

Introduction to NFC Tester RWC5010A



RedwoodComm

Contents

Ver 2.0

- **Overview**
- Key Features
- Listening Device Test
- Polling Device Test
- Sniff
- Automated PC Software
- Test Jig

RWC5010A NFC Tester (1/5)

Ver 2.0

- Hot! • *Compact Low-cost One-box Tester*
 - Including Protocol Emulator, Power Amplifier, Oscilloscope, Digital Volt-meter and so on.
 - Very useful tool for R&D and QC in debugging and validating analog performances of NFC Devices

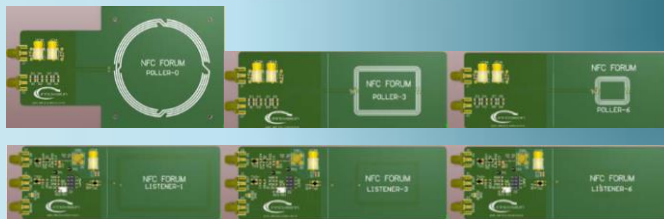


RWC5010A NFC Tester (2/5)

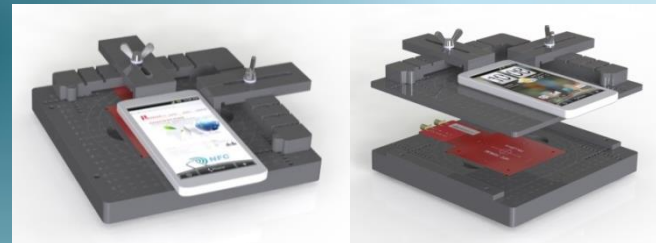
Ver 2.0

- *Complete Test Solution for Analog Tests*
 - Tester + Antenna Set + Test Jig

TESTER



ANTENNA SET



TEST JIG

RWC5010A NFC Tester (3/5)

Ver 2.0

- *Pre-qualification Tests of **NFC Forum** Certification for Analog Test Specification*
 - Fully Supporting NFC Forum Analog Test Cases
 - NFC Forum Member

**Hot!**

- ***NFC Forum V2.0 Support***
 - Backward Compatible
 - Updates on Tests and Measurements for **NFC-V & Tag 5**

RWC5010A NFC Tester (4/5)

Ver 2.0

- HOT!** • *Emulation of Analog Tests & Measurements for **EMVCo***
 - Providing an additional PCD/PICC Antenna Set
 - Emulating Analog Test environment of EMVCo
 - Test Cases are not supported fully

RWC5010A NFC Tester (5/5)

Ver 2.0

- HOT!** • *Performance Tests of NFC devices*
 - Conformance test is for certification; PASS or FAIL
 - Do you expect that all certified devices will work well in the field (real market)?
 - How can devices be compared?
 - That is ...



Performance test

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Listening Device Tests

Ver 2.0

DUT: Listening Device (Tag, Card)

Protocol Emulator	<ul style="list-style-type: none">• Repetitive Identification/Read/Write• Analysis of link messages and timing
Analog Characteristics	<ul style="list-style-type: none">• Quick/easy measurement of Load Modulation• Measurement (S11) of Resonance Frequency of the antenna
Sensitivity Test	<ul style="list-style-type: none">• Automatic Receiver Sensitivity tests according to DUT position and VDC level• 3 modes: TIME(continuous), VDC sweep, SEARCH sensitivity level
EMVCo Test Emulation ^{HOT!}	<ul style="list-style-type: none">• Analog Characteristics and Sensitivity Test of PICC with PCD antenna

Polling Device Tests

Ver 2.0

DUT: Polling Device (Reader)

Protocol Emulator

- Emulation of [all types of Tags](#)
- Analysis of DUT's NFC Activities/Profiles
- Analysis of [link messages](#) and [timing](#)
- Copy/store [NDEF messages](#)

Analog Characteristics

- Quick/easy simultaneous measurement of [ASK Modulation](#), [Power\(VDC\)](#), [Carrier Frequency](#)

Sensitivity Test

- Automatic [Receiver Sensitivity](#) tests according to DUT position and Load mod. amplitude
- 3 modes: TIME(continuous), Load mod. sweep, SEARCH sensitivity level

EMVCo Test Emulation HOT!

- **Analog Characteristics and Sensitivity Test of PCD with PICC antenna**

Sniff & PC Software

Ver 2.0

RF SPY

- Real-time capturing [protocol messages](#) between two NFC devices
- Measuring [link timing](#)

Automated PC Program

- Automatic execution of [Analog Test Cases](#) according to [NFC Forum Specification](#)
- Generation of Test Reports
- [Customized Tests](#) for users' purposes

