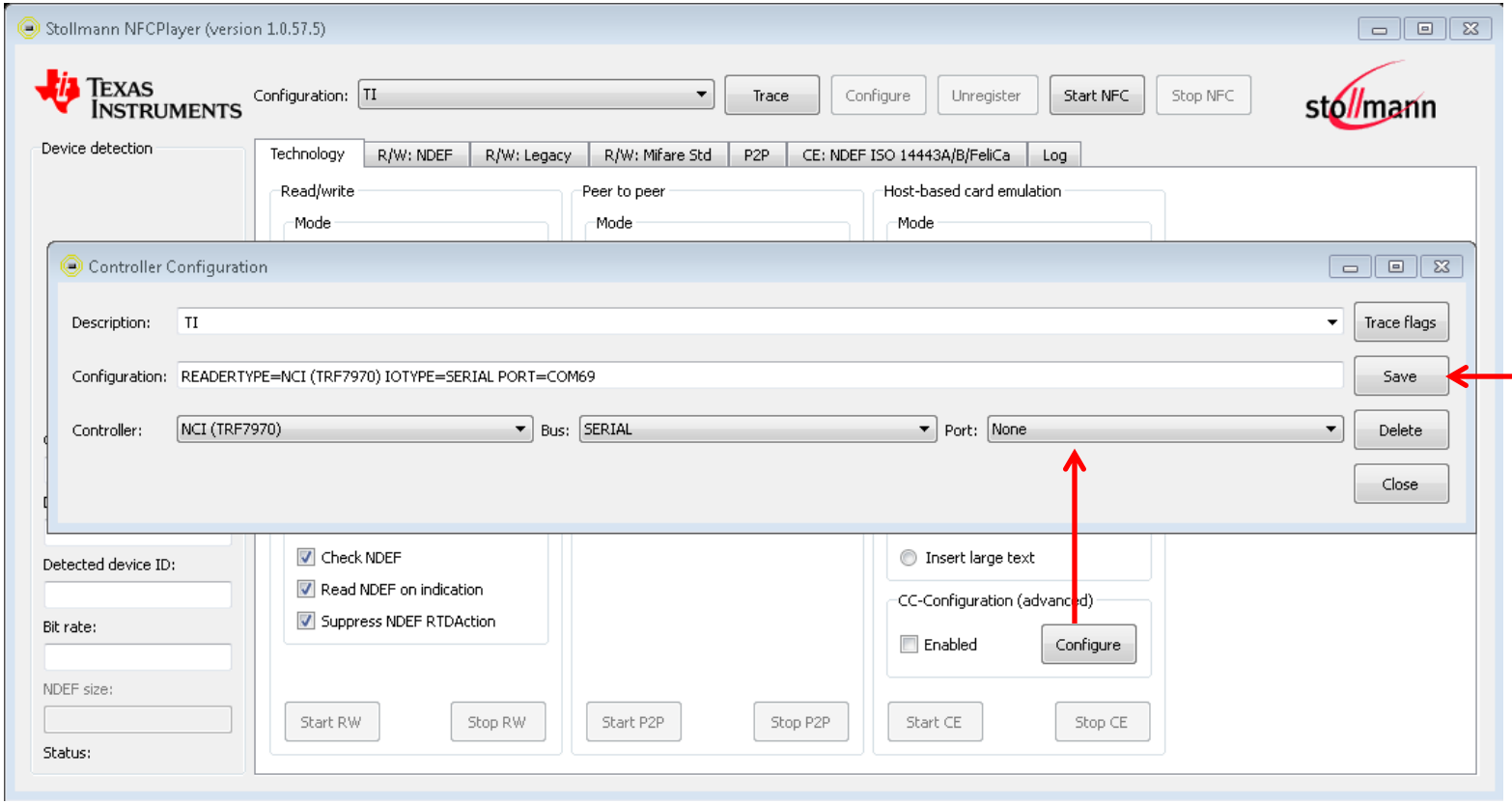
Execute NFCPlayer

- Execute NFCPlayer by double clicking on icon generated during NFCLink installation.
- The GUI will open as seen below.



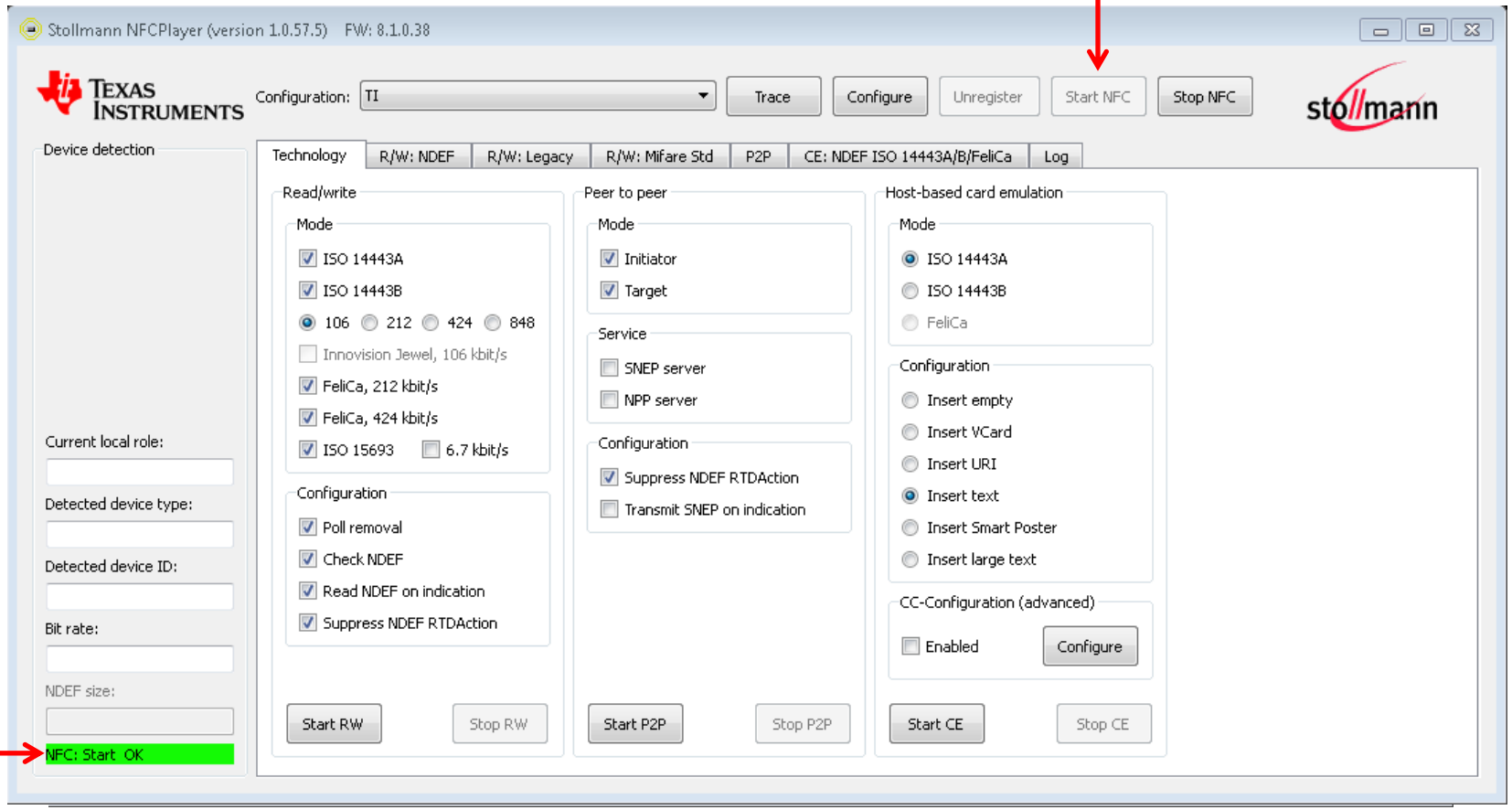
Execute NFCPlayer

- After GUI opens, press the Configure button to pop up sub-screen and type in the number that the COM port enumerated to.
- Save this sub window and close.



Execute NFCPlayer

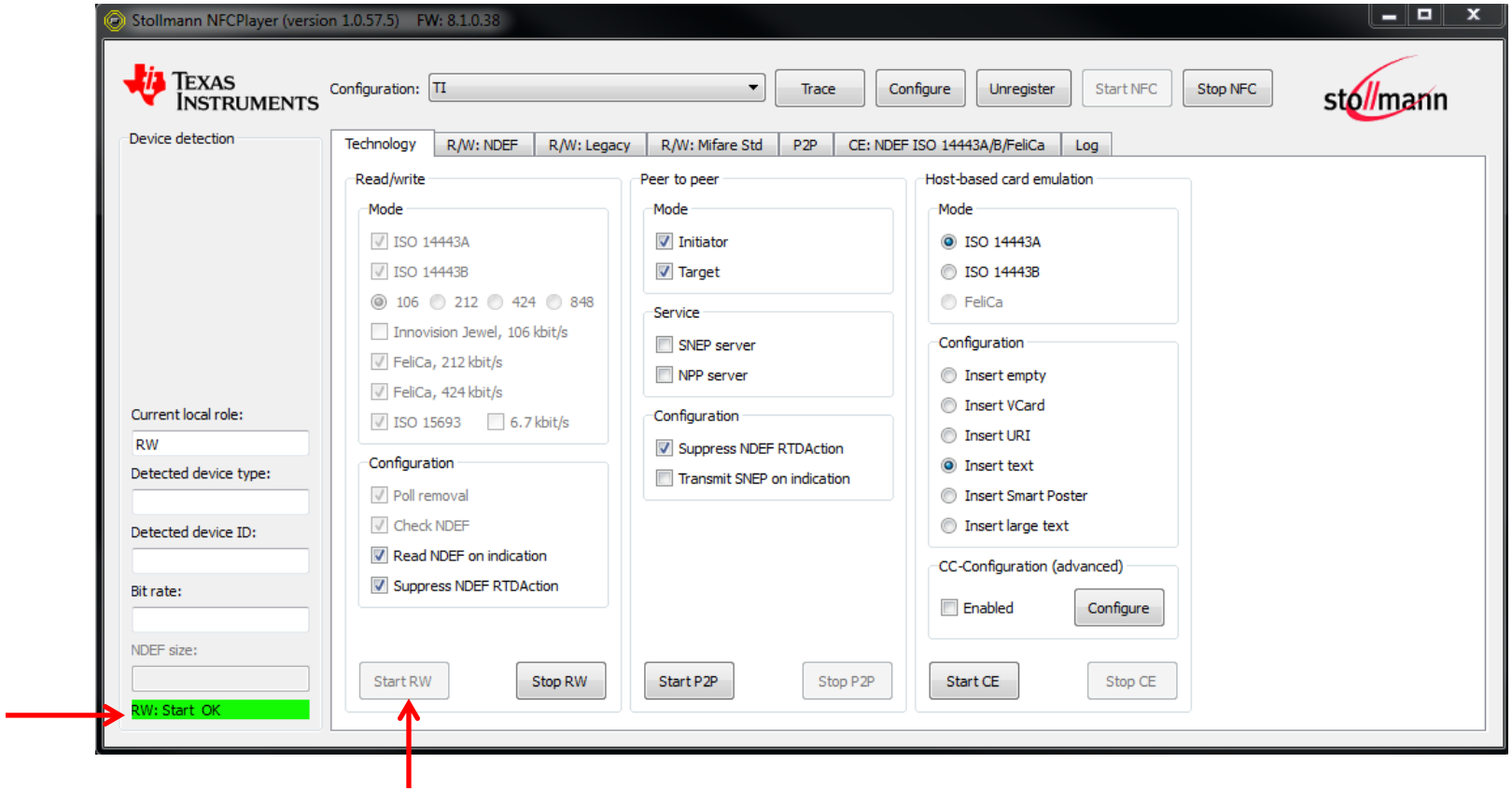
- Press Start NFC Button. NFC: Start OK will appear in lower left hand window of the GUI.



