RN00305

Android 15 MW Release notes for PN722x/PN716x

Rev. 2.0 — 20 August 2025

Document information

Information	Content
Keywords	PN722x, PN716x, Android 15
Abstract	Contains information about the release content of Android 15 MW for PN722x/PN716x.

1 Document purpose

The purpose of this document is to provide information on the content of the Android 15 MW based on PN7220/ PN7221 and PN7160/PN7161 product versions.

2 Middleware version history

The tables below shows the version history of the Android MW releases:

Table 1. Android 15 MW version history

MW version history	Link to release version
NFC_AR_INFRA_001E_15.03.01	Section 3.1 "NFC_AR_INFRA_001E_15_03_01"
NFC_AR_INFRA_001E_15.03.00	Section 3.2 "NFC_AR_INFRA_001E_15_03_00"
NFC_AR_INFRA_001E_15.02.00	Section 3.3 "NFC_AR_INFRA_001E_15_02_00"
NFC_AR_INFRA_0006_15.01.01	Section 3.4 "NFC_AR_INFRA_0006_15_01_01"
NFC_AR_INFRA_001E_15.01.00	Section 3.5 "NFC_AR_INFRA_001E_15_01_00"

Table 2. Android 14 MW version history

MW version history	Link to release version
NFC_AR_INFRA_001E_14.04.00	RN00304
NFC_AR_INFRA_001E_14.03.00	RN00304
NFC_AR_INFRA_001E_14.02.00	RN00304
NFC_AR_INFRA_001E_14.01.00	RN00304

Table 3. Android 13 MW version history

MW version history	Link to release version
NFC_AR_INFRA_001E_13.21.00	Coming soon. NXP is improving the release note documents.
NFC_AR_INFRA_001E_13.20.00	Coming soon. NXP is improving the release note documents.
NFC_AR_INFRA_0004_13.04.00	Coming soon. NXP is improving the release note documents.

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3 Android 15 MW releases

3.1 NFC_AR_INFRA_001E_15_03_01

This release is production ready with full validation done by NXP.

3.1.1 Release content

- Fix for No RF poll issue on screen state change
  - Resolved missing RF poll events caused by unsupported CON_DISCOVERY_PARAM command during screen state transitions.

3.1.2 Test environment

For PN7220/PN7221:

Parameters	Values
Board used	DragonBoard 845c + PN7220/PN7221 Customer evaluation board PNEV7220 BP1 and PNEV7220 BP2 with PN7221 IC
I^{2}C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_001E_15.03.01
Clock configuration	XTAL
Firmware version	Internal version is used for testing.

For PN7160/PN7161:

Parameters	Values
Board used	DragonBoard 845c + PN7160/PN7161 Customer evaluation board PNEV7160 with PN7161 IC
I^{2}C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_001E_15.03.01
Clock configuration	PLL
Firmware version	12.50.11

3.1.3 Android MW memory size

Note: *Memory sizes are based on the used development platform, compiler and settings. Sizes can be different on customer site.*

Table 4. NFC libraries memory consumed

Library	Text (bytes)
nfc_nci_nxp_pn72xx.so	237770
android.hardware.nfc@1.0.so	155836
android.hardware.nfc@1.1.so	164833

Table 4. NFC libraries memory consumed...*continued*

android.hardware.nfc@1.2.so	109617
libnfc_nci_jni.so	854529
libnfc-nci.so	1044175
nfc_nci_nxp.so	186848
nfc_tda.so	37317
vendor.nxp.nxpnfc@1.0.so	67966
vendor.nxp.nxpnfc@2.0.so	88470
emvco_poller.so	88491
vendor.nxp.emvco-V1-ndk.so	120999
emvco_tda.so	37157
emvco_ecp_vas.so	1537
vendor.nxp.emvco-V2-ndk.so	120840

3.2 NFC_AR_INFRA_001E_15_03_00

This release is production ready with full validation done by NXP.

3.2.1 Release content

- Added support for kernel Version 6.6
- Fixed an NFC crash issue in I2CMS during Mifare Desfire tag read.
  - **Root cause**: Firmware timing issue while reading the Mifare Desfire tag.
  Note: Fix added on the MW side, this will be reverted once the firmware fix is available.

