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Programming NFC Sticker / Tags

Introduction:

Near Field Communication tag (NFC tag), is a sticker or wristband with small microchips that can be read by in range mobile devices. Information is stored in these microchips. The amount of information stored on a NFC tag depends on the tag type, as tag memory capacity varies by tag.

NFC tag has the ability to send data to other mobile phones with NFC capabilities. NFC tags also perform a variety of actions, such as changing handset settings or launching a website. Modern example of a commonly used NFC tag function is mobile payment processing, where users swipe or flick a mobile phone on a NFC reader

Objective:

In this guide, we will cover on how to Read, Program & Format the NFC Chips. Apps that been used in this guide are available for both Android and IOS platform.

Side note: *The used Apps are slightly different in UI design between OS, but it provide same functionality.*

NFC Specification:

Currently we already tested & verified all listed NFC Sticker / Tags below:

Model	NTAG 213	NTAG 215	NTAG 216	Anti-Metal OEM	NTAG 213 OEM
IC	NT2H1311G0DUx	NT2H1511G0DUx	NT2H1611G0DUx	F8213*	F8213*
Manufacturer	NXP	NXP	NXP	FEIJU	FEIJU
EEPROM	180 bytes	540 bytes	924 bytes	180 bytes	180 bytes
Storage	144 bytes	504 bytes	888 bytes	144 bytes	144 bytes
Pages	45	135	231	45	45
Protocol	ISO/IEC14443-2 ISO/IEC14443-3 Type A	ISO/IEC14443-2 ISO/IEC14443-3 Type A	ISO/IEC14443-2 ISO/IEC14443-3 Type A	ISO/IEC14443-2 Type A	ISO/IEC14443-2 Type A

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Requirement

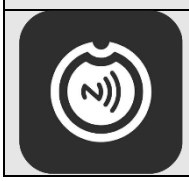
Android - Devices that support NFC, run Android 4.1 and Up. *(Turn On NFC in settings)*

IOS – All latest iPhone from 2014 *(iPhone 6 series and Up)* and with minimum IOS 13.0.

Apps / Program / Software:

There are lot of apps on Store that support programming and read the NFC data for both OS platform.

Here some recommended apps that work the best:

NFC TagInfo by NXP		
This apps are used to check the chip manufacturer & version of tags (storage) if it's from NXP		
This App does not have ability to write the Tags.		
	**Android**	https://play.google.com/store/apps/details?id=com.nxp.taginfolite
	IOS	https://apps.apple.com/us/app/nfc-taginfo-by-nxp/id1246143596
NFC TagWriter by NXP		
With this apps user can write / program NFC tag		
	**Android**	https://play.google.com/store/apps/details?id=com.nxp.nfc.tagwriter
	IOS	https://apps.apple.com/us/app/nfc-tagwriter-by-nxp/id1246143221
NFC Tools by wakdev		
This apps provide more advanced features such as Tasker & Device Automation		
	**Android**	https://play.google.com/store/apps/details?id=com.wakdev.wdnfc
	IOS	https://apps.apple.com/us/app/nfc-tools/id1252962749
BLK CARDS by EmerTech Limited		
This apps are more to Professional Business Card & Social Media Account		
Currently tested only support NXP Chip		
Encoding size quite large not suitable for small storage NFC Tag		
	**Android**	https://play.google.com/store/apps/details?id=hk.emertech.blk
	IOS	https://apps.apple.com/us/app/blk-cards/id6443552250