NFC/RFID Read/Write Mode

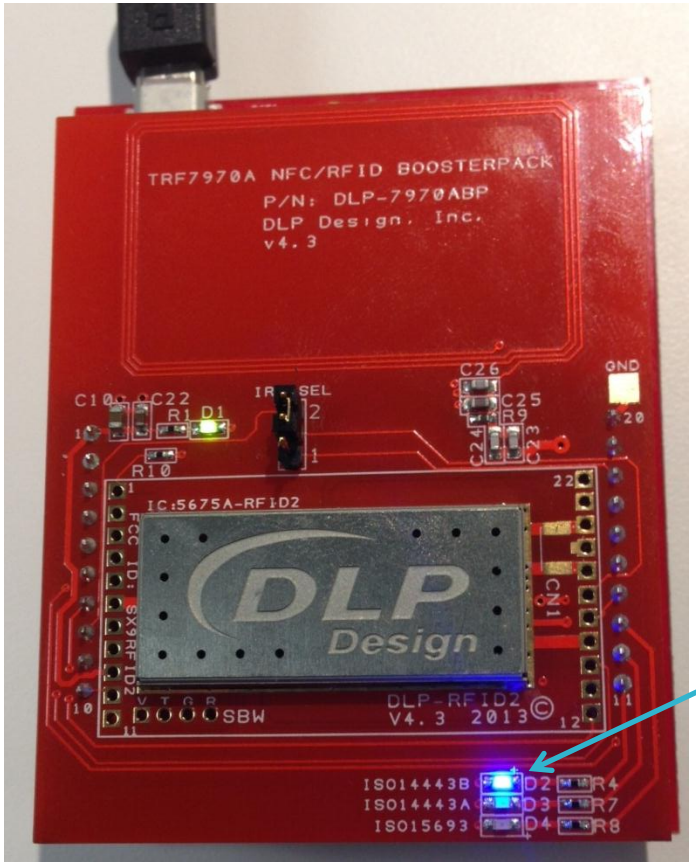
Read/Write Mode

- Press the Start RW button to begin Read/Write Mode.
  - (RW: Start OK will appear in green in lower left hand window of the GUI)



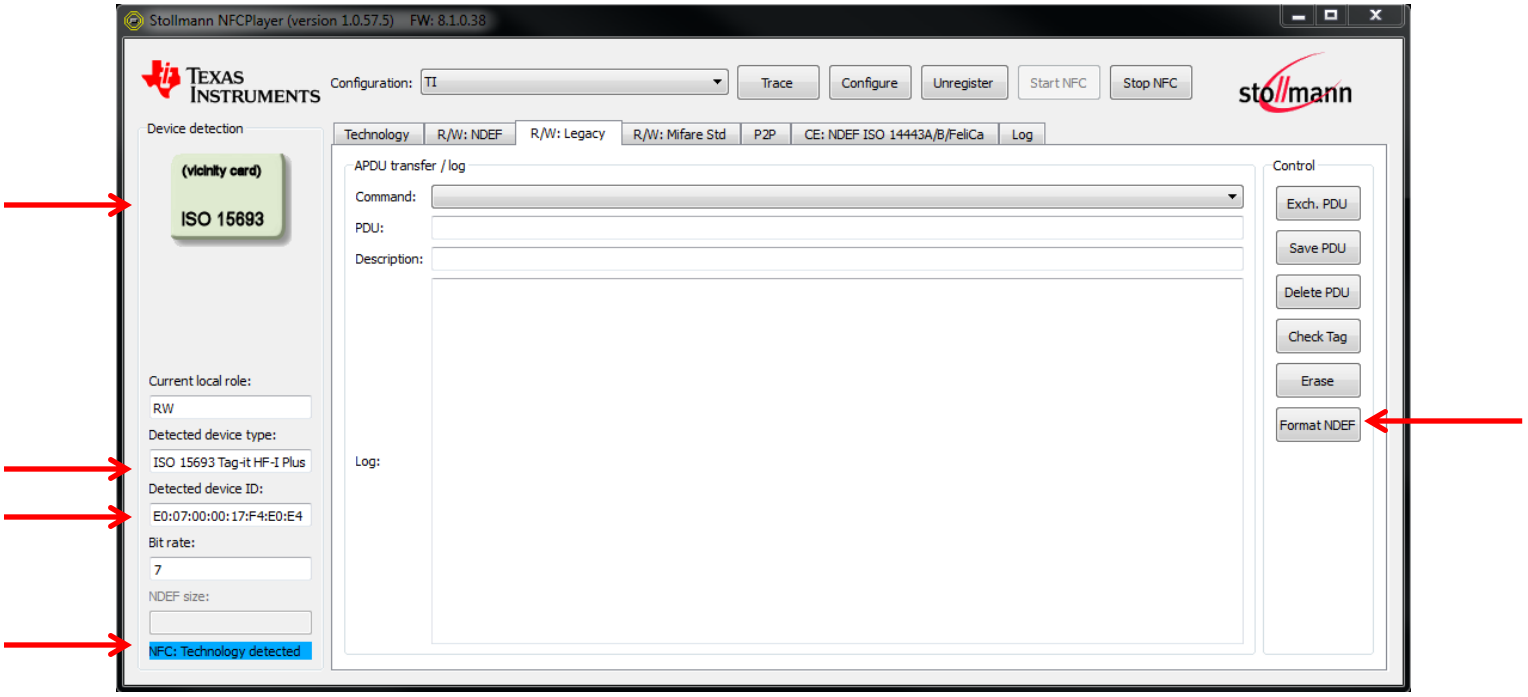
Read/Write Mode

- When hardware is in Read/Write mode, D2 will be flashing. The LED will switch to solid when any NFC/RFID tag is presented.



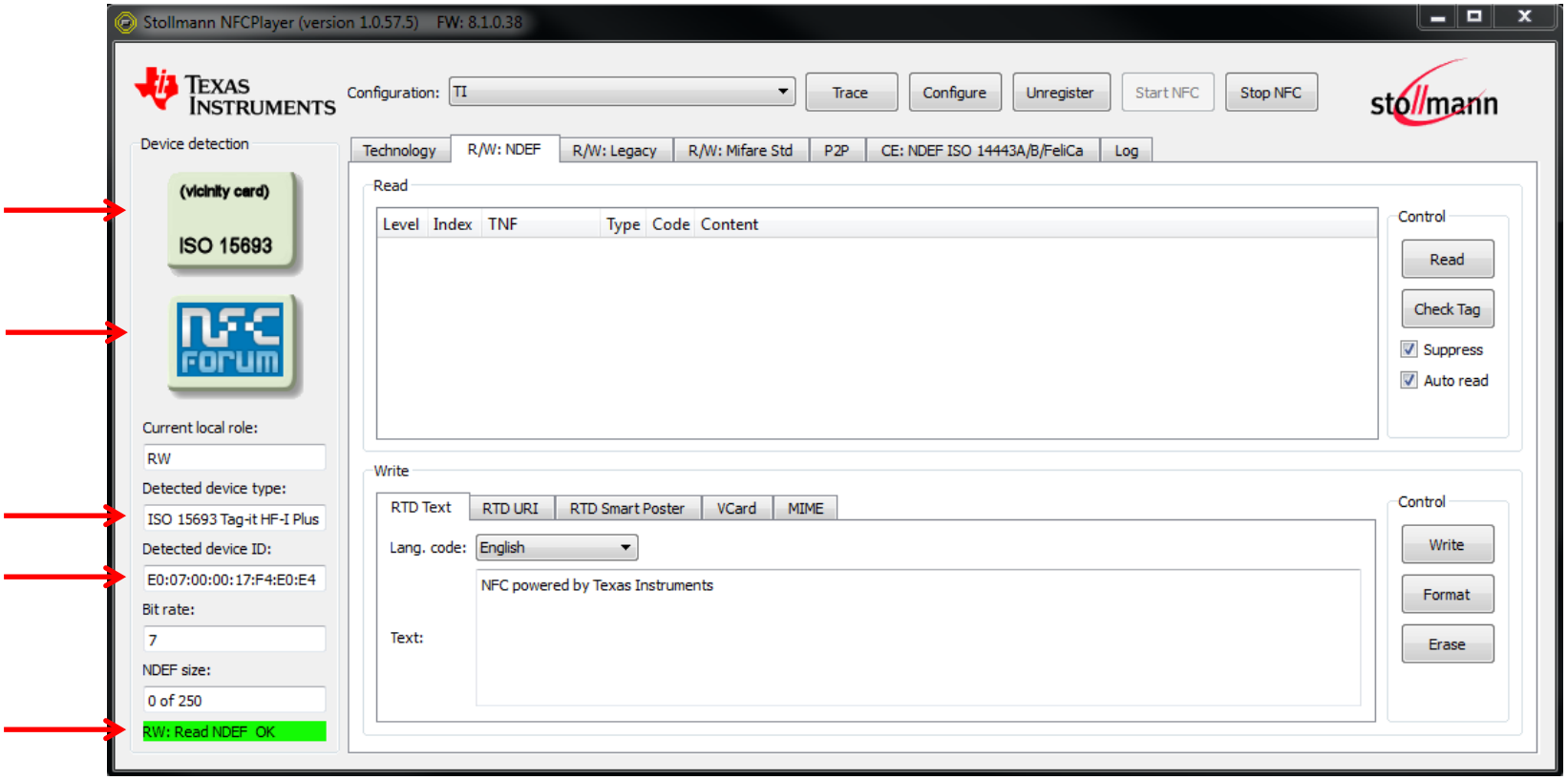
Read/Write Mode NFC-V Tag

- Present any NFC-V tag (unformatted NFC-V ISO15693, TI HF-I tag shown).
  - Tab automatically flips to R/W: Legacy. Type of card is displayed graphically along with the Unique ID (in this case: E007000017F4E0E4)
  - Press the Format NDEF button to make the tag NFC-V type.



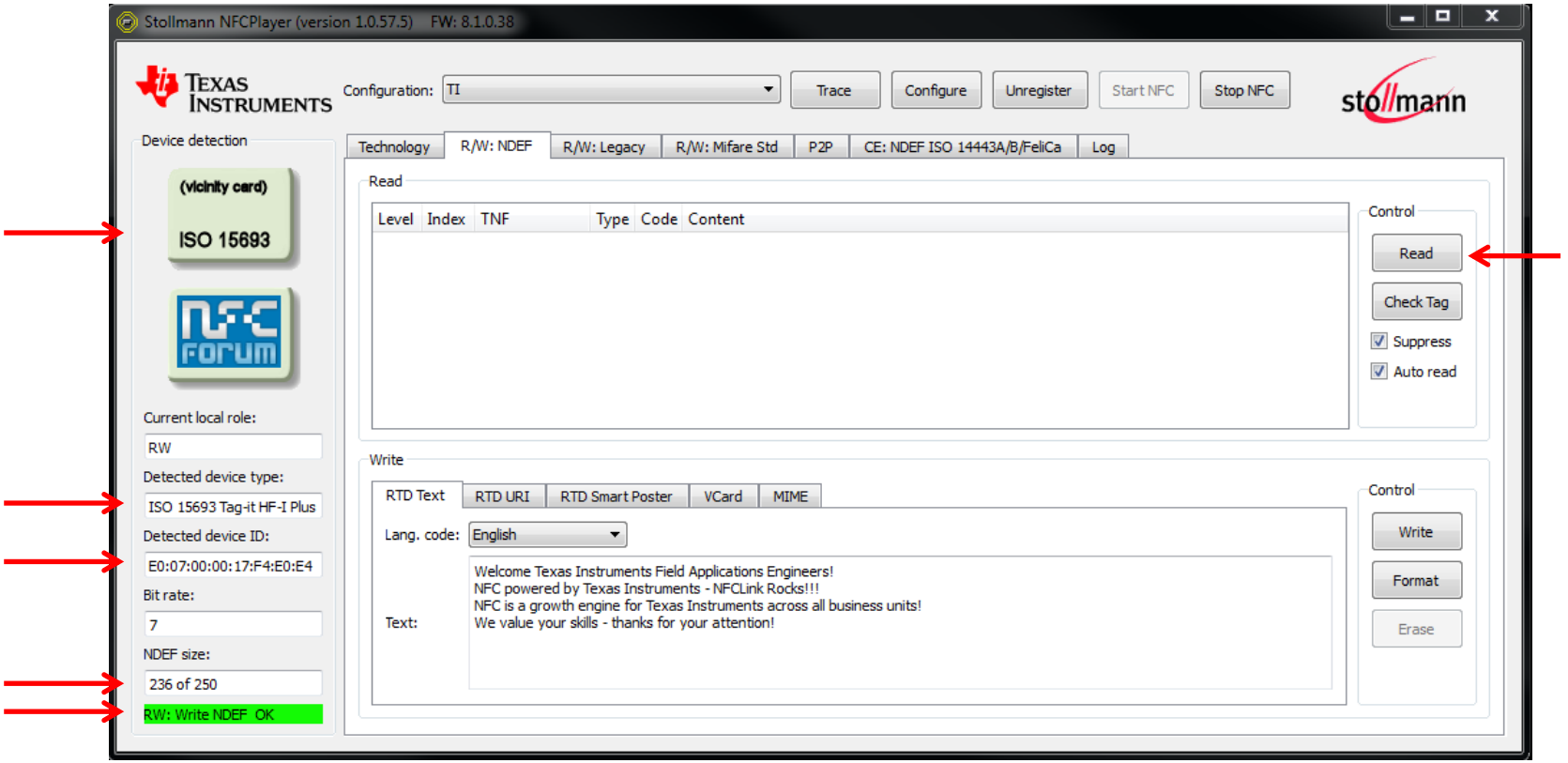
Read/Write Mode NFC-V Tag

- After the tag is formatted, the GUI status window will quickly flip to Format NDEF OK, then the R/W NDEF tab will open, with the status changing to RW: Read NDEF OK.