3.2.2 Test environment

For PN7220/PN7221:

Parameters	Values
Board used	DragonBoard 845c + PN7220/PN7221 Customer evaluation board PNEV7220 BP1 and PNEV7220 BP2 with PN7221 IC
I^{2}C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_001E_15.03.00
Clock configuration	XTAL
Firmware version	03.02.04

For PN7160/PN7161:

Parameters	Values
Board used	DragonBoard 845c + PN7160/PN7161 Customer evaluation board PNEV7160 with PN7161 IC
I^{2}C speed	1 MHz on DragonBoard 845c

Parameters	Values
Android version	15
MW version	NFC_AR_INFRA_001E_15.03.00
Clock configuration	PLL
Firmware version	12.50.11

3.2.3 Android MW memory size

Note: *Memory sizes are based on the used development platform, compiler and settings. Sizes can be different on customer site.*

Table 5. NFC libraries memory consumed

Library	Text (bytes)
nfc_nci_nxp_pn72xx.so	237770
android.hardware.nfc@1.0.so	155836
android.hardware.nfc@1.1.so	164833
android.hardware.nfc@1.2.so	109617
libnfc_nci_jni.so	854529
libnfc-nci.so	1044175
nfc_nci_nxp.so	186848
nfc_tda.so	37317
vendor.nxp.nxpnfc@1.0.so	67966
vendor.nxp.nxpnfc@2.0.so	88470
emvco_poller.so	88491
vendor.nxp.emvco-V1-ndk.so	120999
emvco_tda.so	37157
emvco_ecp_vas.so	1537
vendor.nxp.emvco-V2-ndk.so	120840

3.3 NFC_AR_INFRA_001E_15_02_00

This release is early access for customers, so they could start integration into their system. This release has not undergone NXPs full validation required for a production release.

3.3.1 Release content

- **GMS Compilancy for PN72xx products.**
  Note: *FW 03.02.04 and later need to be used with this MW release, since other FW releases don't support POWER_SUB_SCREEN_STATE_CMD.*
  Note: *To understand below screen stated and commands refer to ref.[4].*
  – Fix for CTS issue (screen off HCE payment in emulator mode test was failing)
  – Support of HCE in screen off state for PN722x:
    – As per screen off & lock state,
      POWER_SUB_SCREEN_STATE_CMD is sent

RF_DEACTIVATE_CMD into IDLE
RF_DISCOVER_CMD with only CE enabled
– As per screen on & unlock state
POWER_SUB_SCREEN_STATE_CMD is sent
RF_DEACTIVATE_CMD into IDLE
RF_DISCOVER_CMD with only Card and Reader enabled.

Screen State	Previous Screen State	Action
SCREEN_OFF_LOCKED	SCREEN_ON_LOCKED	RF_DISCOVER_IDLE
SCREEN_OFF_LOCKED	SCREEN_ON_UNLOCKED	RF_DISCOVER_CMD(Listen enable & poll disabled)
SCREEN_OFF_UNLOCKED	SCREEN_ON_LOCKED	RF_DISCOVER_IDLE
SCREEN_OFF_UNLOCKED	SCREEN_ON_UNLOCKED	RF_DISCOVER_CMD(Listen enable & poll disabled)
SCREEN_ON_UNLOCKED	SCREEN_ON_LOCKED	RF_DISCOVER_IDLE
SCREEN_ON_UNLOCKED	SCREEN_OFF_UNLOCKED	RF_DISCOVER_CMD(Listen enable & poll enable)
SCREEN_ON_LOCKED	Not supported	Not supported

Figure 1. Supported states

• **SEPolicy update**
  – SELinux is updated in Enforce mode
  – SEPolicy update for EMVCo HAL:
    – hal_emvco_client is acessing the hal_emvco_service using service manager.
    – hwservice context and enforcement file deleted (in vendor/nxp/emvco/sepolicy) as it no longer need as EMVCo stack is using AIDL Interface
    – service context and type enforcement is added for EMVCo AIDL interface
  – property contexts is added to set vendor property. (Common for NFC and EMVCo stack)
  – SEPolicy is updated for NFC HAL:
    – service context and type enforcement is added for NFC AIDL interface

3.3.2 Test environment

For PN7220/PN7221:

Parameters	Values
Board used	DragonBoard 845c + PN7220/PN7221 Customer evaluation board PNEV7220 BP1 and PNEV7220 BP2 with PN7221 IC
I^2C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_001E_15.02.00
Clock configuration	XTAL
Firmware version	Internal version is used for testing.