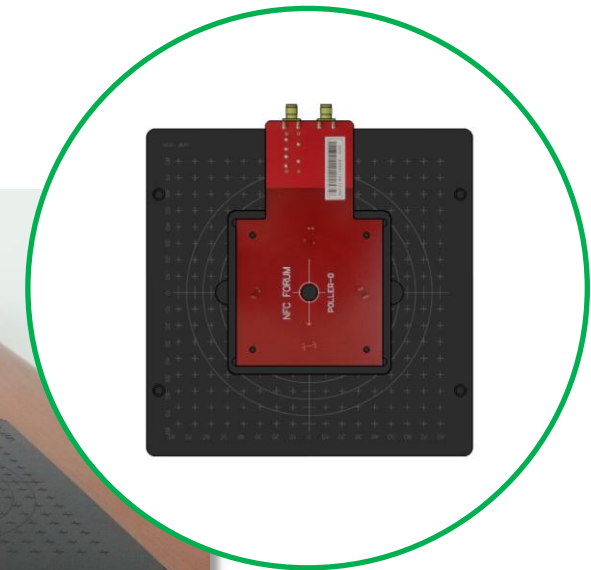
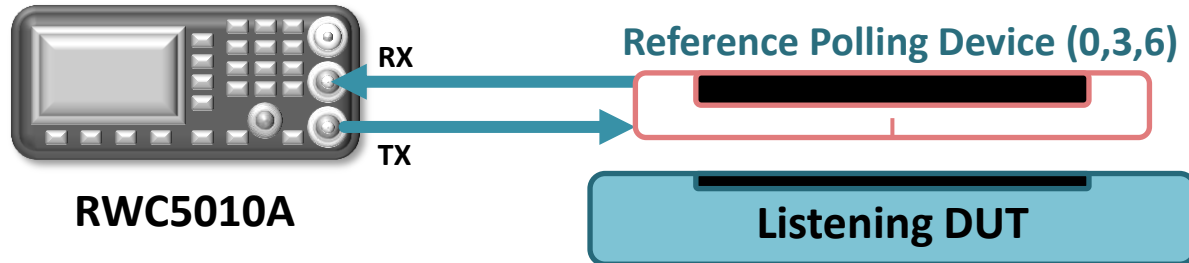
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Test Setup

Ver 2.0



Protocol Emulator

Ver 2.0

- Repeating Activity Procedure (Scenario)
- Analysis of [link messages](#) and [timing](#)
- Protocol & Analog Configuration

LISTEN_TEST NFC-A (247) RMT AGC TRG CAP ETH EXT F

NUM	D	FDT/6T	CHD	CONTENTS
430	P	5.00m	SENS_REQ	
431	L	86.5u	SENS_RES	NFCID: 7byte
432	P	500.0u	SDD_REQ_CL1	
433	L	86.4u	SDD_RES_CL1	
434	P	500.0u	SEL_REQ_CL1	
435	L	91.2u	SEL_RES_CL1	T2_TAG
436	P	500.0u	SDD_REQ_CL2	
437	L	86.4u	SDD_RES_CL2	NFCID: 0x04819352233
438	P	500.0u	SEL_REQ_CL2	
439	L	86.4u	SEL_RES_CL2	T2_TAG

52 23 35 80 C4 00

STATUS STOPPED
MODE CONT
PROTOCOL NFC_A
MSG_CLR
FILTER
TOGGLE

LINK → POW_TIME SENSITIVITY CONFIG

LISTEN_TEST NFC-A (247) RMT AGC TRG CAP ETH EXT F

FREQUENCY 13.560 MHz

REF_POLLER POLLER-0

VDC_TYPE NOMINAL

• VDC 5.220 V

LISTEN_TEST NFC-A (247) RMT AGC TRG CAP ETH EXT F

• REF_LISTENER LISTENER-1

• LOAD_R 820R

MOD_SETUP COND_1_820R

PROTOCOL NFC_A

• ACTIVITY RESOLUTION

• ID_SIZE DOUBLE

• NFCID1 0x12345678901234

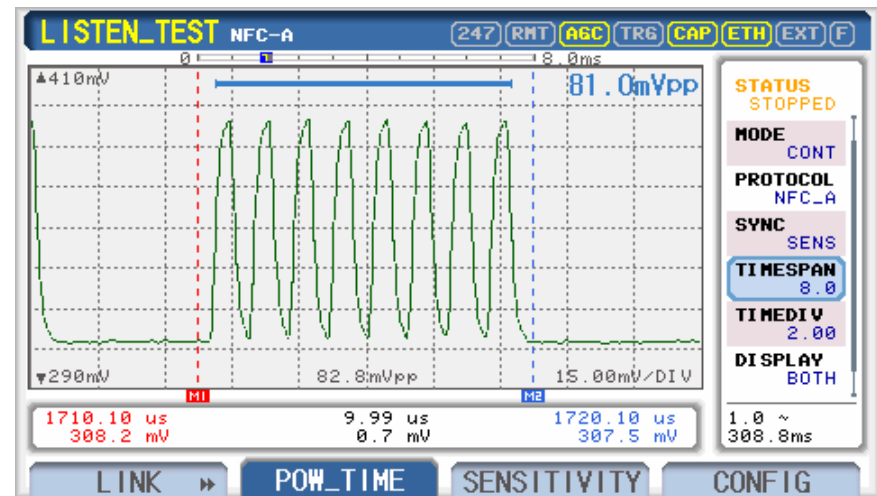
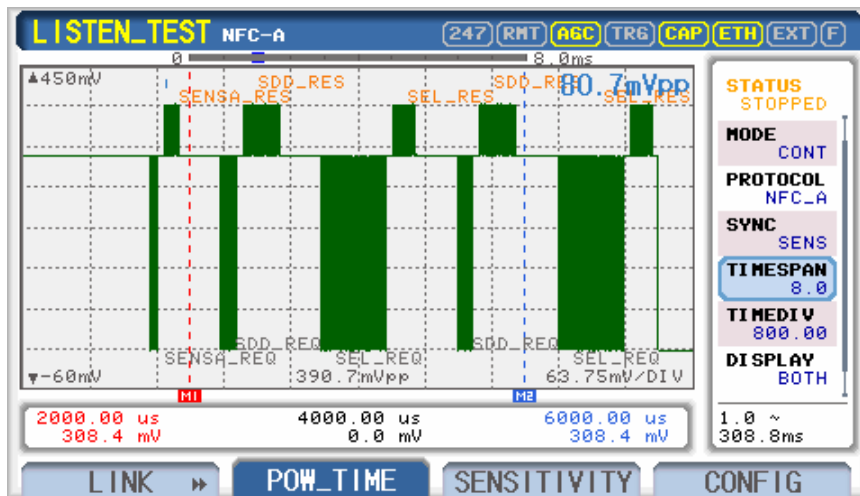
POP-UP