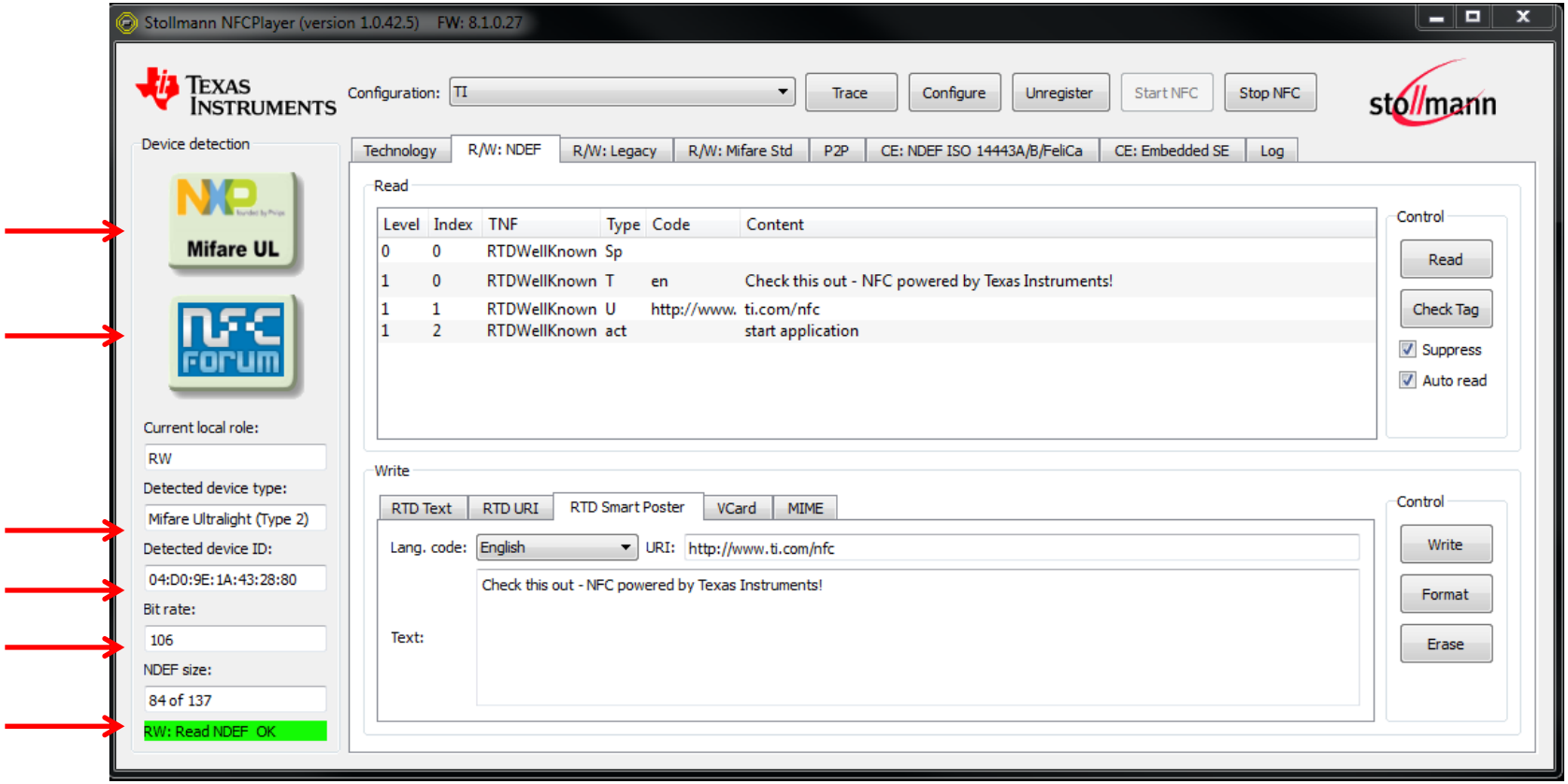
Read/Write Mode NFC-V Tag

- Enter data into Text field and press Write button to write the tag.
- The screen will quickly flip to Write NDEF. Press Read or remove/re-present tag to read newly written data.



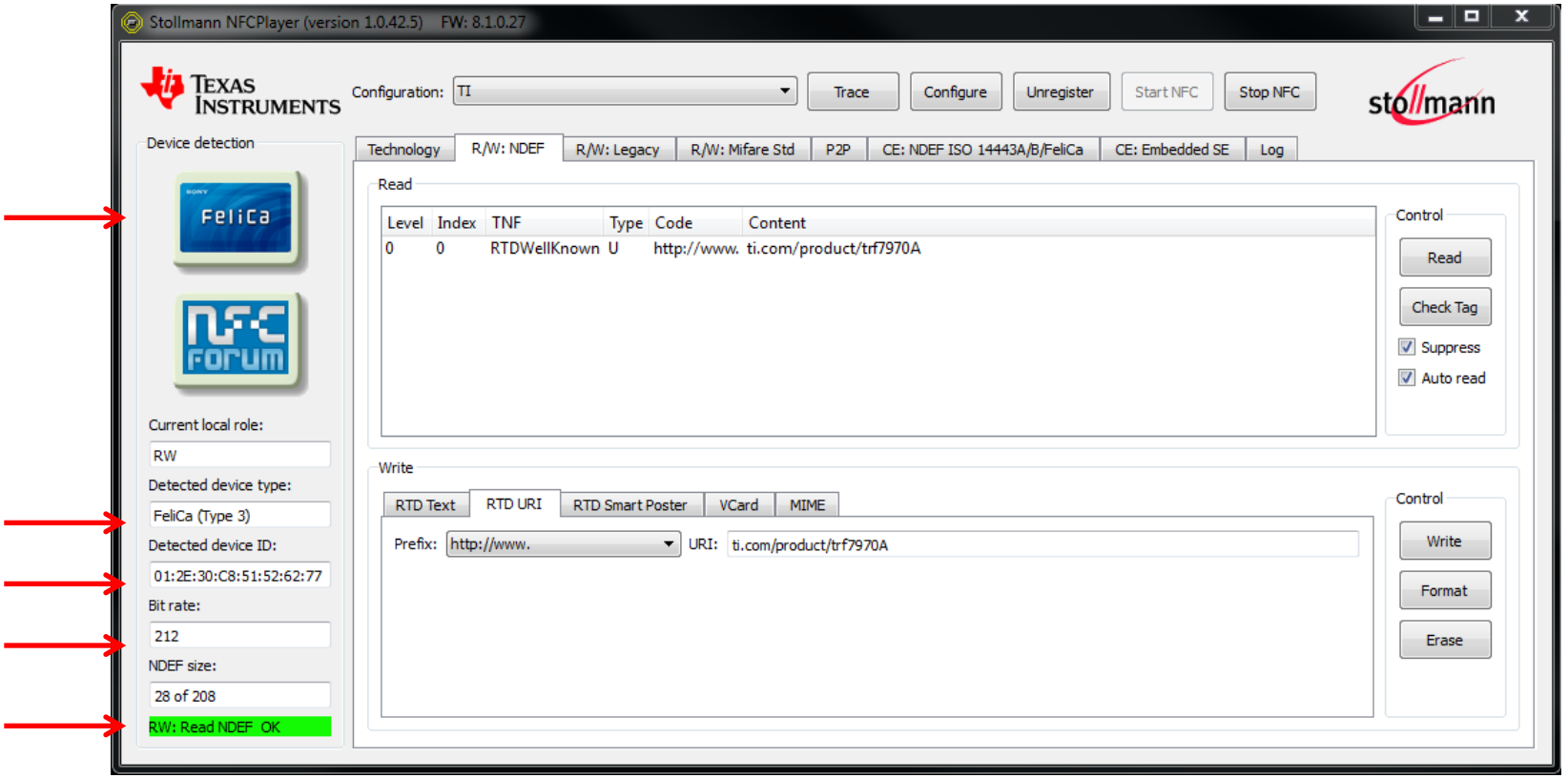
Read/Write Mode NFC Type 2 Tag

- Present Type 2 tag (programmed RTD Smart Poster tag shown).
- If Suppress NDEF RTD Action (in front panel) box is unchecked, tag will open programmed web page.



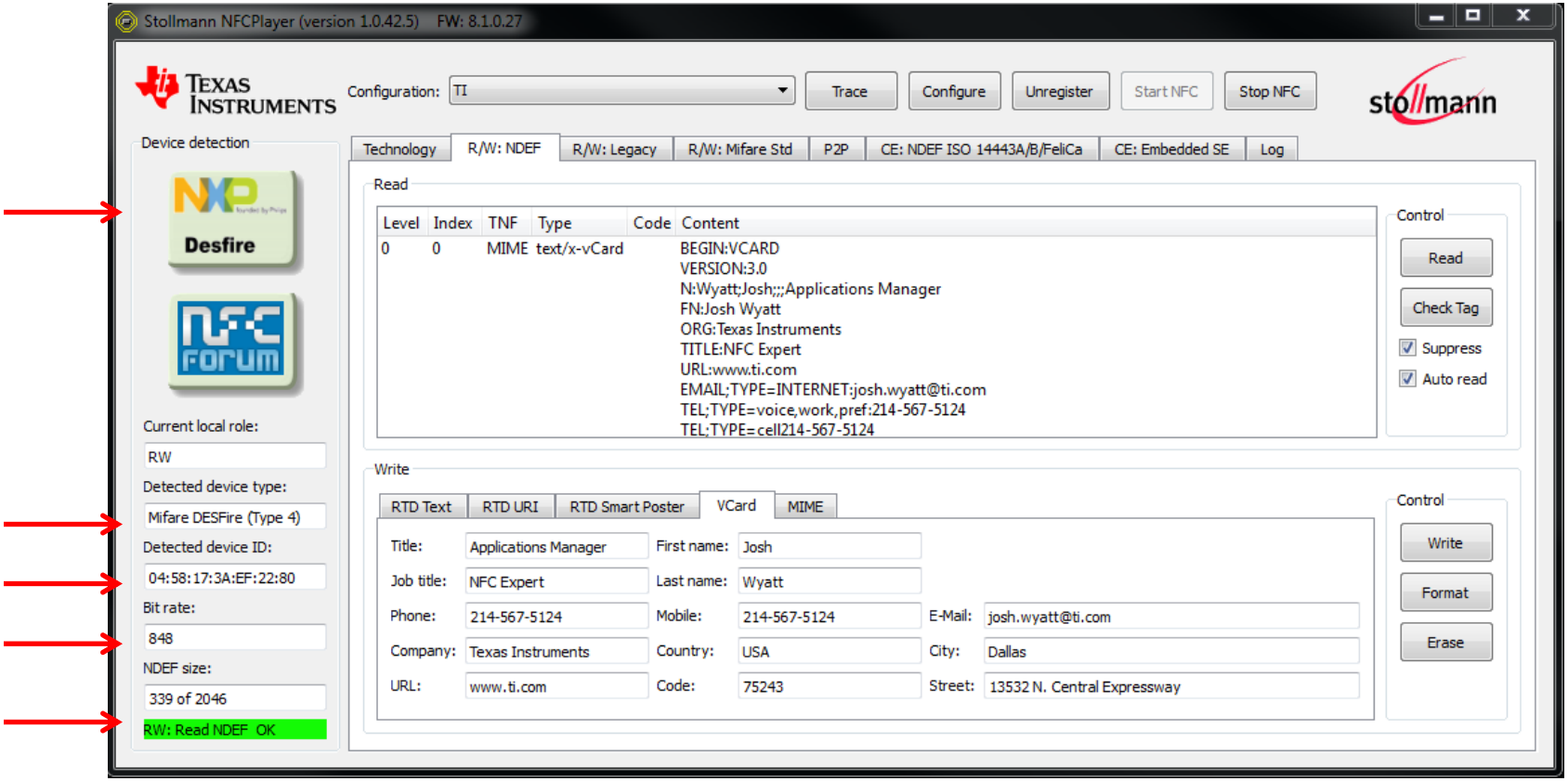
Read/Write Mode NFC Type 3 Tag

- Present Type 3 tag (RTD URI tag shown).