For PN7160/PN7161:

Parameters	Values
Board used	DragonBoard 845c + PN7160/PN7161 Customer evaluation board PNEV7160 with PN7161 IC
I^{2}C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_001E_15.02.00
Clock configuration	PLL
Firmware version	12.50.11

3.3.3 Android MW memory size

Note: *Memory sizes are based on the used development platform, compiler and settings. Sizes can be different on customer site.*

Table 6. NFC libraries memory consumed

Library	Text (bytes)
nfc_nci_nxp_pn72xx.so	237770
android.hardware.nfc@1.0.so	155836
android.hardware.nfc@1.1.so	164833
android.hardware.nfc@1.2.so	109617
libnfc_nci_jni.so	854529
libnfc-nci.so	1044175
nfc_nci_nxp.so	186848
nfc_tda.so	37317
vendor.nxp.nxpnfc@1.0.so	67966
vendor.nxp.nxpnfc@2.0.so	88470
emvco_poller.so	88491
vendor.nxp.emvco-V1-ndk.so	120999
emvco_tda.so	37157
emvco_ecp_vas.so	1537
vendor.nxp.emvco-V2-ndk.so	120840

3.4 NFC_AR_INFRA_0006_15_01_01

This release is validated only on PN7160/PN7161. It can be used only with those chipset since PN7220/PN7221 is not fully validated (for PN7220/PN7221, this MW is not production ready).

Users should use the latest MW release.

3.4.1 Release content

- NXP HAL migration to AIDL
    - NxpNfc Hal aligned as per AIDL Interface (before it was HIDL interface).
    - In NxpNfc HAL new API called **switchMode** is added as part of AIDL migrations
        - This API is required to switch between below configuration
            - EMVCO_MODE_SWITCH
            - NFC_MODE_SWITCH
            - SMCU_FW_DNLD_MODE_SWITCH

3.4.2 Test environment

For PN7220/PN7221:

Parameters	Values
Board used	DragonBoard 845c + PN7220/PN7221 Customer evaluation board PNEV7220 BP1 and PNEV7220 BP2 with PN7221 IC
I^{2}C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_0006_15.01.01
Clock configuration	XTAL
Firmware version	Internal version is used for testing.

For PN7160/PN7161:

Parameters	Values
Board used	DragonBoard 845c + PN7160/PN7161 Customer evaluation board PNEV7160 with PN7161 IC
I^{2}C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_001E_15.01.01
Clock configuration	PLL
Firmware version	12.50.0E

3.4.3 Android MW memory size

Note: Memory sizes are based on the used development platform, compiler and settings. Sizes can be different on customer site.

Table 7. NFC libraries memory consumed

Library	Text (bytes)
nfc_nci_nxp_pn72xx.so	237770
android.hardware.nfc@1.0.so	155836
android.hardware.nfc@1.1.so	164833
android.hardware.nfc@1.2.so	109617
libnfc_nci_jni.so	854529
libnfc-nci.so	1044175

Table 7. NFC libraries memory consumed...*continued*

nfc_nci_nxp.so	186848
nfc_tda.so	37317
vendor.nxp.nxpnfc@1.0.so	67966
vendor.nxp.nxpnfc@2.0.so	88470
emvco_poller.so	88491
vendor.nxp.emvco-V1-ndk.so	120999
emvco_tda.so	37157
emvco_ecp_vas.so	1537
vendor.nxp.emvco-V2-ndk.so	120840

3.5 NFC_AR_INFRA_001E_15_01_00

This release was not fully validated. It is early release to customers that can start the integrations. It must not be used in production.

Users should use the latest MW release.

3.5.1 Release content

- Android version migration from Android-14 to Android-15
- Aligned DTA with TR13.2 change
  – Aligned with New DTA architecture
  – DTA must use the MW api for NFC Forum certification.
- Firmware download sequence update
  – Before sending the HDLL command, VEN is toggled as HDLL command is allowed with in 5sec of VEN toggle.
  – As per FW download sequence, checking the session is opened before sending the firmware version command.

3.5.2 Test environment

For PN7220/PN7221:

Parameters	Values
Board used	DragonBoard 845c + PN7220/PN7221 Customer evaluation board PNEV7220 BP1 and PNEV7220 BP2 with PN7221 IC
I^{2}C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_001E_15.01.00
Clock configuration	XTAL
Firmware version	Internal version is used for testing.