LINK → POW_TIME SENSITIVITY CONFIG

Analog Characteristics (1/2)

Ver 2.0

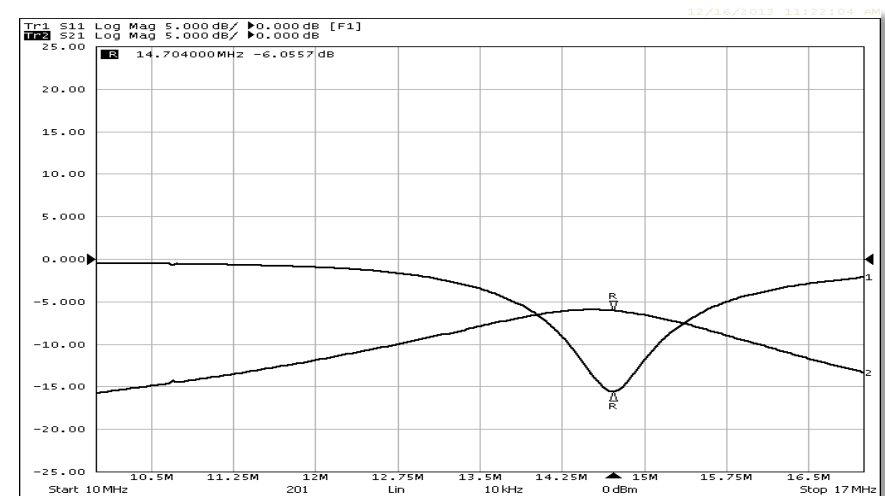
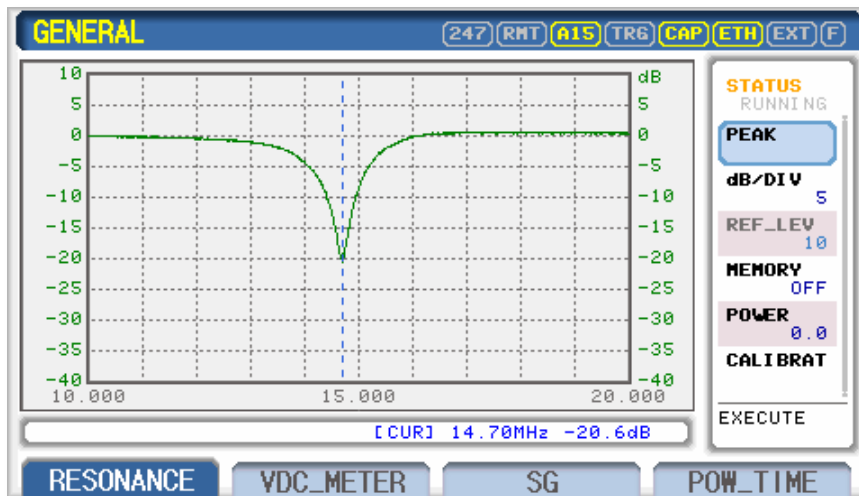
- Power-Time measurement
- Protocol Message Logs
- Quick/easy measurement of Load Modulation



Analog Characteristics (2/2)