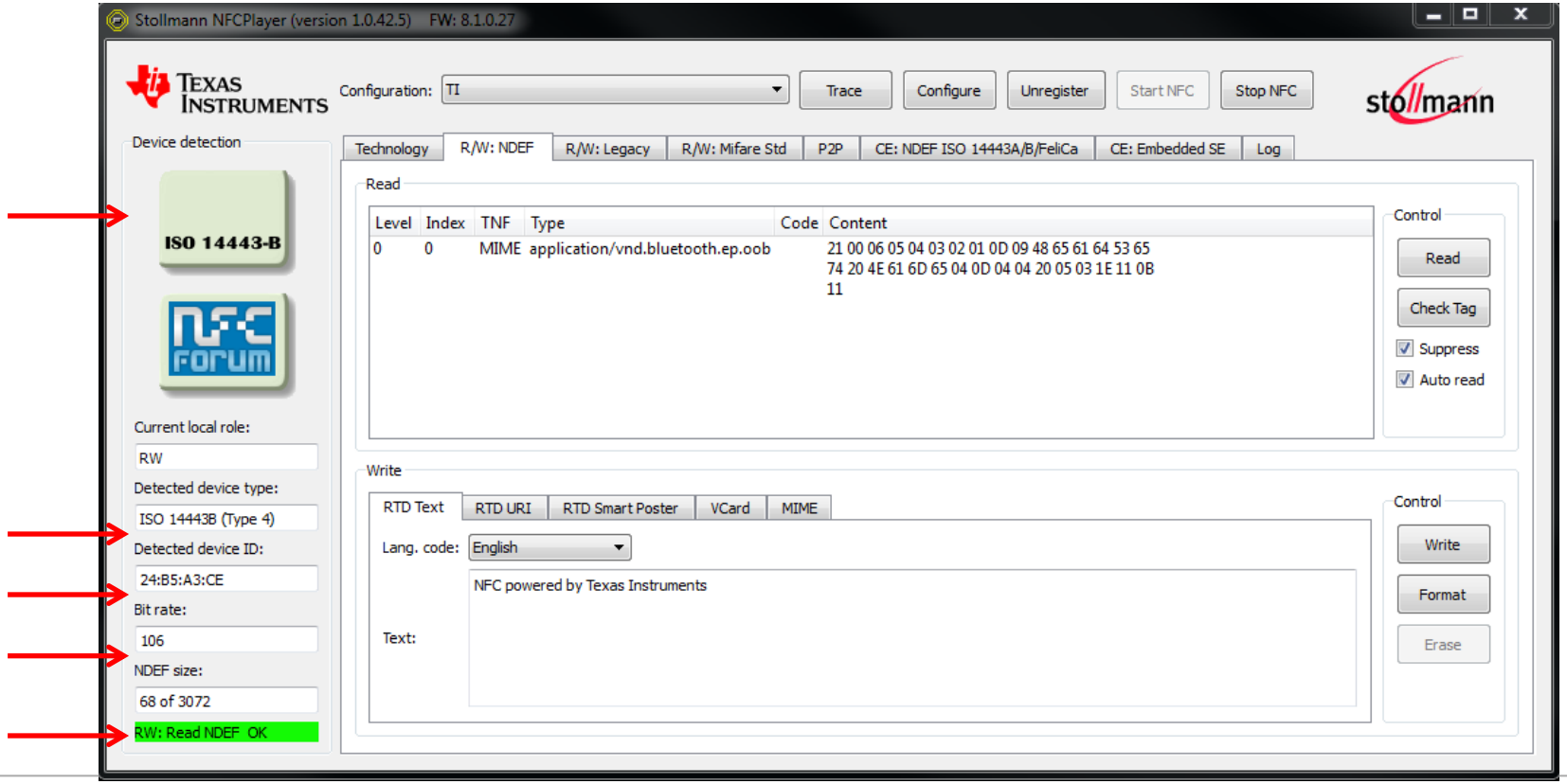
Read/Write Mode NFC Type 4A Tag

- Present Type 4A tag (vCard programmed Type 4A tag).



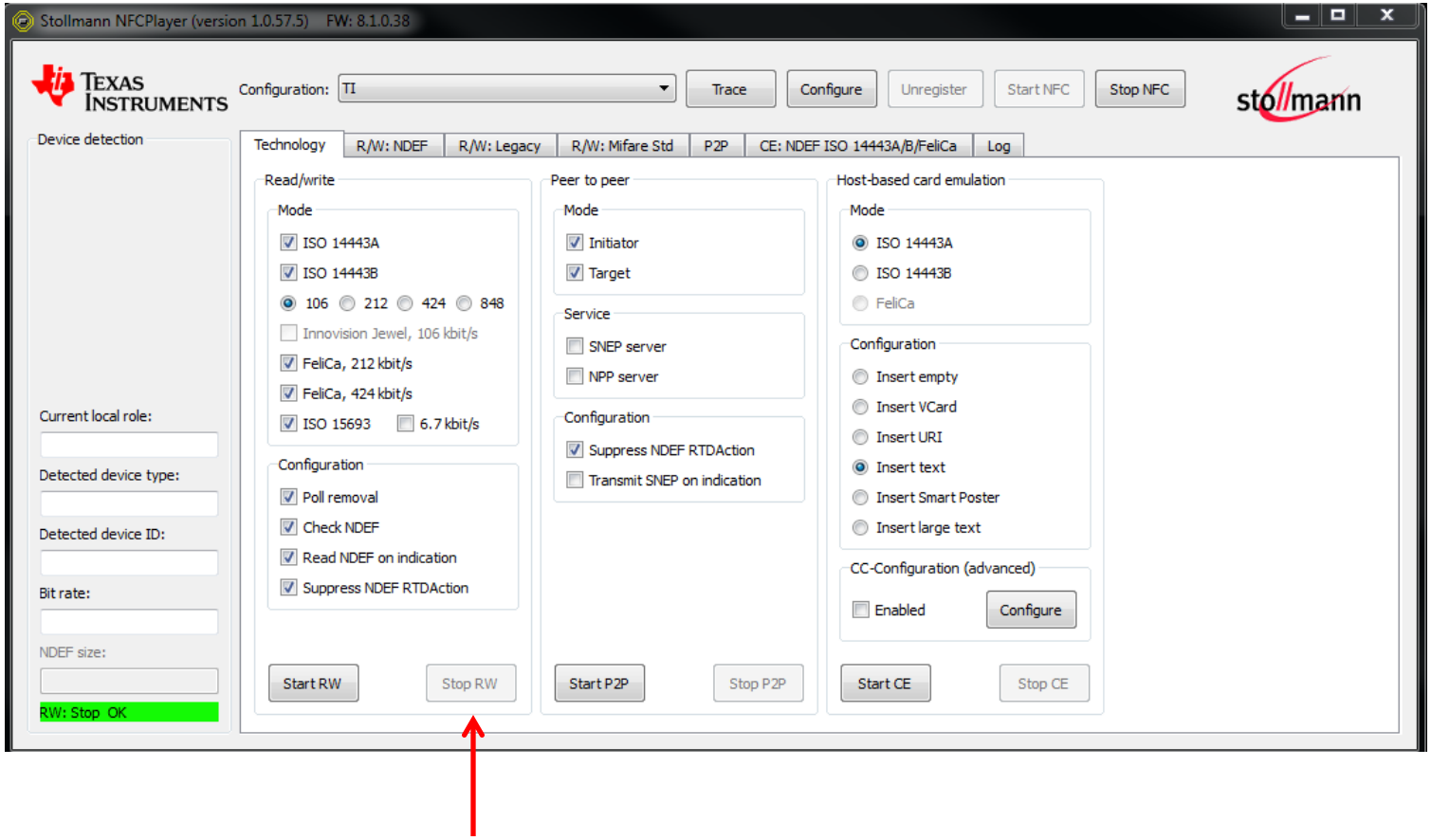
Read/Write Mode NFC Type 4B Tag

- Present Type 4B tag (RF430CL330H which has been formatted and programmed for NFC Forum Bluetooth Connection Handover shown).
- Enter data into Write field and press Write.



Exiting or Stopping the Read/Write Mode

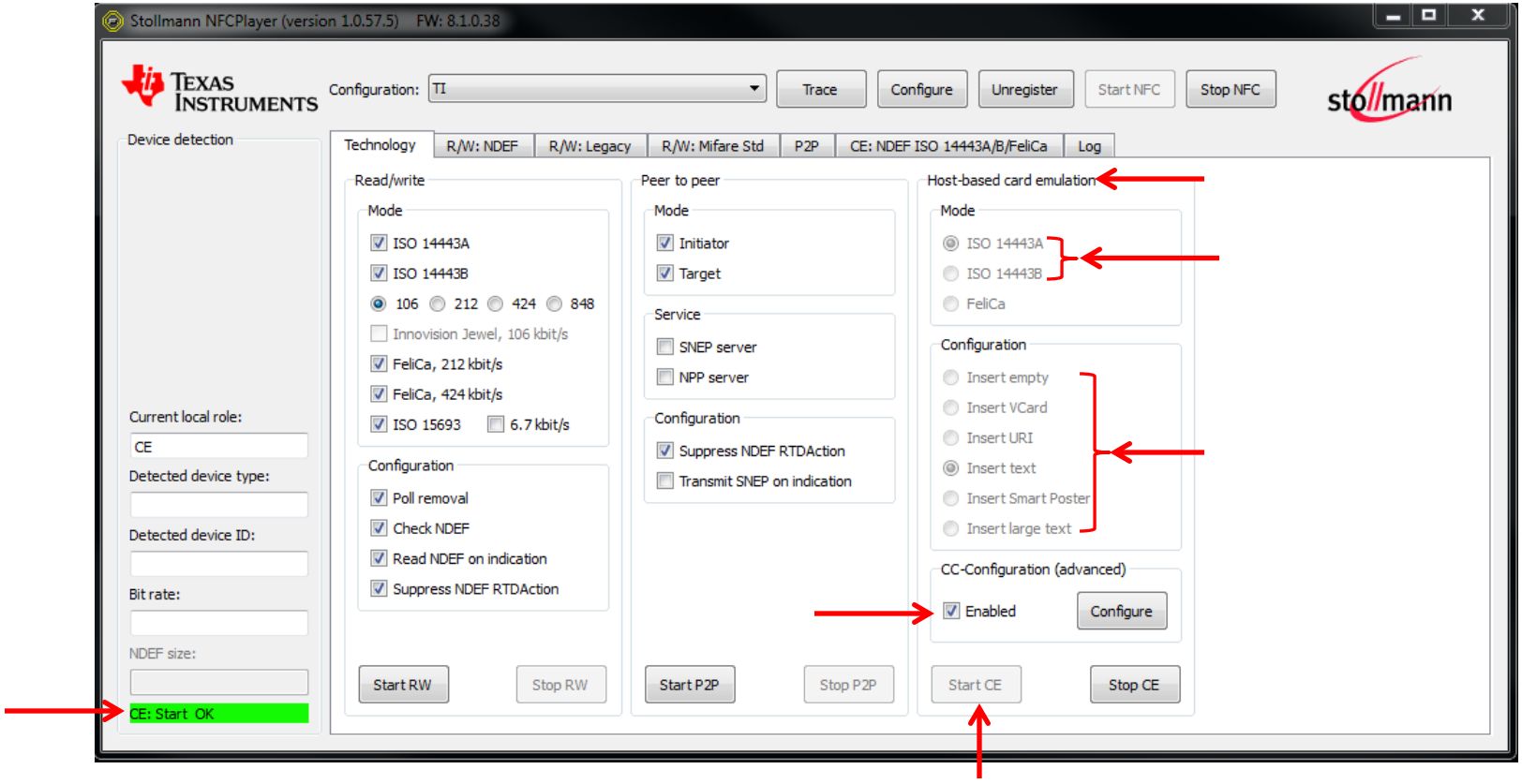
- To stop the R/W mode, remove the tag in the field and press the Stop RW button.



NFC/RFID Card Emulation Mode

Card Emulation Mode

- Under Host-based card emulation, choose the Mode and the Configuration, then press the Start CE button.
  - (CE: Start OK will appear in lower left hand window of the GUI)

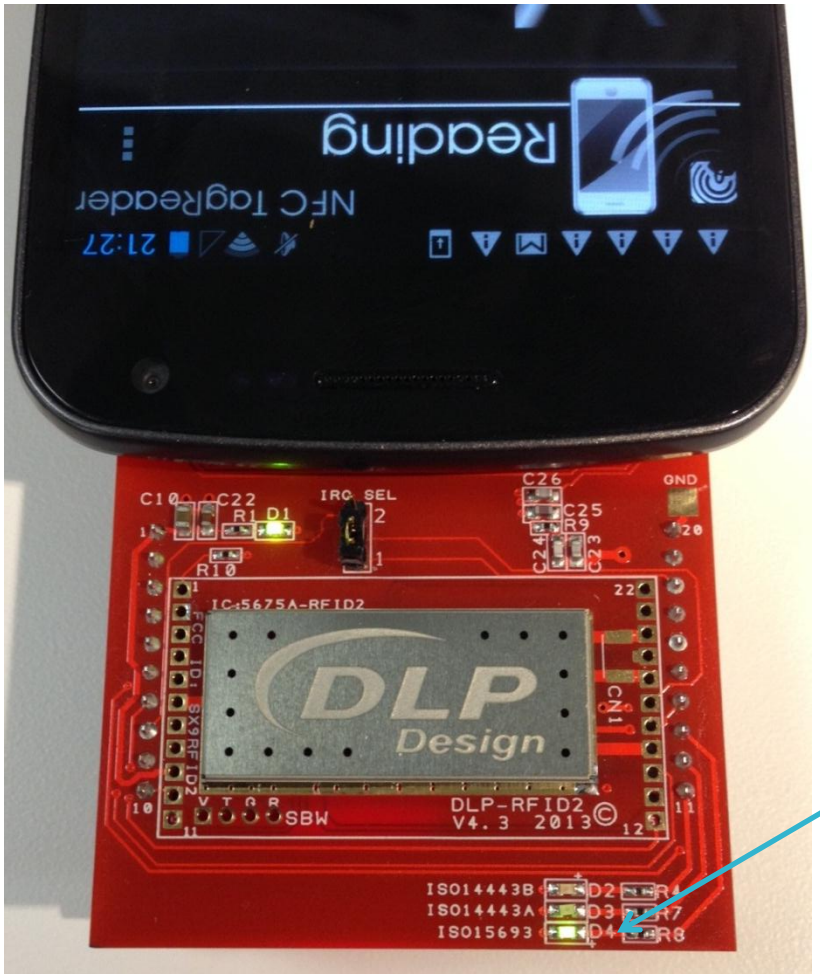


Card Emulation Mode

- When hardware is in card emulation mode, D4 will be solid.