For PN7160/PN7161:

Parameters	Values
Board used	DragonBoard 845c + PN7160/PN7161 Customer evaluation board PNEV7160 with PN7161 IC
I^{2}C speed	1 MHz on DragonBoard 845c
Android version	15
MW version	NFC_AR_INFRA_001E_15.01.00
Clock configuration	PLL
Firmware version	12.50.0D

3.5.3 Android MW memory size

Note: *Memory sizes are based on the used development platform, compiler and settings. Sizes can be different on customer site.*

Table 8. NFC libraries memory consumed

Library	Text (bytes)
nfc_nci_nxp_pn72xx.so	237770
android.hardware.nfc@1.0.so	155836
android.hardware.nfc@1.1.so	164833
android.hardware.nfc@1.2.so	109617
libnfc_nci_jni.so	854529
libnfc-nci.so	1044175
nfc_nci_nxp.so	186848
nfc_tda.so	37317
vendor.nxp.nxpnfc@1.0.so	67966
vendor.nxp.nxpnfc@2.0.so	88470
emvco_poller.so	88491
vendor.nxp.emvco-V1-ndk.so	120999
emvco_tda.so	37157
emvco_ecp_vas.so	1537
vendor.nxp.emvco-V2-ndk.so	120840

4 Recommendations, known limitations, and precautions

4.1 PN722x customer eval board

- In PN722x customer eval BP2 board used for Dual CPU use case, Android host shall use HIF2-I2C (I2CM follower) Interface of PN722x. By design this interface is not possible to be used as a wake-up reason from Standby.
  - **Solution**: GPIO3 of PN722x needs to used as a wake-up signal. By connecting HIF2-I2C SCL line to GPIO3, any HIF activity will be used as wake-up of PN722x.
- The Secure MCU mode switch application is only for reference purpose. Any negative testing scenarios using this application may result in ambiguous behavior.

4.2 Android middleware

- EMVCo middleware KPI values are not guaranteed in Android as Android thread scheduling varies every time based on other background threads running on the system. It is recommended to run the EMVCo stack in a trusted environment to ensure consistent thread scheduling and achieve the optimized KPI value. EMVCo Stack is implemented fully in native mode and it is thread-safe to ensure critical timings once the thread is scheduled.
- The Secure MCU mode switch application is only for reference purpose. Any negative testing scenarios using this application may result in ambiguous behavior.
- To use only contactless interface and achieve the best standby current (LPCD average current) it is advised to remove/delete the *xxx.so* file from the Android installation which disables the NFC CT feature.
  - **Solution**: Remove the NFC tda library (*nfc_tda.so*) from the *system/lib64* path.

4.3 PN722x NFCC

- Limitation:
  - Incompliance to Digital CT EMVCo 4.3d specs – 4 test failures related to handling of CWT & EGT where both values are same (i.e. min = max) – TC_1800.DTS112, TC_1800.DTS113,TC_1800.DTS212 and TC_1800.DTS213 test cases fail
- Cautions/Recommendations:
  - It is advised not to disable the DPC as It may damage TX drivers due to overcurrent.
  - Firmware updates shall be done in a stable power supply condition, otherwise a full firmware download can be required. Therefore it is recommended to not interrupt the FW update procedure.

4.4 Precautionary notes

Table 9. Precautions and recommendations

Limitation	Recommendation
TX driver may be damaged due to overcurrent.	Do not disable DPC on PN7220.

5 Features, certifications, and applications supported in releases

To achieve all below mentioned things, users need to check the test environment chapter of the MW version in use and check with which settings the below results were achieved (see Section 3 "Android 15 MW releases").

The results in the tables below can be achieved with all minor versions releases on Android 15.