Ver 2.0

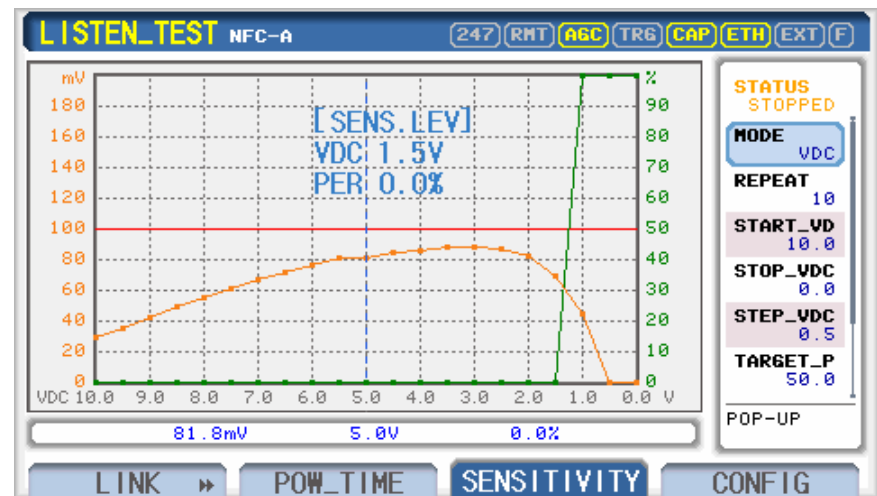
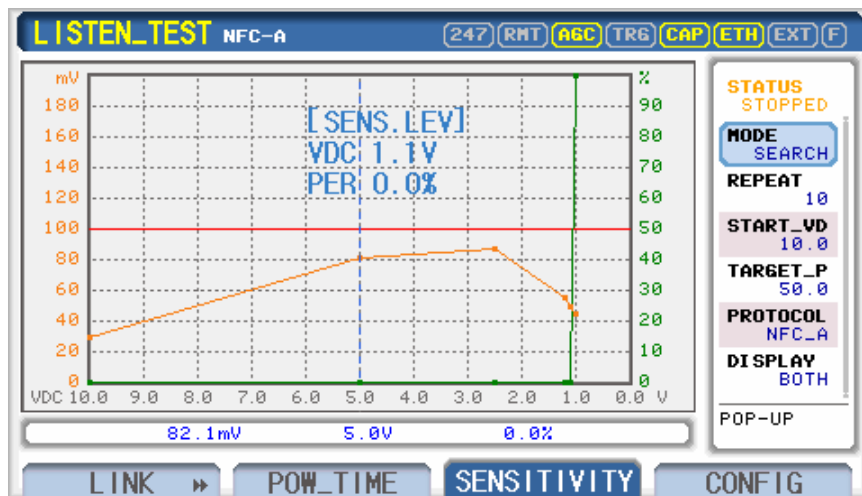
- Measurement (S11) of Resonance Frequency of the antenna
- Comparison with network analyzer



Receiver Sensitivity (1/2)

Ver 2.0

- **SEARCH** mode:
automatic search
for sensitivity level
(VDC)
- **VDC** mode:
full VDC sweep
within the defined
range

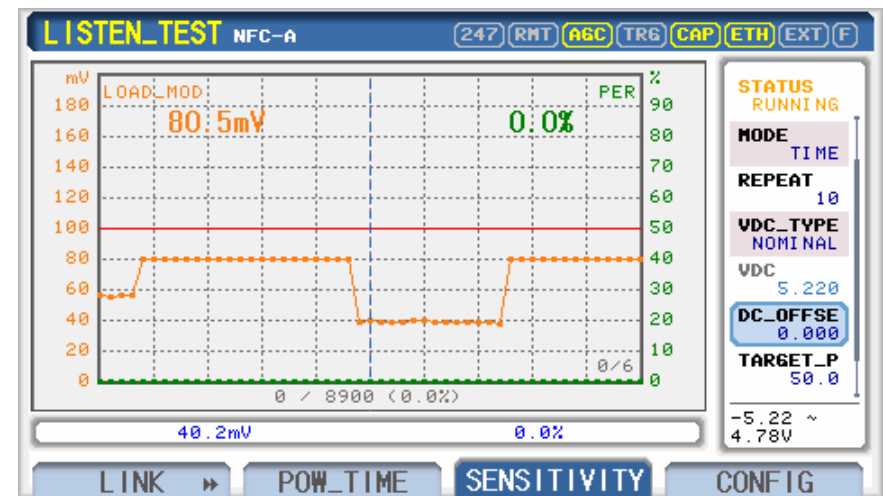
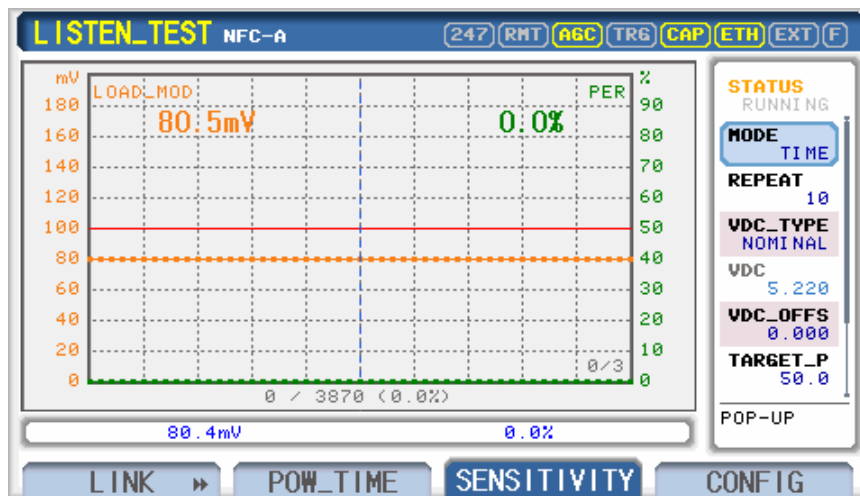


Receiver Sensitivity (2/2)

Ver 2.0

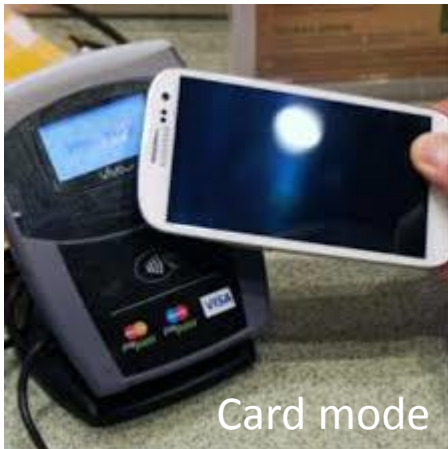
- **TIME** mode:
continuous monitor
with fixed VDC level