Card Emulation Mode

- Place NFC enabled device above BoosterPack antenna.



Card Emulation Mode

Card Emulation Mode

- When an NFC enabled reader/writer is presented, the BoosterPack will read like a passive NFC/RFID tag.
- Screen captures below from NFC TagReader (KDDI).

VCard

URI

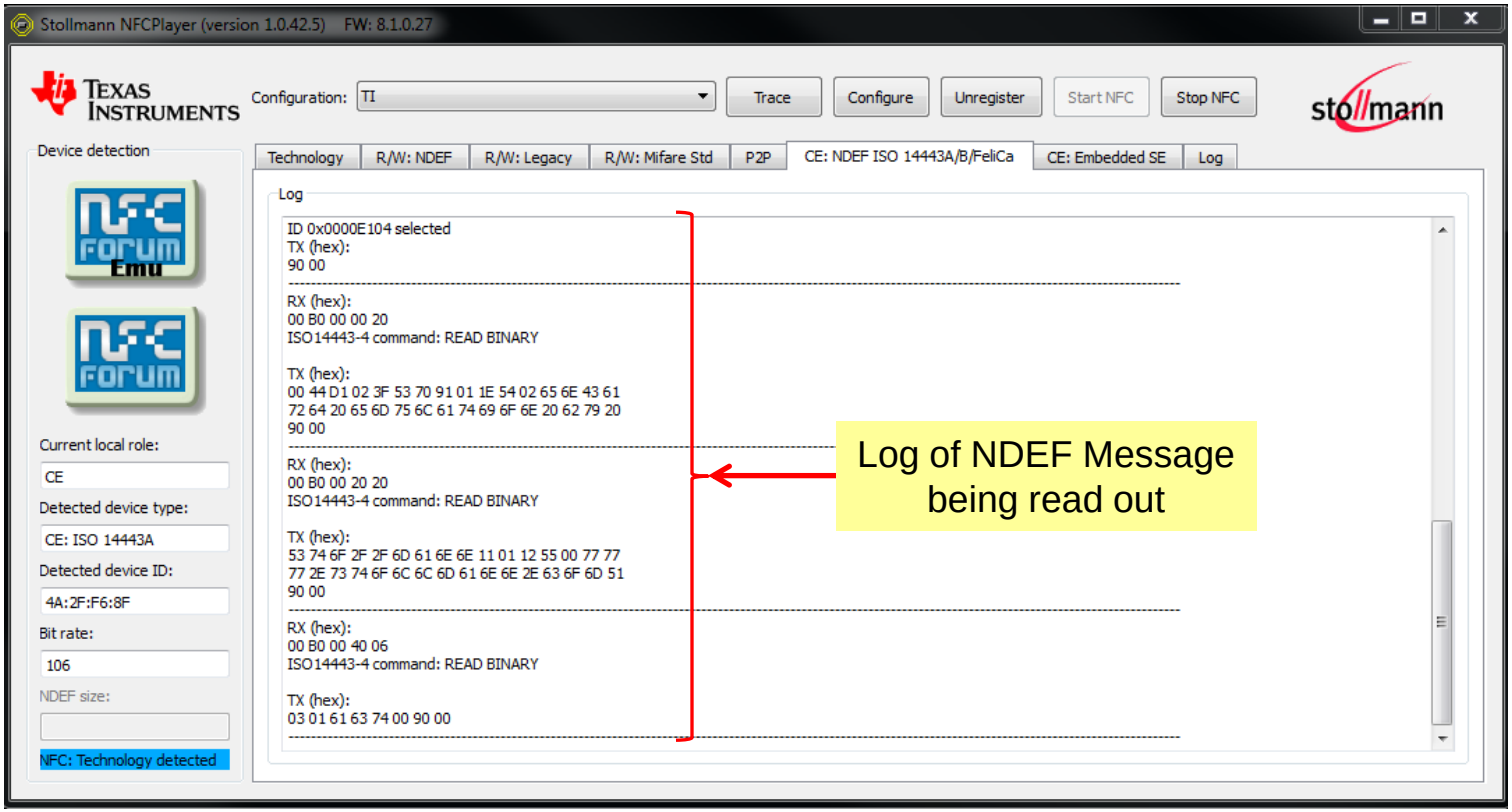
text

Smart Poster

Large text

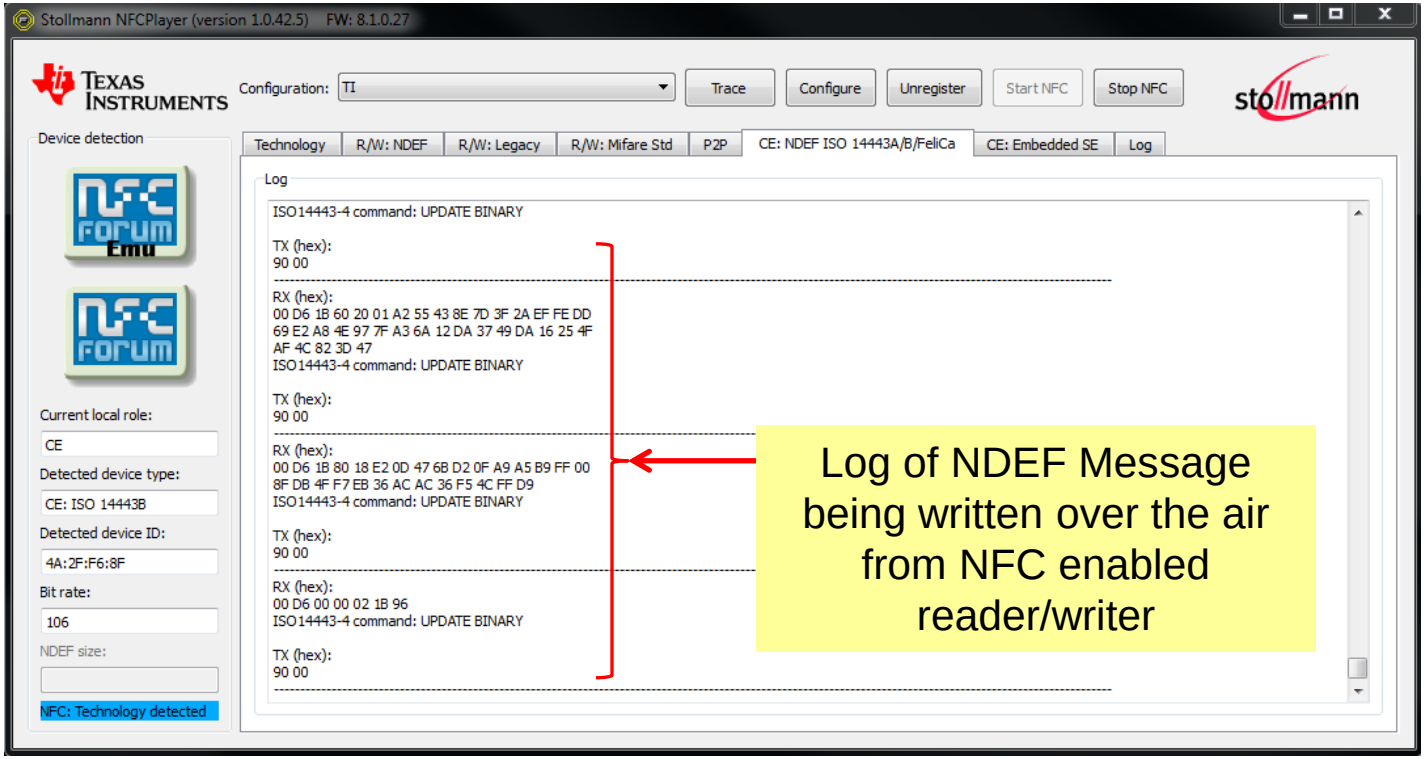
Card Emulation Mode

- NFCLink will read out packet activity between NFC enabled reader/writer and BoosterPack.



Card Emulation Mode

- An NFC enabled reader/writer can write an image to the BoosterPack, as shown below.

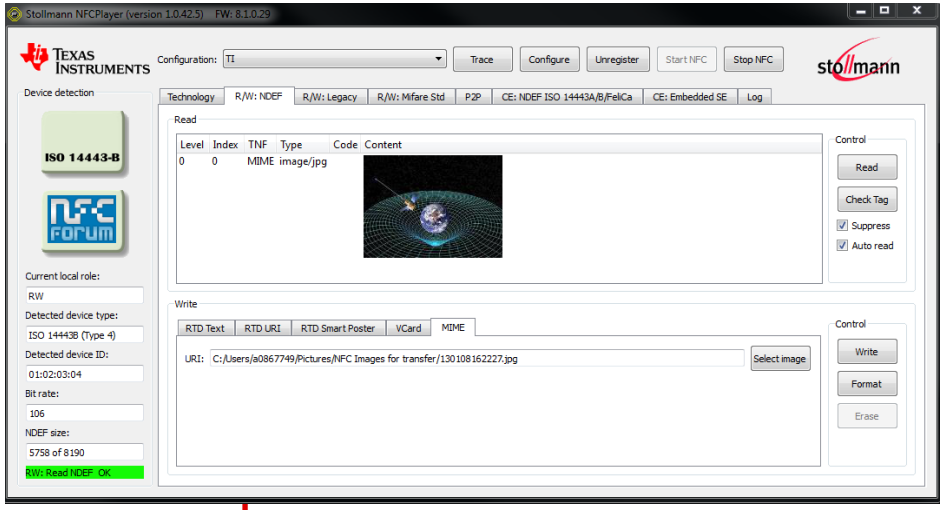


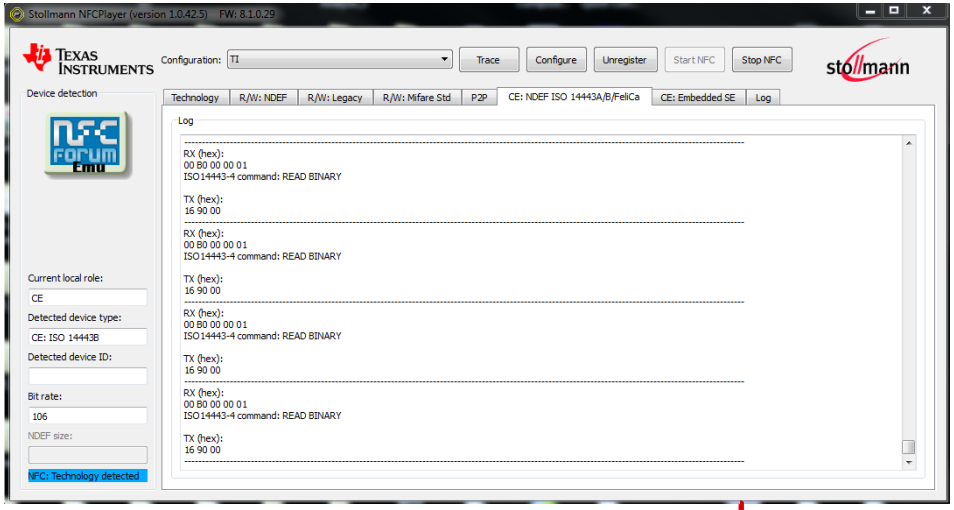
Card Emulation Mode

- NFC enabled reader/writer can read image back from written BoosterPack card emulation tag.

R/W & Card Emulation Modes used in conjunction with one another

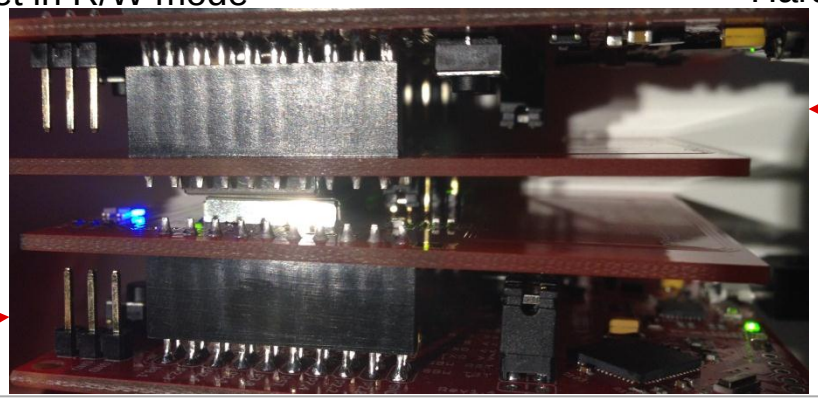
- Two instances of NFCLink with two LaunchPads with BoosterPack can communicate using CE and R/W mode simultaneously.