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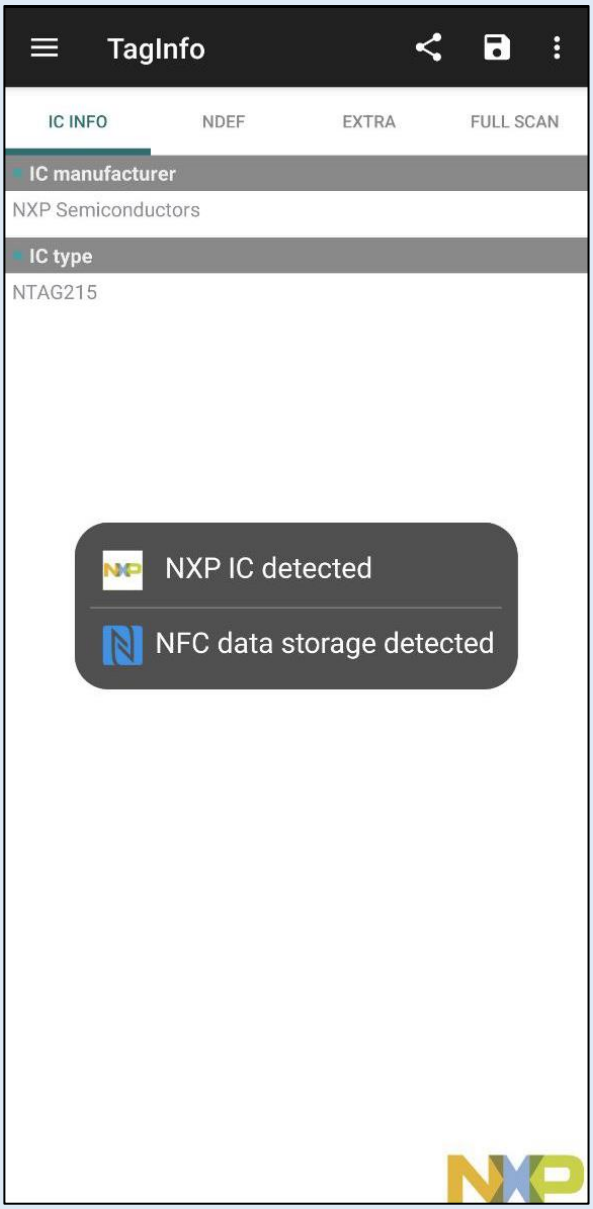
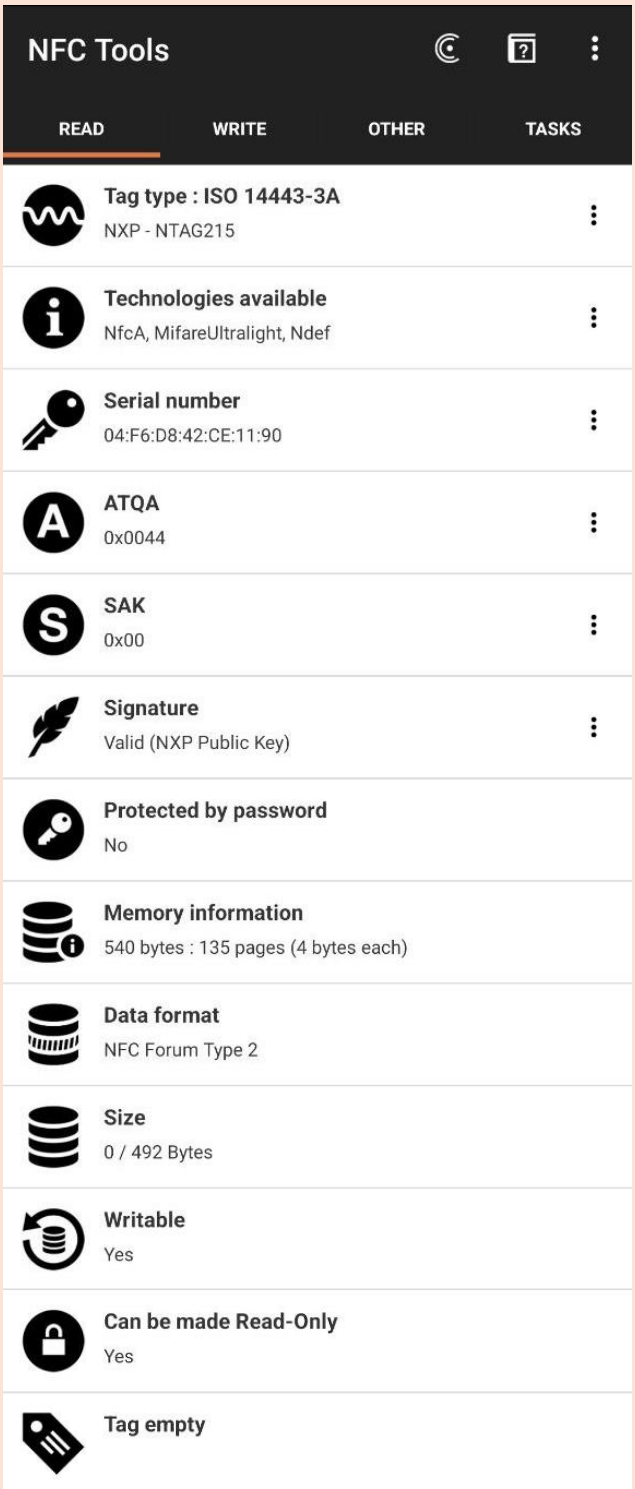
A. Checking your NFC Tag Manufacturer & Storage Size

Recommended to check NFC Tags Storage before start programming.

NXP TagInfo	NFC Tools
Only Manufaturer & Model of tag displayed on main page	All info will displayed on main Page of the apps
This apps can detect other OEM chip but it only read Manufacturer Data	Not properly detect OEM Manufacturer data