- **TIME** mode:
continuous monitor
with adjustable VDC level or DUT position



Performance Test (1/2)

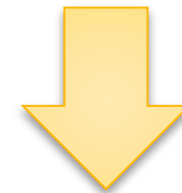
Ver 2.0



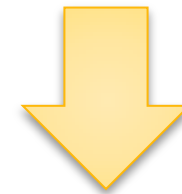
Card mode



**What is the
Card Performance?**



**Wakeup Range
(Distance)**



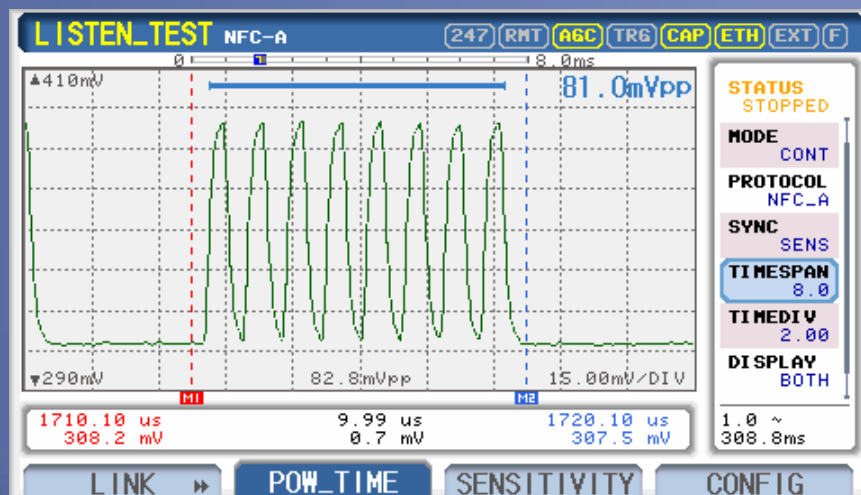
**Increase TX mag.
&
improve RX sensitivity**

Performance Test (2/2)

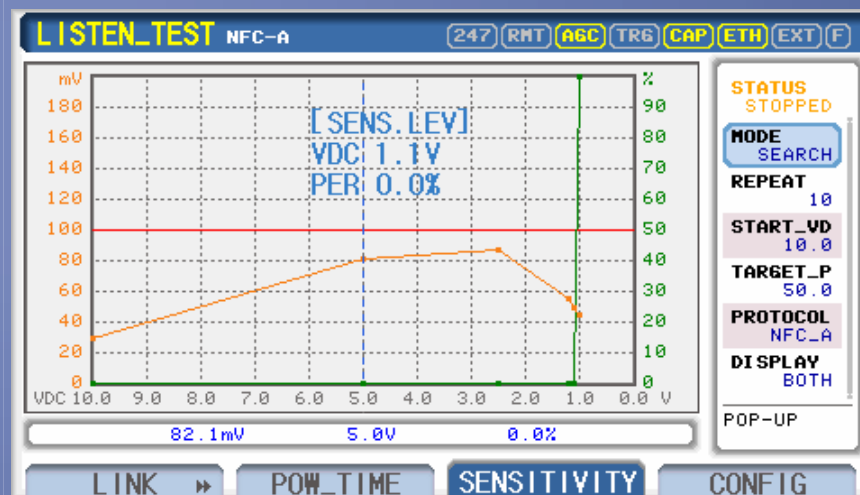
Ver 2.0

TX

Load Modulation Amplitude



RX

Sensitivity
(Minimum Level for Wakeup)

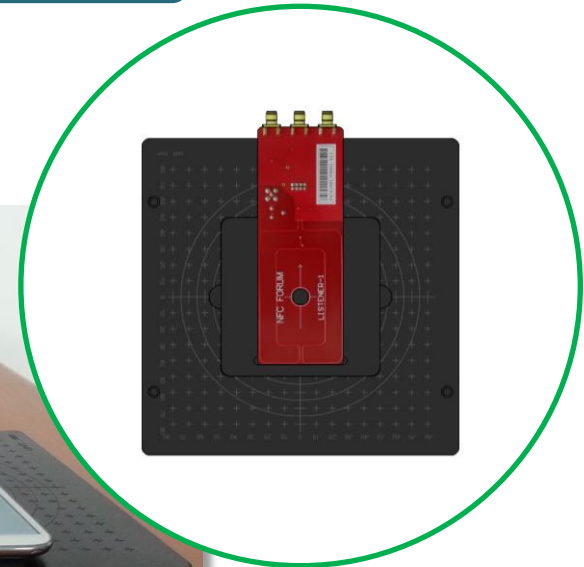
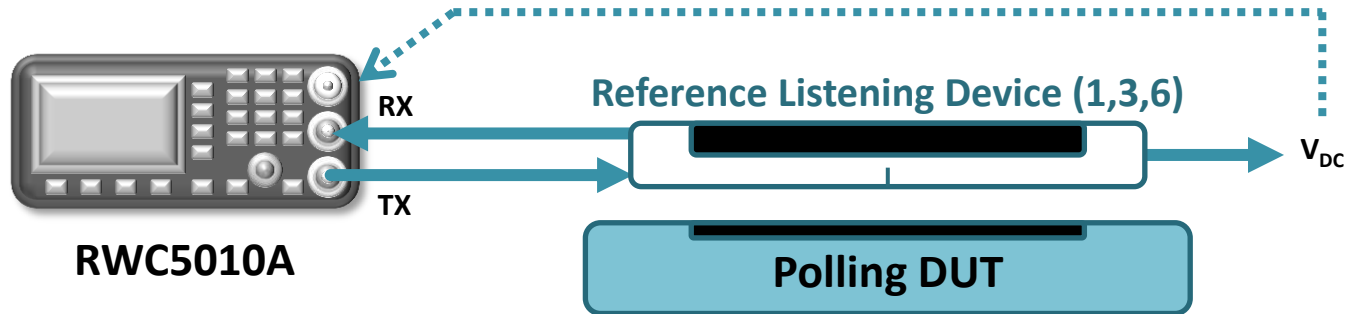
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Test Setup