Hardware set in R/W mode

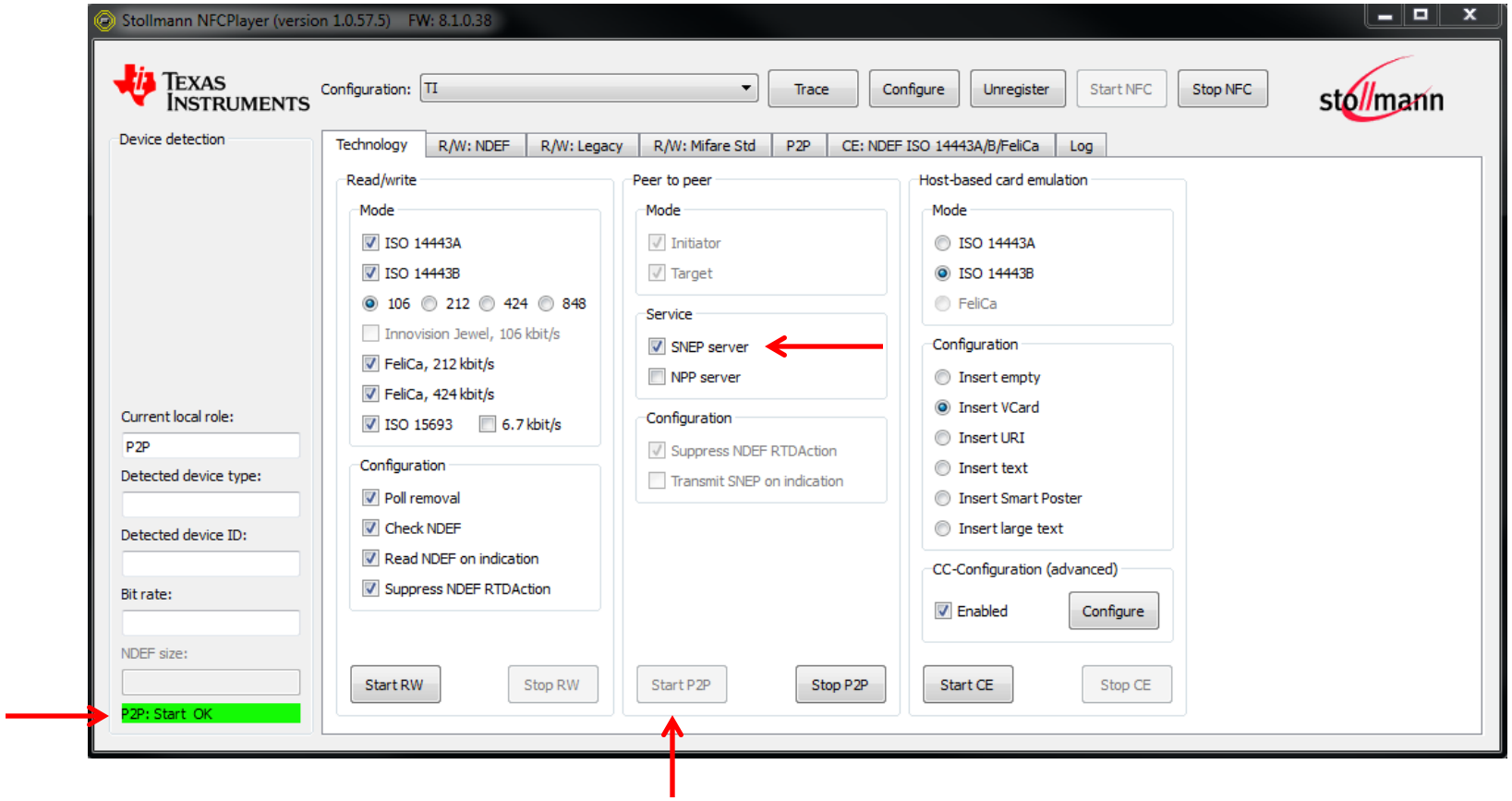
Hardware set in CE mode



NFC/RFID P2P Mode

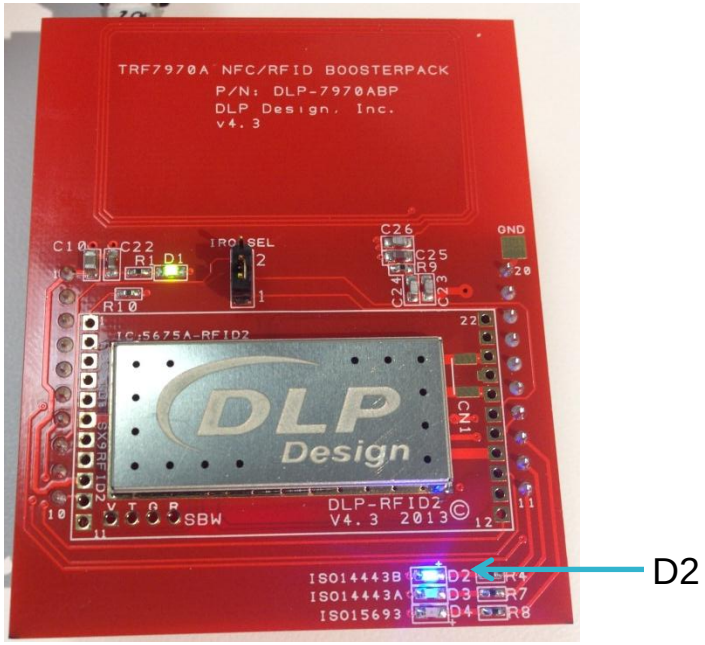
Peer to Peer Mode (P2P)

- Under the Peer to Peer column, choose the SNEP box, then press the Start P2P button.
  - (P2P: Start OK will appear in lower left hand window of the GUI)

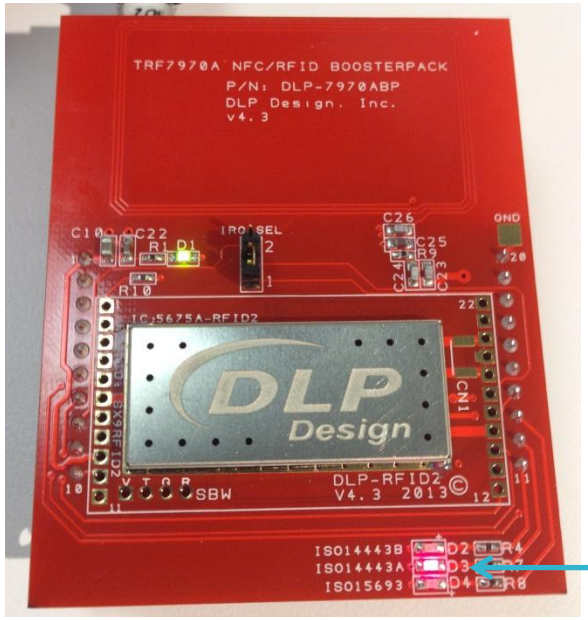


Peer to Peer Mode (P2P)

- D2 & D3 will flash alternately in P2P mode until another NFC device is presented.
- When NFC device is presented, the LED that is currently on will remain on for the duration of the connection.
- After transfer is complete, the LEDs will go back to alternately flashing



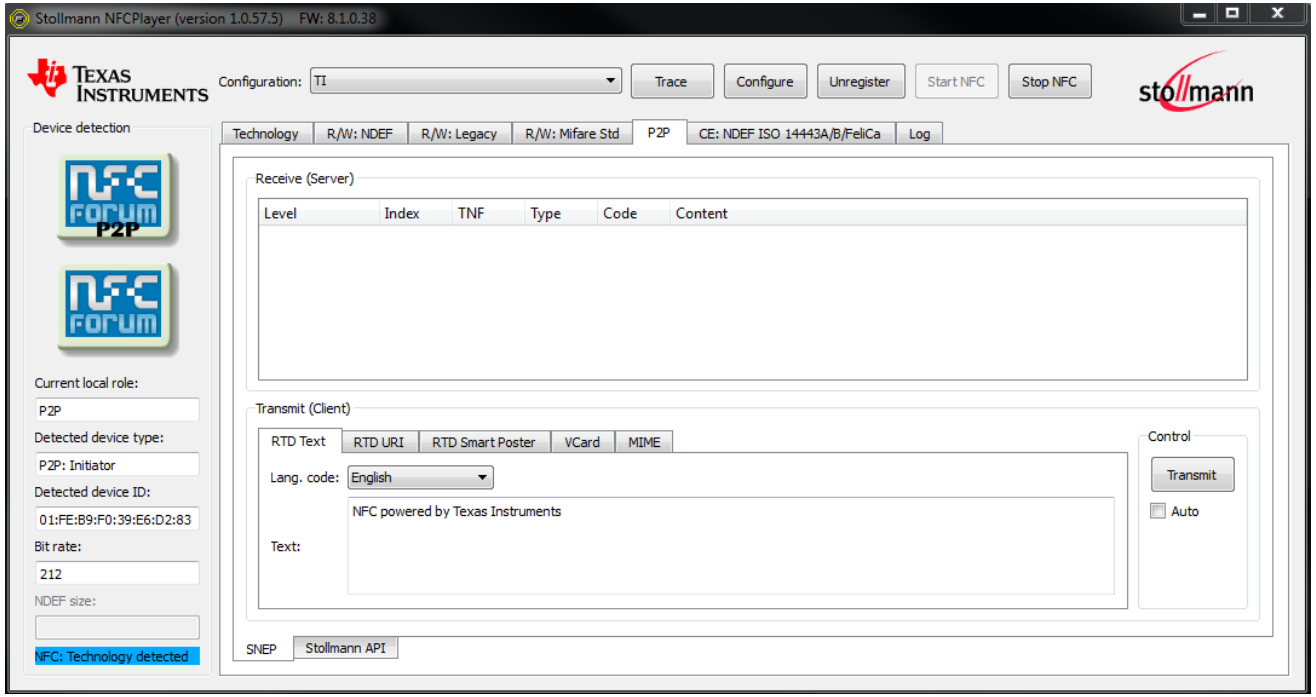
D2



D3

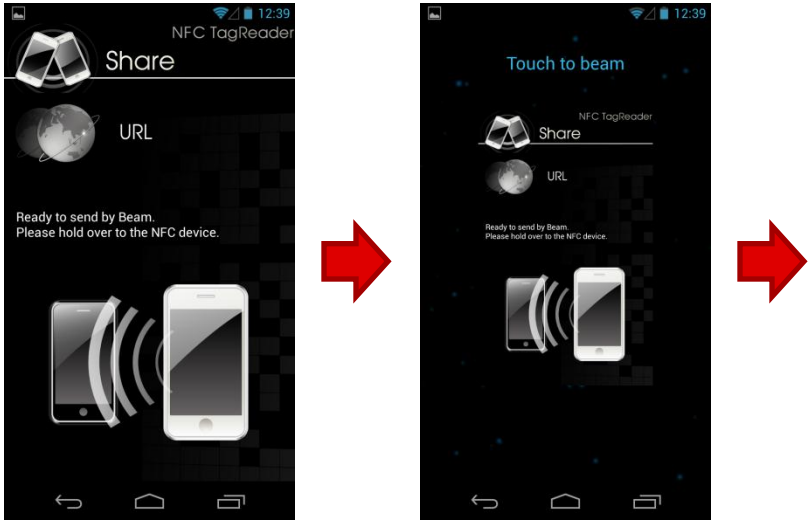
Peer to Peer Mode (P2P)

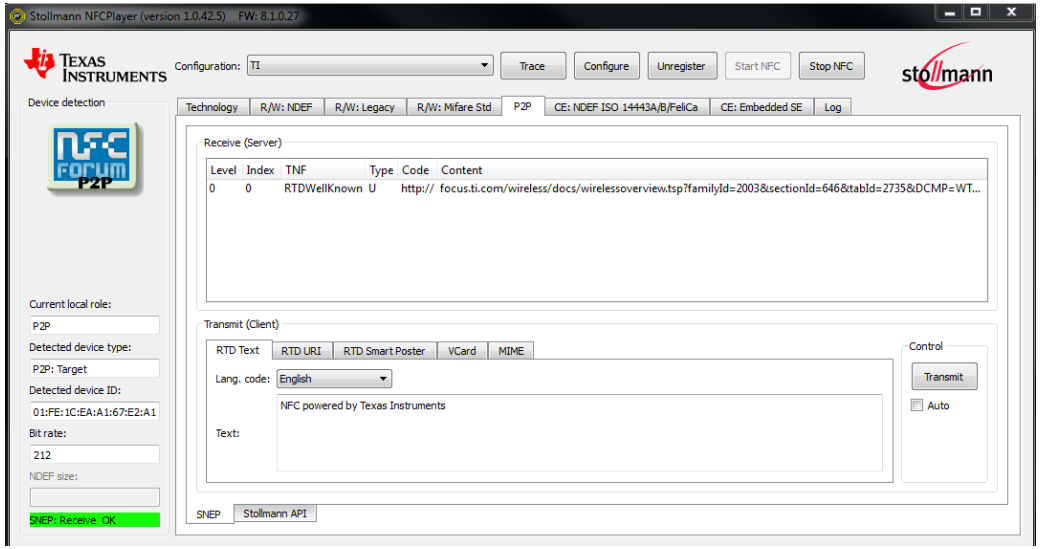
- Present NFC Enabled device. The GUI screen flips over to P2P mode.
- Message can now be sent from GUI to the NFC enabled device using the Transmit button. This will open the native or default application.