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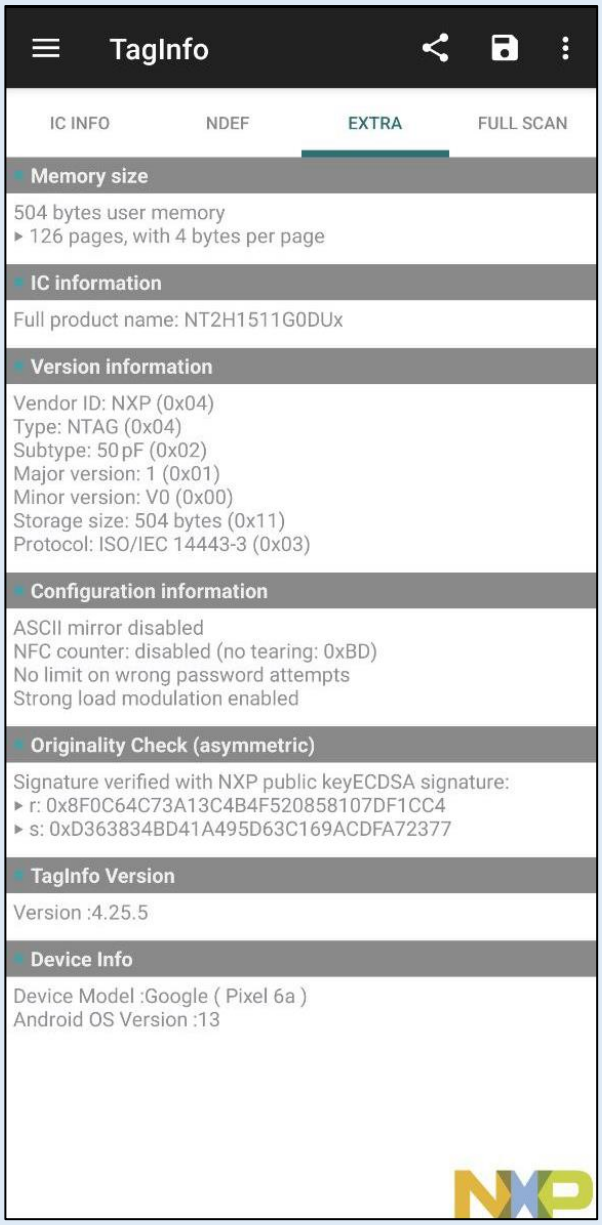
Storage Size located at the 'EXTRA' page	**NXP TagWriter**
	User can tap on 'Read' to read storage info



B. Programming NFC Tag

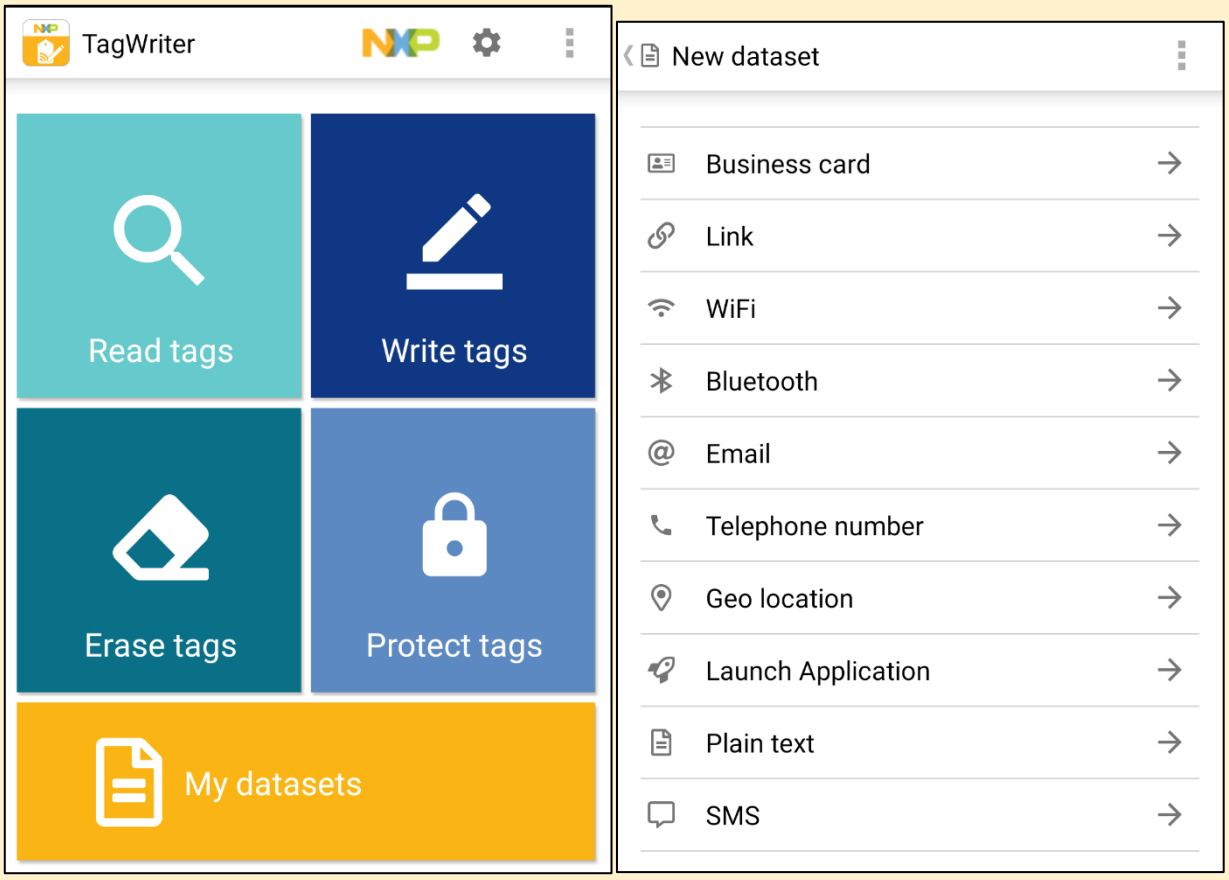
NFC Tag Storage / User data normally already formatted to NDEF format from factory. NDEF is a standardized data format specification by the NFC Forum which is used to describe how a set of actions are to be encoded onto a NFC tag or to be exchanged between two active NFC devices. The vast majority of NFC enabled devices (readers, phones, tablets…) support reading NDEF messages from NFC tags.