Table 10. RF features list

Mode	Protocol	Techno	NFCEE	Other	Completeness
R/W – NFC Forum	ISO-DEP	NFC-A	DH	Frame RF IF 106 kB/s	Functional verified
				ISO-DEP RF IF 106 kB/s	Functional verified
				ISO-DEP RF IF 212, 424, 848 kB/s	Functional verified
		NFC-B	DH	Frame RF IF 106 kB/s	Functional verified
				ISO-DEP RF IF 106 kB/s	Functional verified
				ISO-DEP RF IF 212, 424, 848 kB/s	Functional verified
	MIFARE Cl.	NFC-A	DH	TAG-CMD IF 106 kB/s	Functional verified
	T2T	NFC-A	DH	Frame RF IF 106 kB/s	Functional verified
				TAG-CMD IF 106 kB/s	Functional verified
	FeliCa / T3T	NFC-F	DH	Frame RF IF 212, 424 kB/s	Functional verified
	ISO 15693	ISO 15693	DH	Frame RF IF 26, 53 kB/s	Functional verified
R/W – EMVCo Mode	ISO-DEP	NFC-A	DH	ISO-DEP RF IF 106 kB/s	Functional verified
		NFC-B	DH	ISO-DEP RF IF 106 kB/s	Functional verified
	FeliCa / T3T	NFC-F	DH	Frame RF IF 212, 424 kB/s	Functional verified
Card Emulation	ISO-DEP	NFC-A	HCE	ISO-DEP RF IF 106 kB/s	Functional verified
				ISO-DEP RF IF 212, 424, 848 kB/s	Functional verified

Table 11. Other FW features released

Sl.no	Feature	Completeness
1	Secure FW download	Functional verified
2	Mode Switch GPIO	Functional verified
3	Standby mode	Functional verified
4	PRBS	Functional verified
5	Contact Interface support using ISO7816 Interface	Functional verified
6	Dynamic Power Control (DPC)	Functional verified
7	External DC-DC support	Functional verified
9	Automatic Waveshape Control	Functional verified
10	LPCD - Tag detector	Functional verified
11	Clock management (PLL / XTAL)	Functional verified

Table 12. Other MW features released

Sl.no	Feature
1	Firmware downloads through Android
2	EMVCo Discovery Profile -> Type A,B, and F (Prop tech) Technology polling Enablement
4	NFC Discovery Profile -> Type A, B, F, and V Technology polling Enablement
5	Discovery Mode Switch between NFC and EMVCo Profiles
6	Proprietary commands Support
7	HIF1-I2C interface support
8	Contact interface support for NFC and EMVCo

Table 13. Android PSP released

Sl.no	Feature
1	EMVCo loopback application for Digital and analog Compliance
2	EMVCo Transac A and B application for analog Compliance
3	EMVCo Interop application
4	Configuration tool to update EEPROM and Protocol Area of PN7220
5	Self-test APK
6	EMVCo loopback application for CT Compliance
7	NFC reference application to test SAM card on contact interface
8	Secure MCU switch application to switch between SMCU and Android Host

Table 14. Secure MCU PSP released

Sl.no	Feature
1	EMVCo Contactless loopback application for Digital and analog Compliance
2	EMVCo Contactless Transac A and B application for analog Compliance
3	EMVCo Contactless Interop application
4	EMVCo Contact loopback application for CT compliance
5	Secure MCU application to update the PN722x FW

Table 15. Certifications

Sl.no	Feature	Completeness
1	NFC Forum CR13 - Digital Compliance (Internal)	Functional verified
2	NFC Forum CR13 - Analog Compliance (Internal)	Functional verified
3	EMVCo 3.0 L1 Digital Compliance (Internal)	Functional verified
4	EMVCo 3.0 L1 analog Compliance (Internal)	Functional verified
5	EMVCo 4.3d L1 CT Compliance (Internal)	Functional verified

6   Abbreviations and acronyms

Table 16. Abbreviations

Acronym	Description
FW	FirmWare
GMS	Google Mobile Service
MW	MiddleWare

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7 References

[1] Webpage – PN7160-EVK - Development Kits for PN7160 Plug'n Play NFC Controller (link)

[2] Webpage – PNEV7220BP1 - Development Board for PN7220 NFC Controller for EMVCo and NFC Forum Operation (link)

[3] Webpage – PNEV7220BP2 - Development Board for PN7220 NFC Controller with Two Host Configuration (link)

[4] Specificaiton - NFC Controller Interface (NCI) version 2.2

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8 Revision history

Table 17. Revision history

Document ID	Release date	Description
RN00305 v.2.0	20 August 2025	• Section 2 "Middleware version history": updated. • Section 3.1 "NFC_AR_INFRA_001E_15_03_01": added
RN00305 v.1.0	5 June 2025	PN722x/PN716x MW documentation previously found in RN00082. • Initial version.

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