Ver 2.0



Protocol Emulator

Ver 2.0

- Analysis of DUT's NFC Activities/Profiles
- Analysis of [link messages](#) and [timing](#)
- Emulation of all types of Tags
- Protocol & Analog Configuration

POLL_TEST NFC-A (247) (RMT) (AGC) (TR6) (CAP) (ETH) (EXT) (F)

NUM	D	FDT/6T	CHD	CONTENTS
450	P	5.01m	SENS_REQ	
451	L	86.4u	SENS_RES	NFCID: 7byte
452	P	495.6u	SDD_REQ_CL1	
453	L	86.4u	SDD_RES_CL1	
454	P	495.6u	SEL_REQ_CL1	
455	L	86.4u	SEL_RES_CL1	
456	P	495.6u	SDD_REQ_CL2	
457	L	86.4u	SDD_RES_CL2	NFCID: 0x04340002782
458	P	495.6u	SEL_REQ_CL2	NFCID: 0x04340002782
459	L	86.4u	SEL_RES_CL2	T2_TAG

95 70 02 78 2D 89 DE 27 B0

STATUS: RUNNING
PROTOCOL: NFC_A
MSG_CLR
FILTER
RESET
SAVE_NDE: USER_0
EXECUTE

LINK POW_TIME SENSITIVITY CONFIG

POLL_TEST NFC-A (247) (RMT) (AGC) (TR6) (CAP) (ETH) (EXT) (F)

REF_LISTENER: LISTENER-1
LOAD_MOD_TYPE: NOMINAL

POLL_TEST NFC-A (247) (RMT) (AGC) (TR6) (CAP) (ETH) (EXT) (F)

- LOAD_R: 330R
- PROTOCOL: NFC_A
- TAG: TYPE_2
- MEMORY_SIZE: 1024 Byte
- NDEF_MSG: TEXT
- ID_SIZE: DOUBLE
- NFCID1: 0x05340002782D89

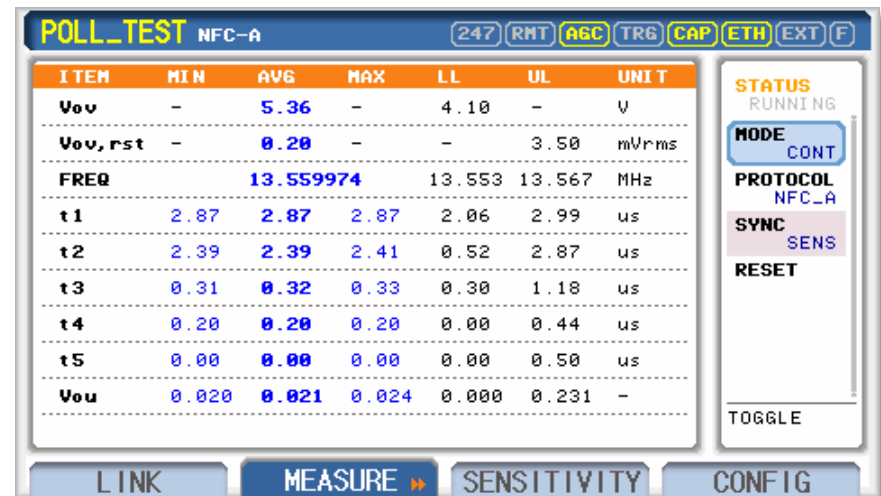
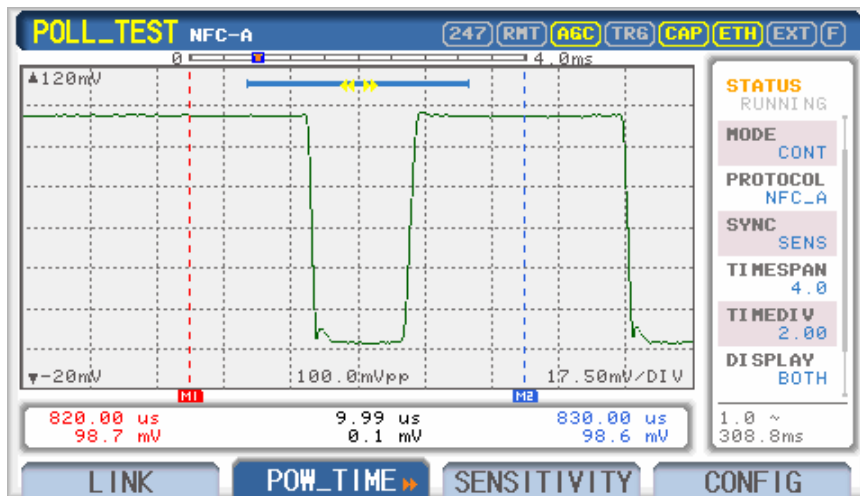
POP-UP