There a numerous Data type that user can program into NFC Tag for example:

1. Contact or Business Card (VCF / vCards / .vcf format).
2. Link / URL / URI (Website, Spotify playlist, YouTube).
3. Telephone Number, Email & SMS.
4. Smart Home Automation Tags.
5. Wi-Fi connection (Share Wi-Fi without showing your password).
6. Bluetooth connection (Quick pair between BT devices).
7. Location (Add any location / address on Tag).
8. Plain Text Message.

NXP TagWriter

Simpler interface & ability to save user data (My datasets)



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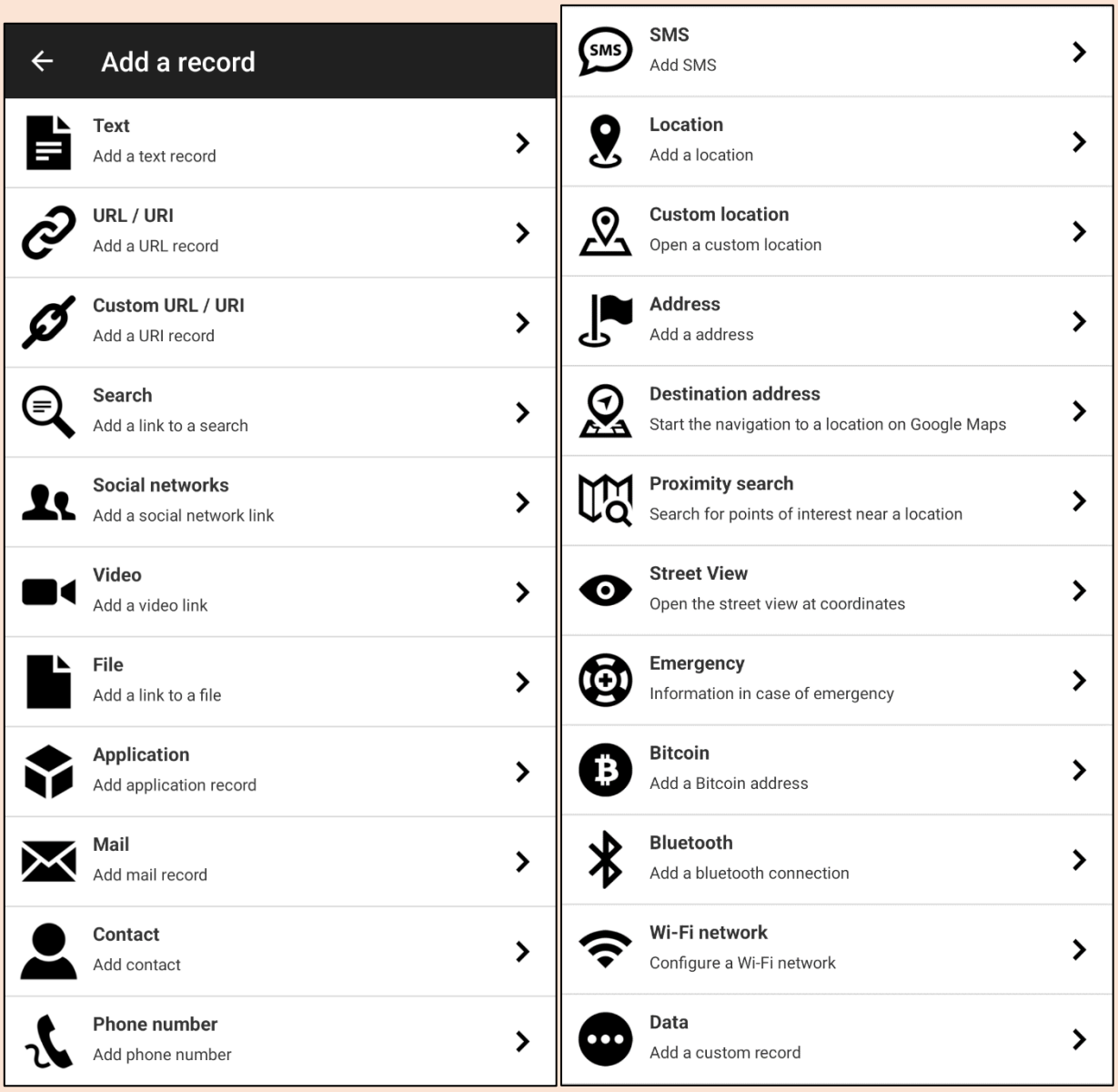
NFC Tools