Peer to Peer Mode (P2P)

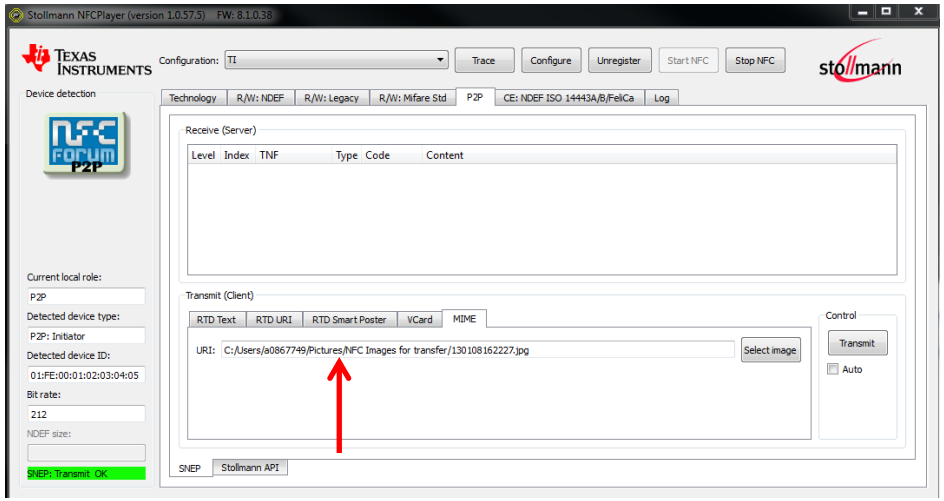
- Send message from the NFC enabled device to the GUI.
- The BoosterPack can send/receive URLs, Radio Handovers, text content, SmartPoster, Phone Numbers, Applications, Images, etc.

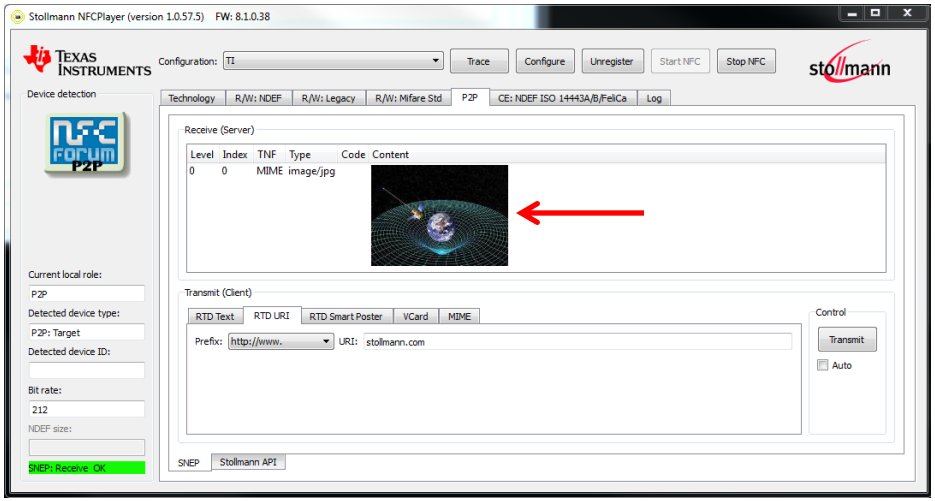




Peer to Peer between two NFCLink hardware sets

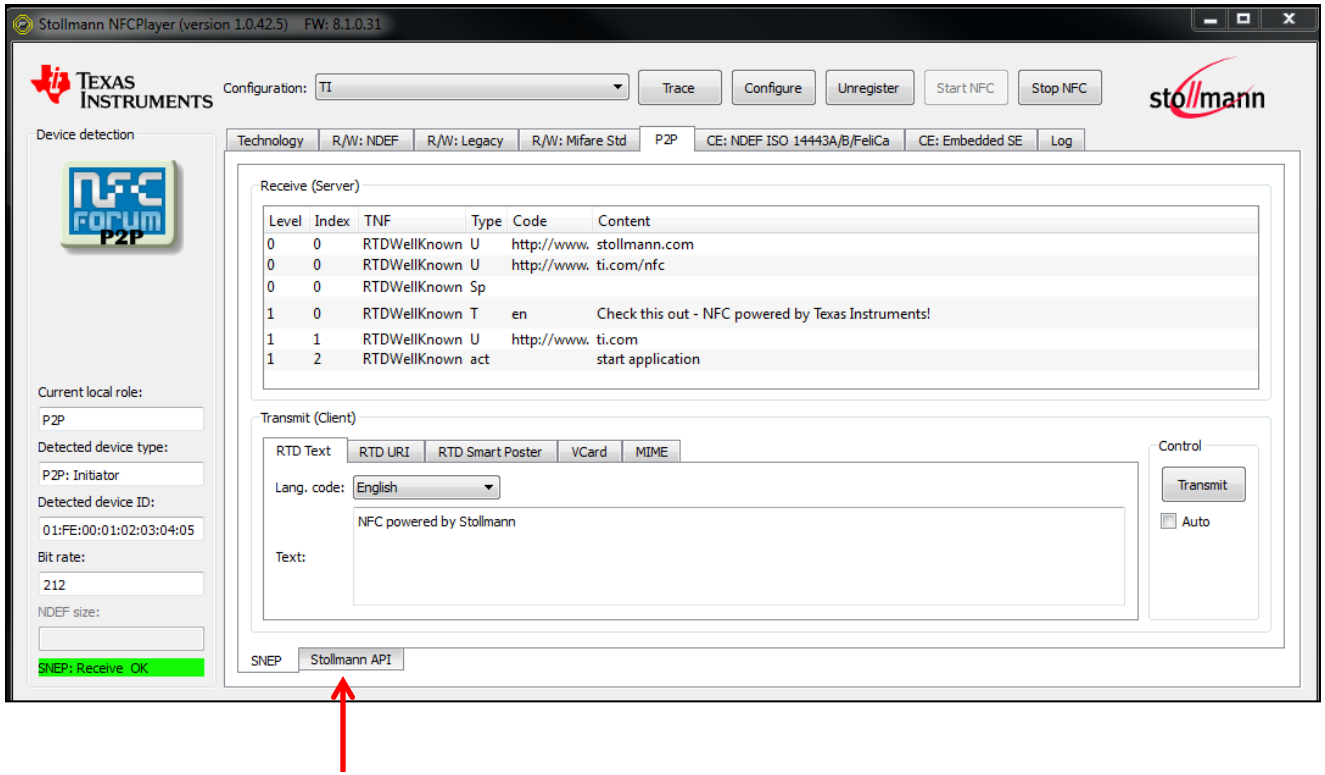
- Set up two of the hardware sets and run two instances of the GUI on the same PC, then use P2P functionality without using an NFC handset.
- RTD MIME message can be sent from one hardware set to another using SNEP.





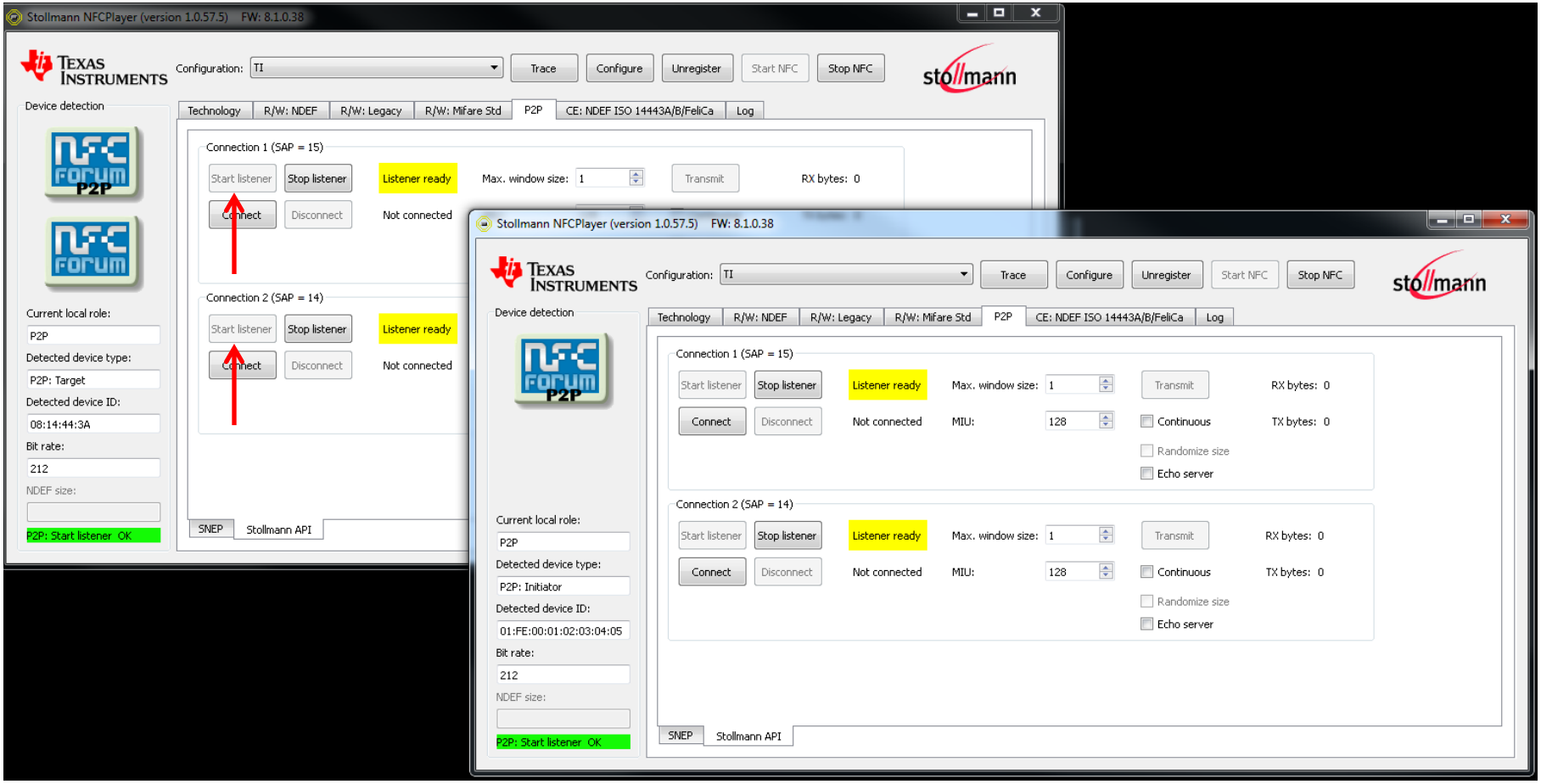
Bi-Directional P2P

- To enable ultra-fast communication, NFCLink offers bi-directional communication through P2P mode.
- When two NFCLink hardware sets are connected through P2P, select the Stollman API tab.



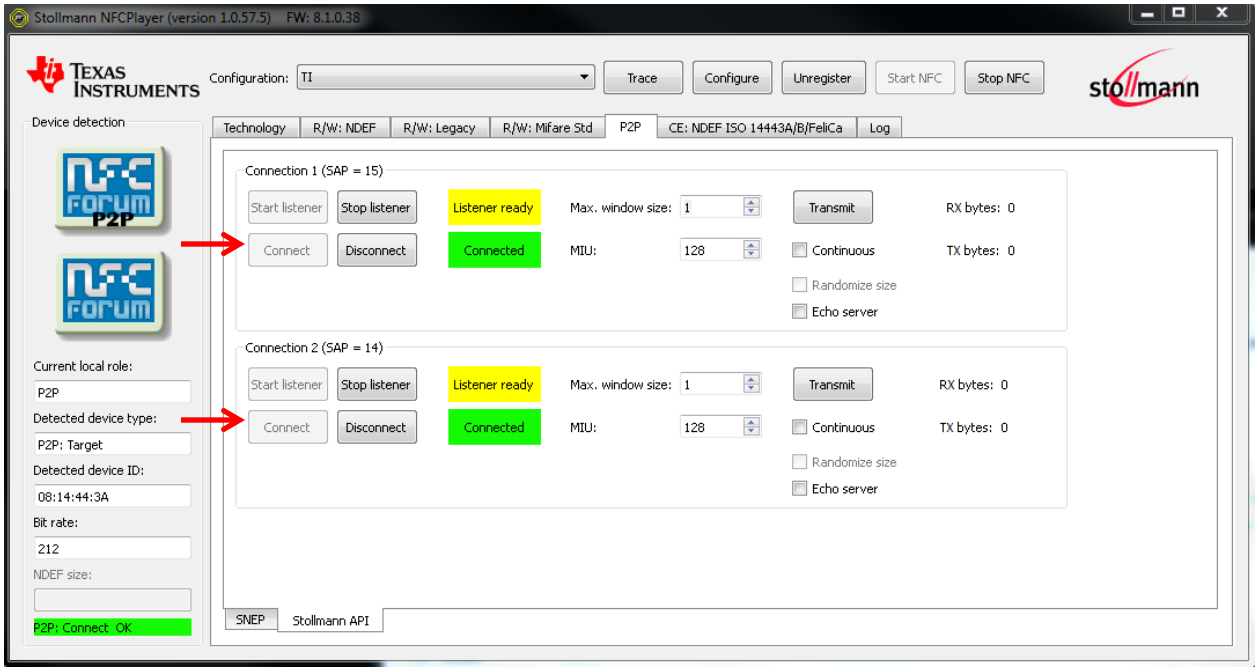
Bi-Directional P2P

- Start the listener for Connections 1 and 2 on either side of the channel.