LINK POW_TIME SENSITIVITY CONFIG

Analog Characteristics

Ver 2.0

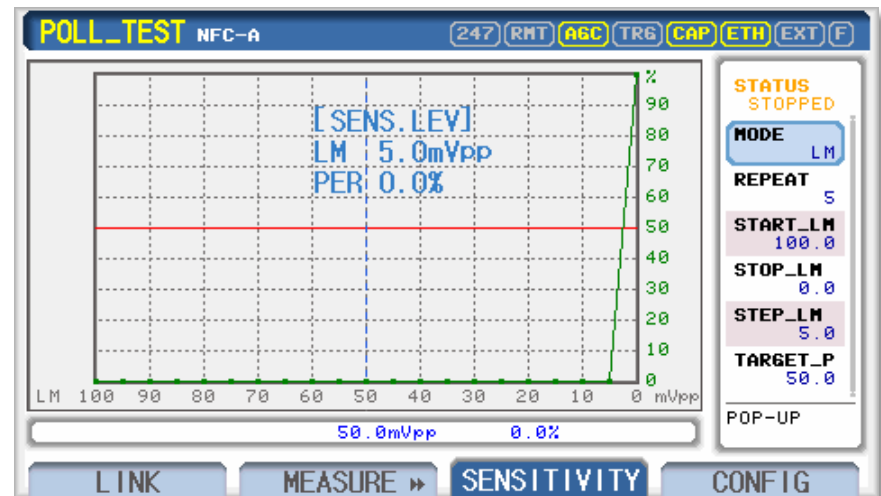
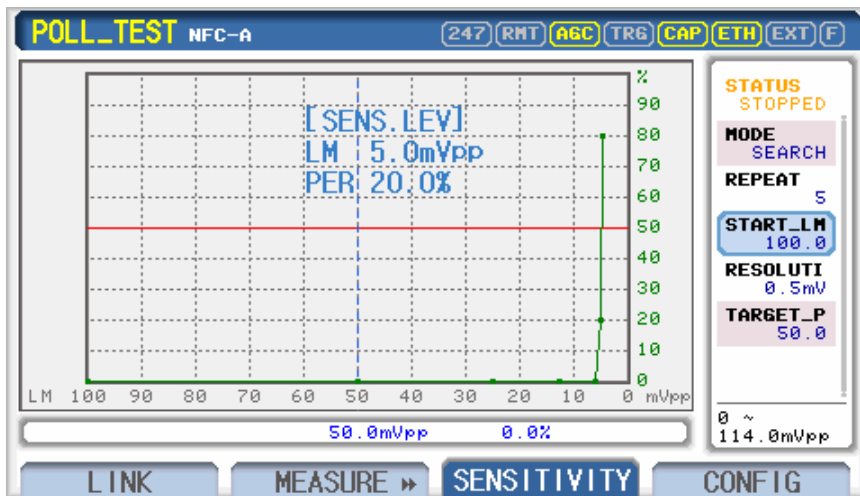
- Graphical display of modulation envelope
- Simultaneous measurement of ASK modulation, Power (VDC), Carrier Frequency



Receiver Sensitivity (1/2)

Ver 2.0

- **SEARCH** mode:
automatic search
for sensitivity level
(Load Mod. amplitude)
- **LM** mode:
full Load Mod.
sweep within the
defined range