More data type provided for use



NFC Tools App provide more data type but it seems some them are same

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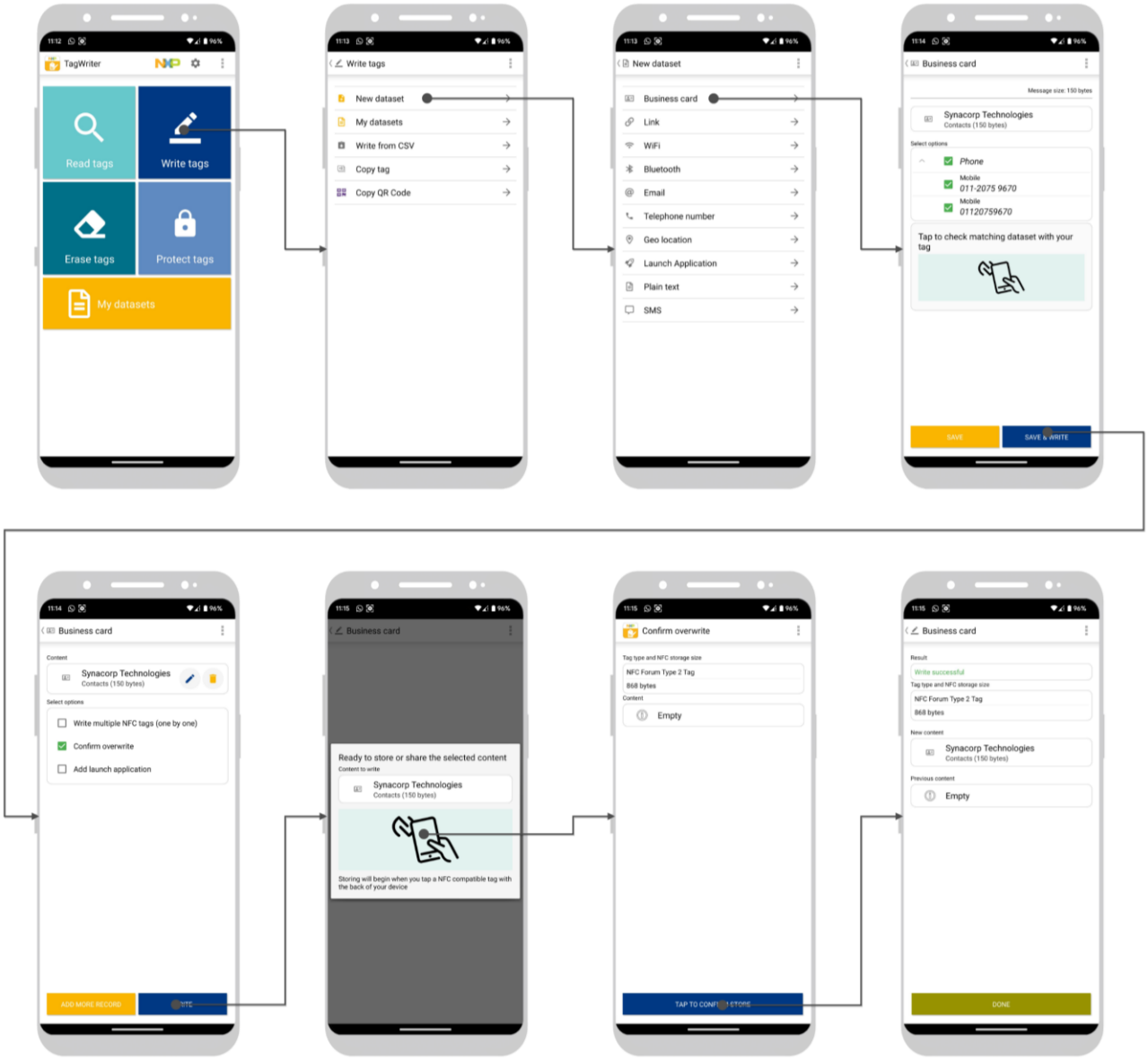
B-1. Programming Business Card

Depend on apps, some can input more information into vCards format, some app can only input basic info such as name and telephone number.