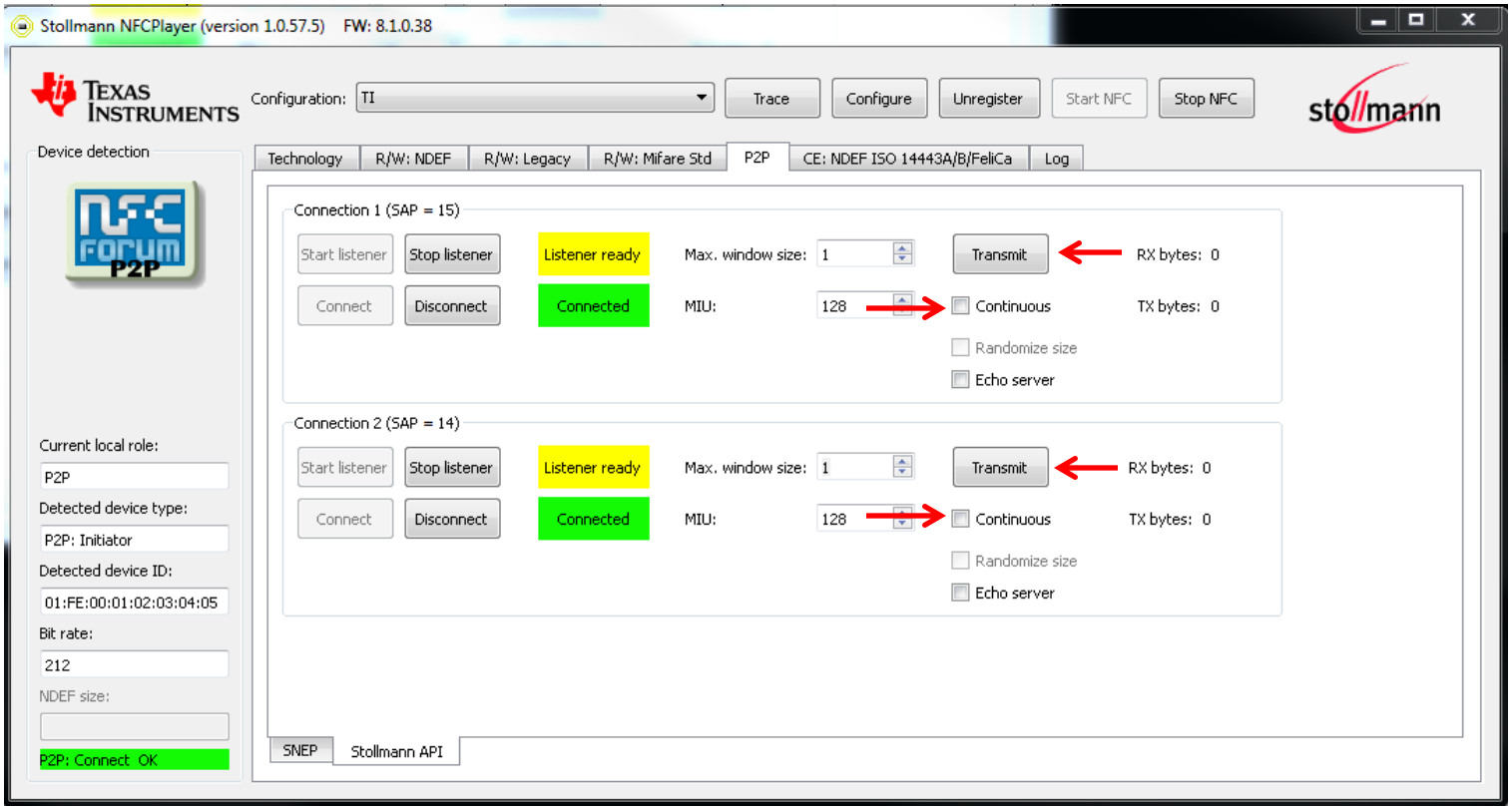
Bi-Directional P2P

- Establish the connections by clicking the Connect buttons on either side of the channel.



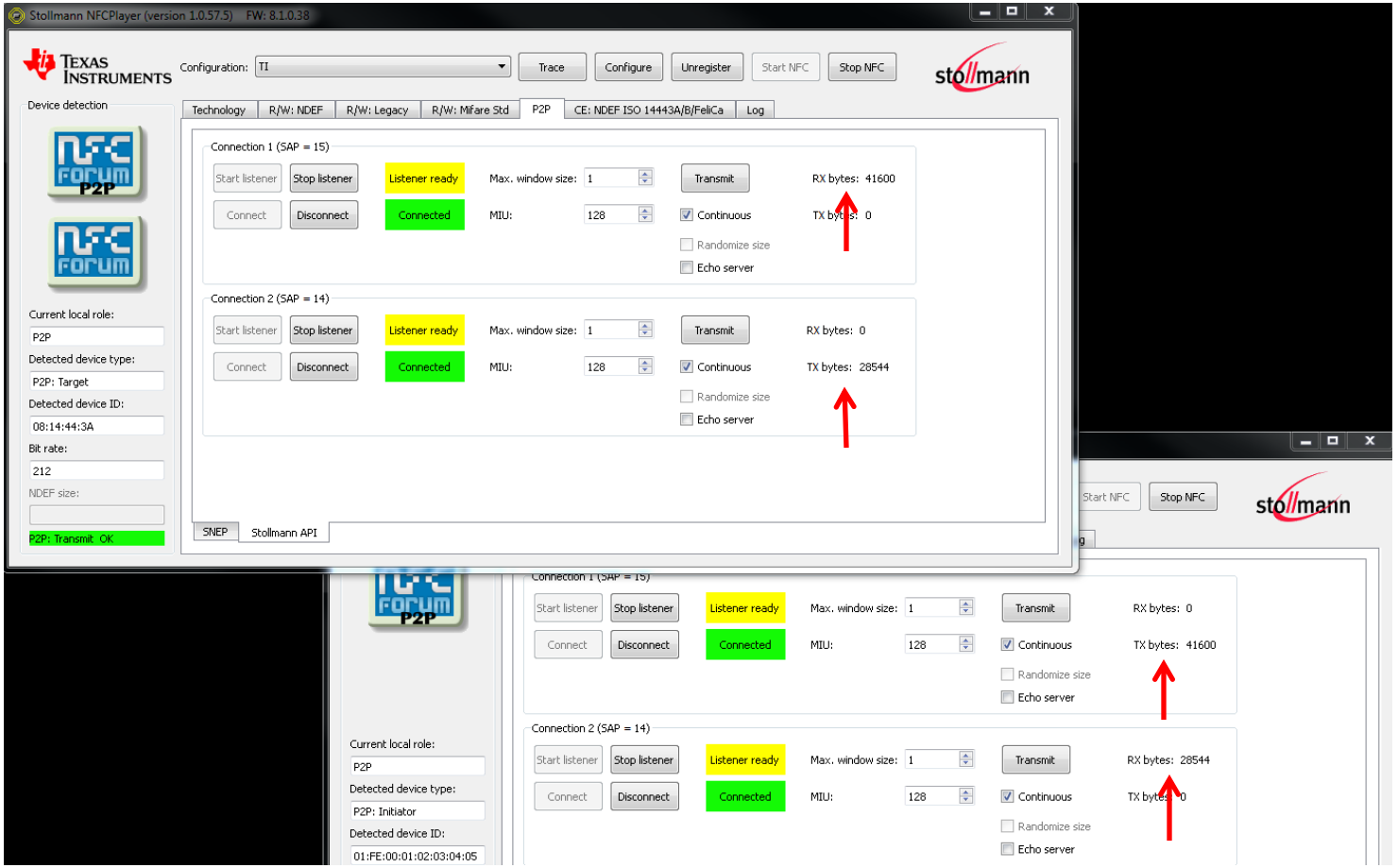
Bi-Directional P2P

- Select Continuous box and then press Transmit button for reach connection on either side of the channel.



Bi-Directional P2P

- Note the data transfer amounts and the direction.
- This bi-directional communication link can ensure fast data transfer.



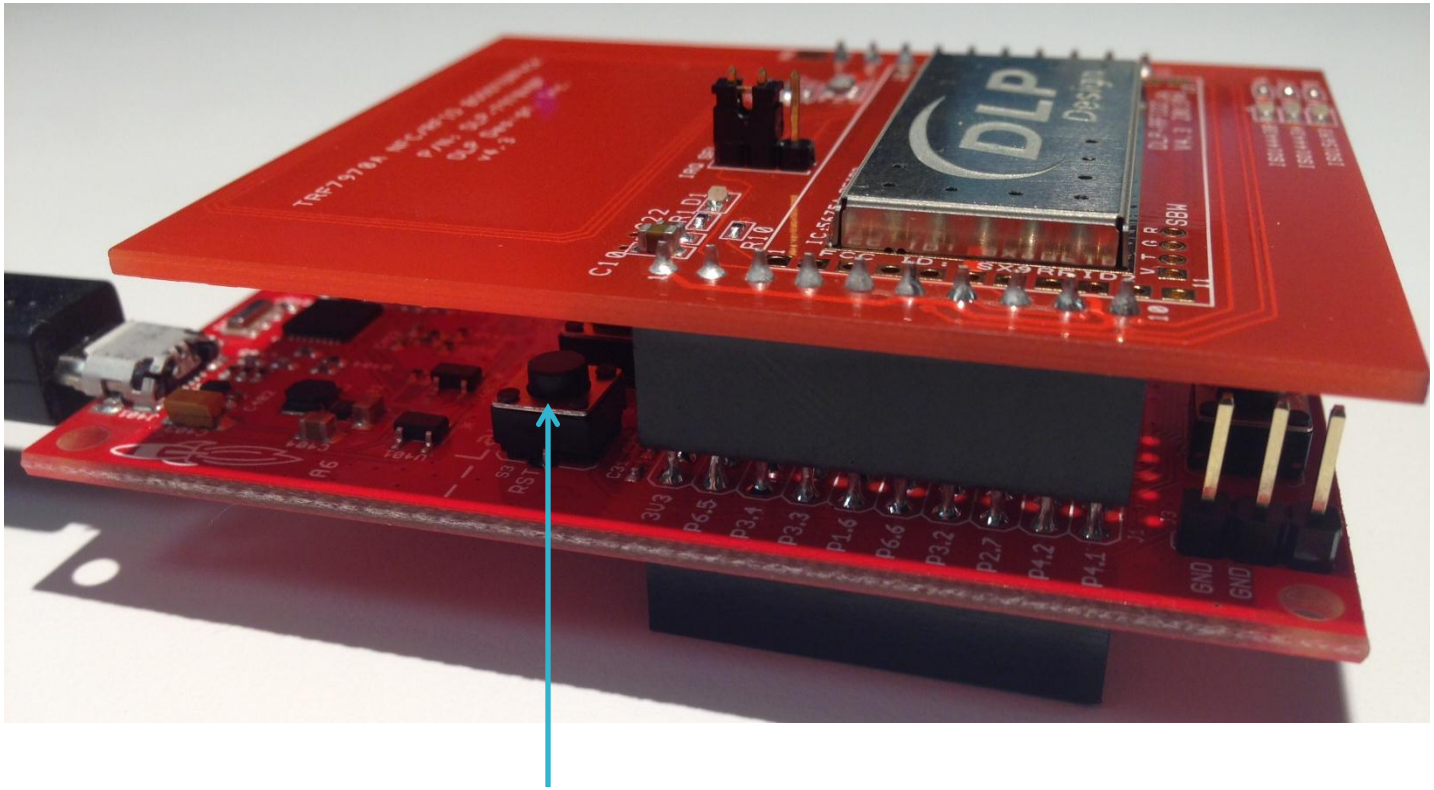
Troubleshooting

Troubleshooting Tips

- If the blinking red “heartbeat” on the LaunchPad stops, reset the LaunchPad by pressing the reset button. If the “heartbeat” does not resume, go through the Uniflash flash steps again to re-flash the system.
- If LaunchPad is not responding, close Uniflash and NFCLink, then unplug/replug LaunchPad.
- If LaunchPad is still not responding, reset following steps on next slide.

Reset LaunchPad

- Press and LaunchPad RST button for three seconds to reset the device.



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