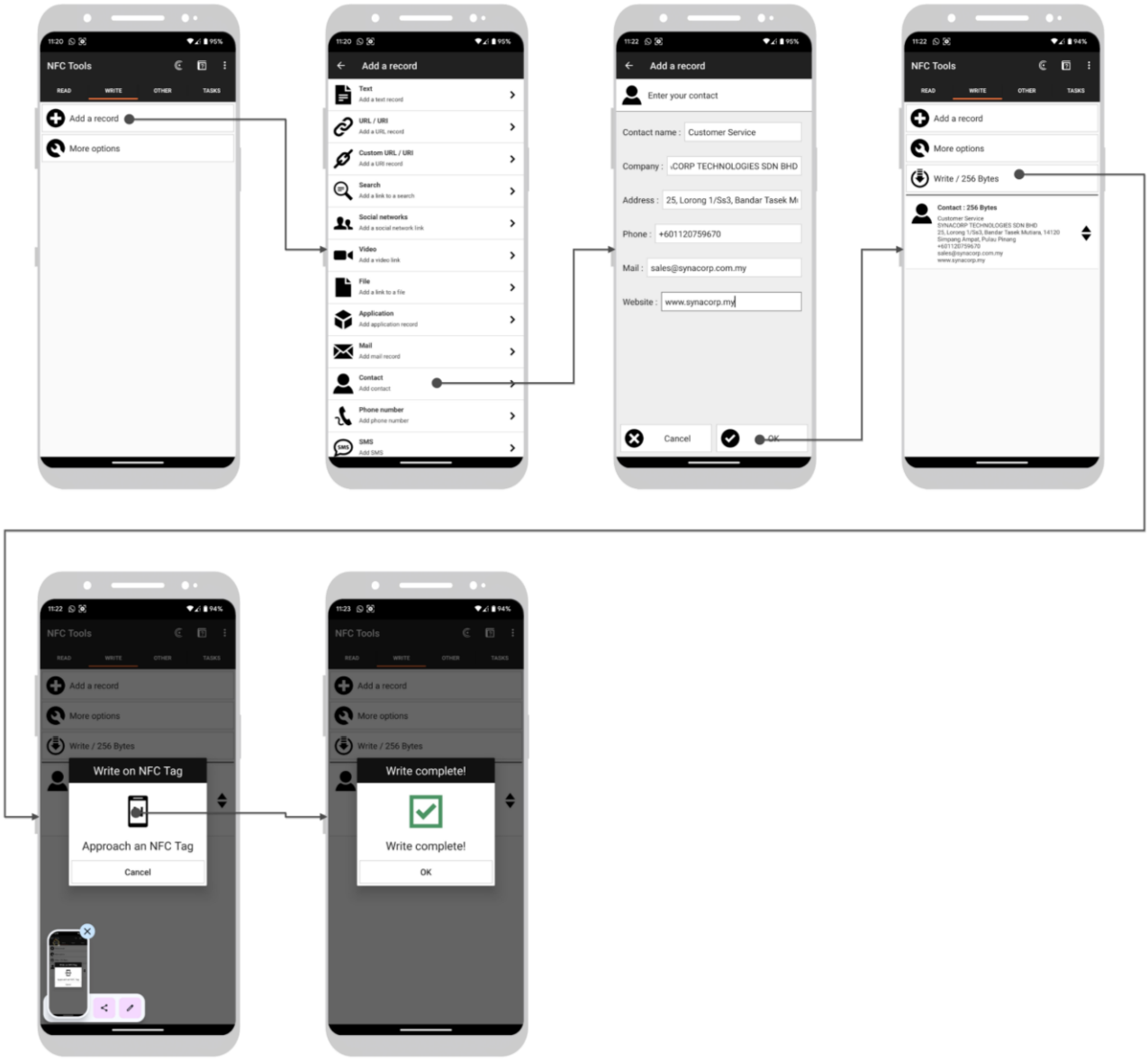
B-1a) Programming Business Card using TagWriter app.

- NXP TagWriter will share contact from your Phone Contact apps (User saved contact).
- Make sure to add all detail first.
- Close the app after complete the process.
- Next time user scan the NFC Tag it will automatically Contact info.



B-1b) Programming Business Card using NFC Tools app.

- NFC Tools require user to manually input contact detail from app itself.
- Close the app after complete the process.
- Next time user scan the NFC Tag it will automatically Contact info.

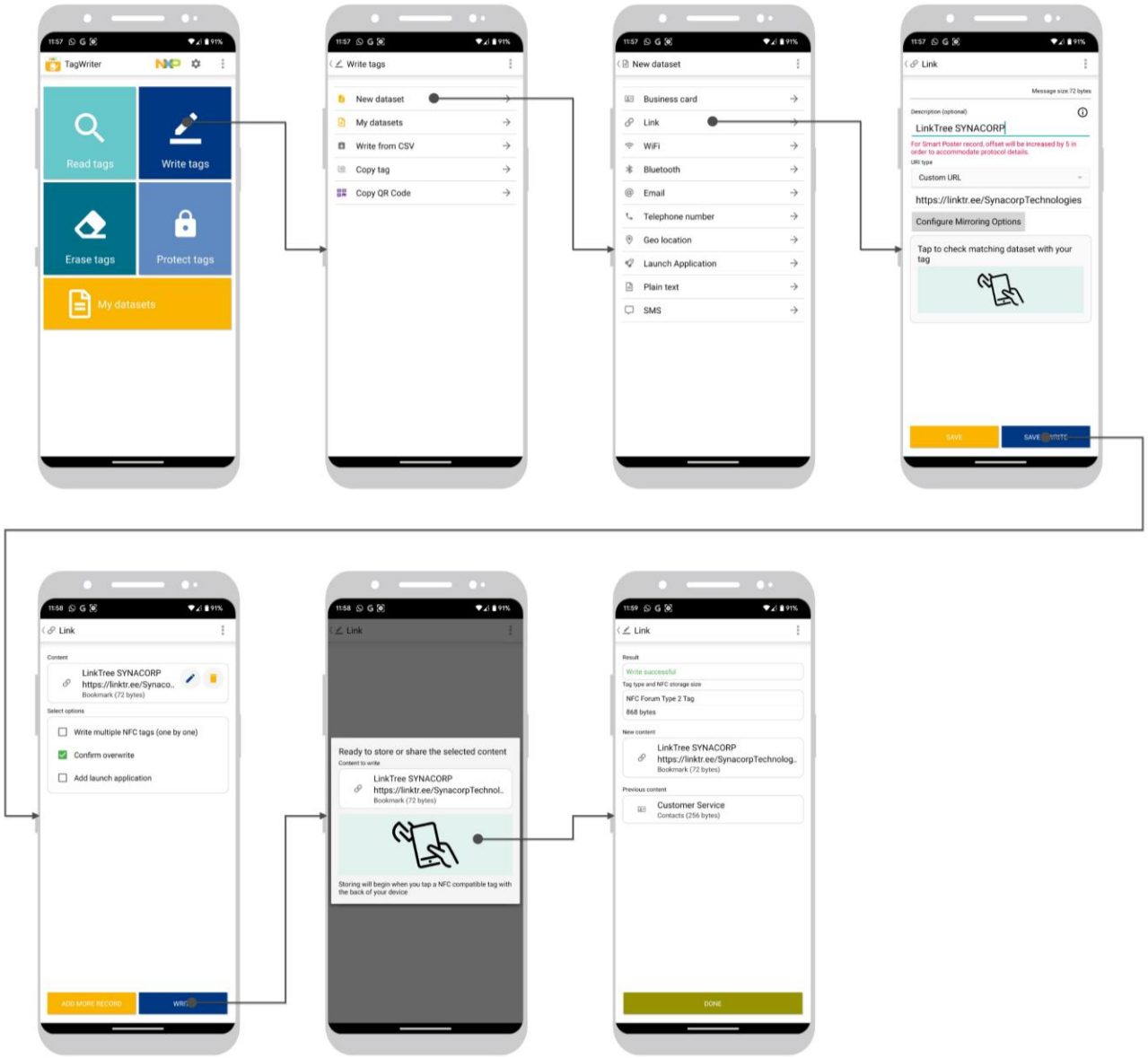


B-2. Programming Link / URL

Some Link / URL will trigger the installed apps on the phone. For example sharing YouTube Link thru NFC Tag will trigger YouTube apps instead of Web browser app.

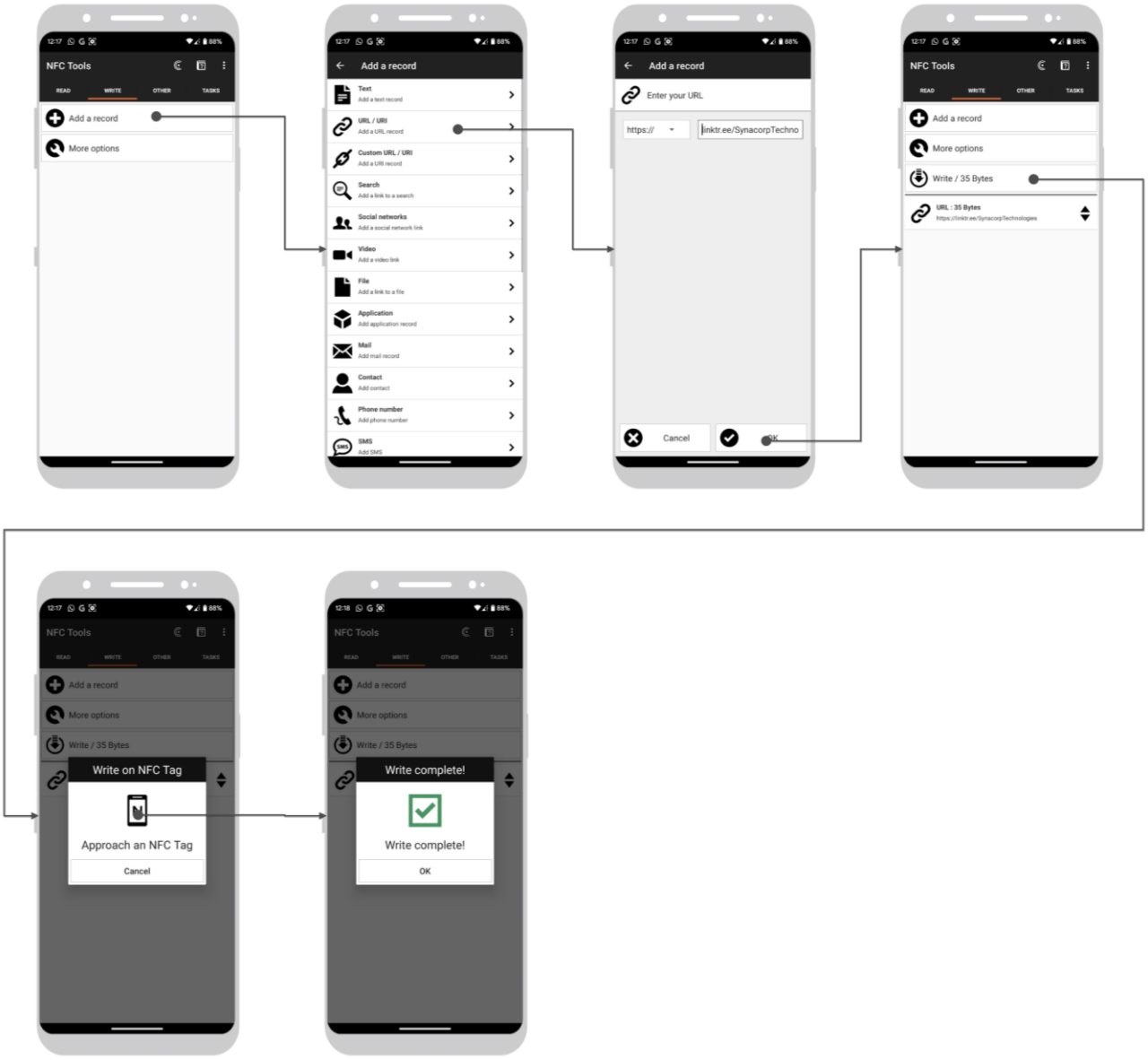
B-2a) Using NXP TagWriter app

- Close the app after complete the process.
- Next time user scan the NFC Tag it will automatically launch Web browser.



B-2a) Using NFC Tools app

- Close the app after complete the process.
- Next time user scan the NFC Tag it will automatically launch Web browser.

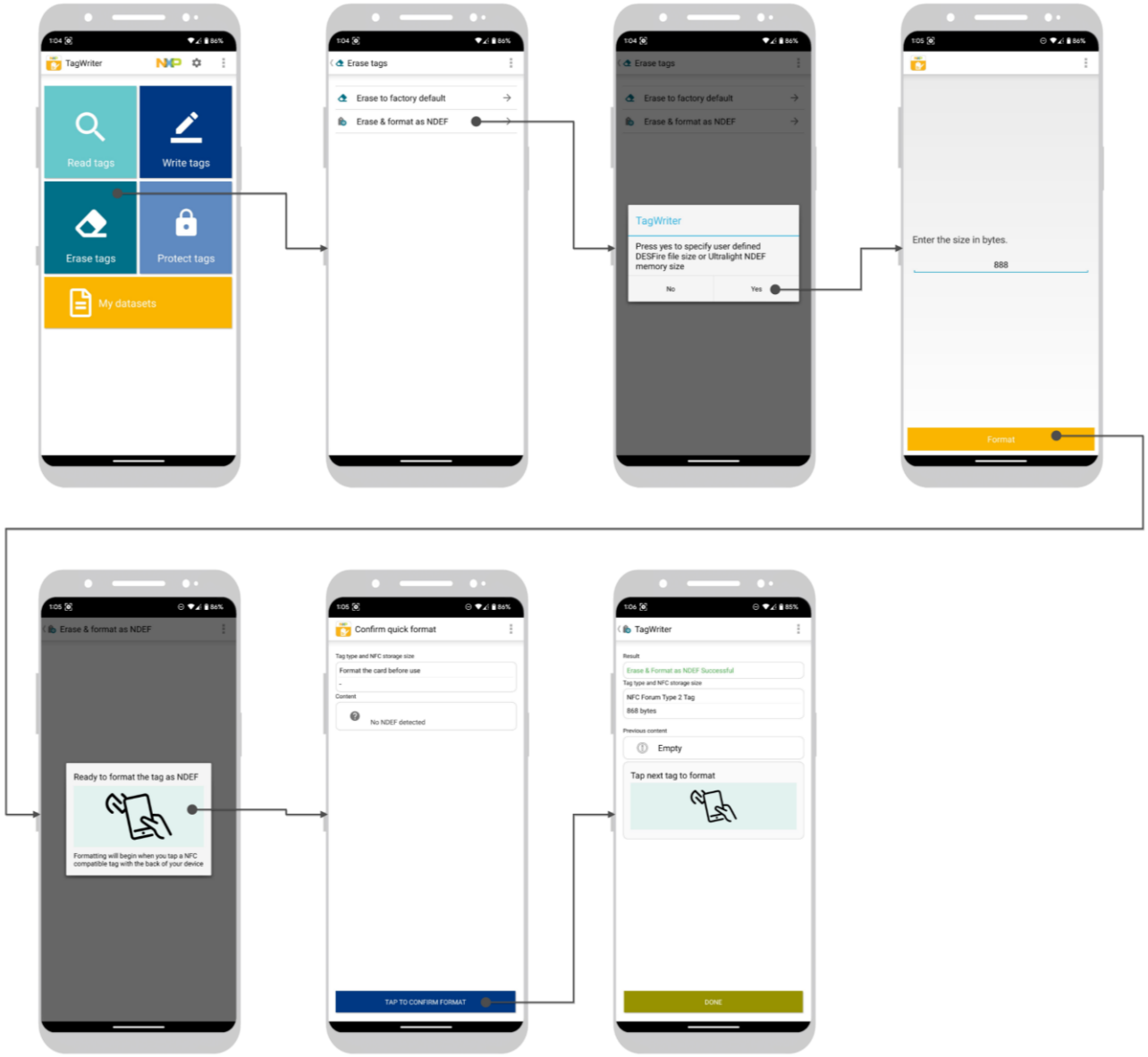


C. Formatting / Erase NFC Tag

As mentioned before data that encoded / programmed into NFC are in NDEF format. Since NFC are rewriteable, sometimes user will need to erase old data from tag to clear spaces for new data.

C-1. Using NXP TagWriter.

- User need manually enter NDEF storage size. Check storage size before format.



C-2. Using NFC Tools

- This app will automatically define the storage size and auto format.