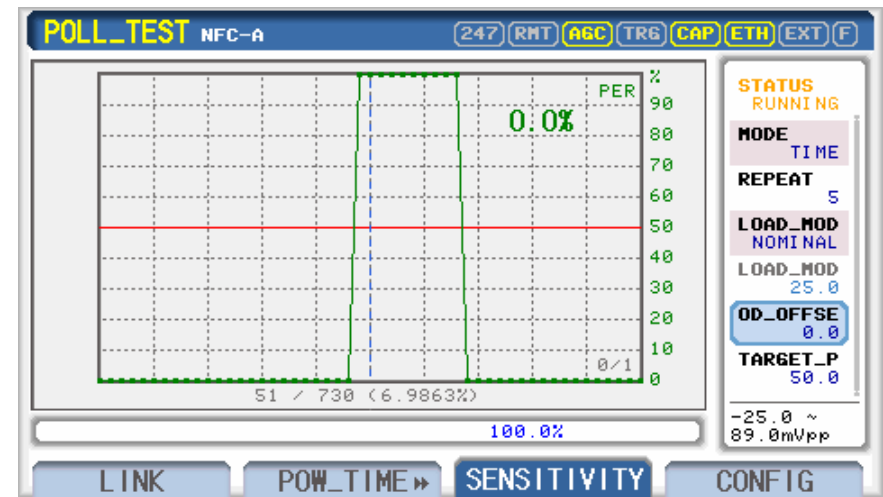
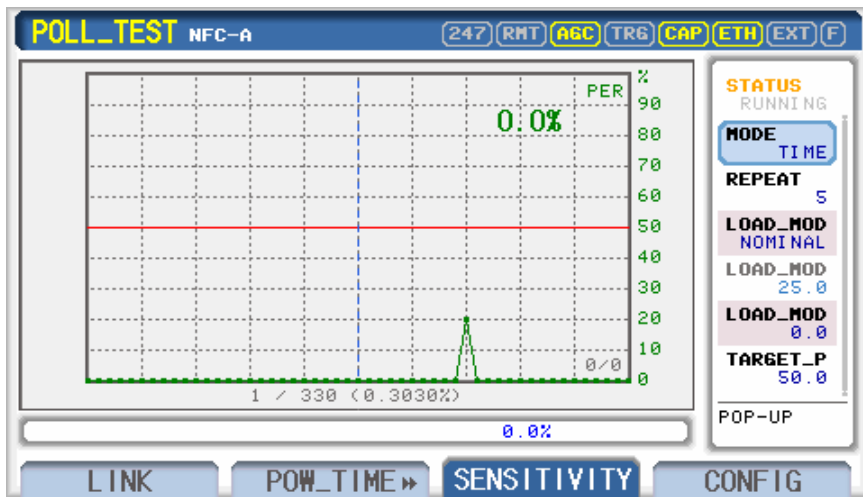


Receiver Sensitivity (2/2)

Ver 2.0

- **TIME** mode:
continuous monitor
with fixed Load
Mod. amplitude

- **TIME** mode:
continuous monitor
with adjustable Load
Mod. amplitude or
DUT position

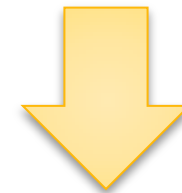


Performance Test (1/2)

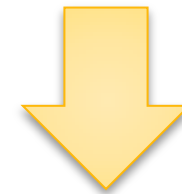
Ver 2.0



What is the Reader Performance?



Operating Range
(Distance)



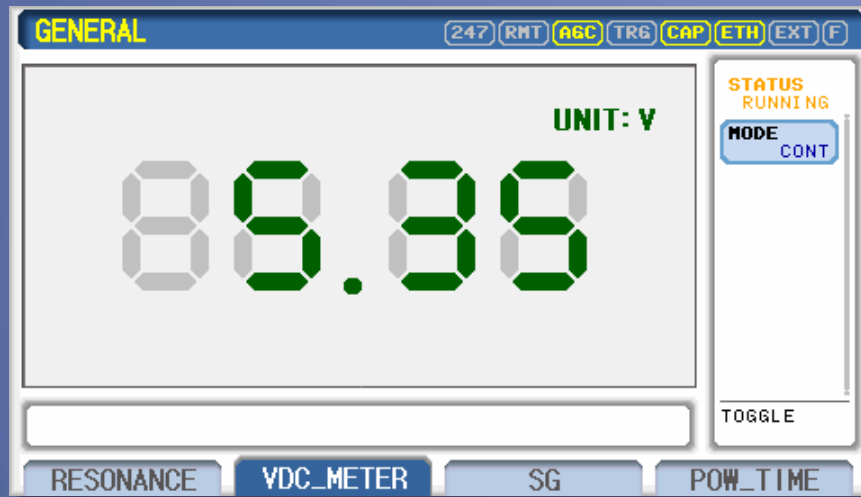
Increase TX power
&
improve RX sensitivity

Performance Test (2/2)

Ver 2.0

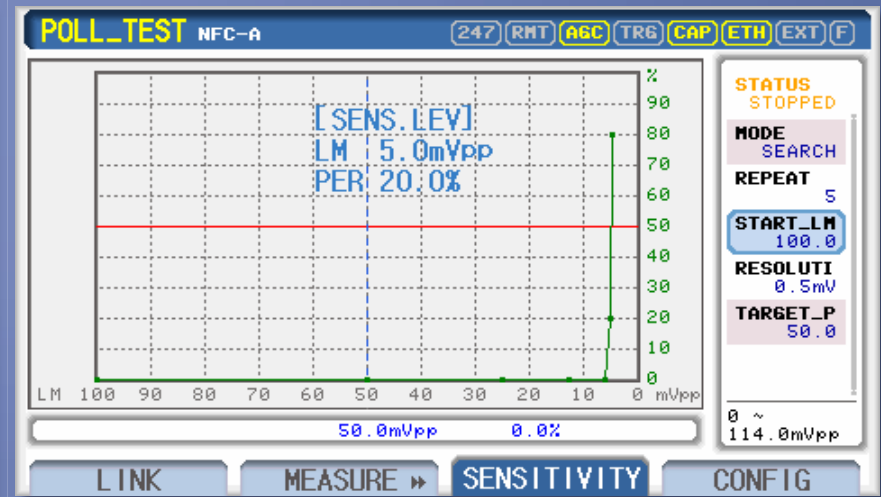
TX

VDC Level
(Output Power)



RX

Sensitivity
(Minimum Detectable Level)



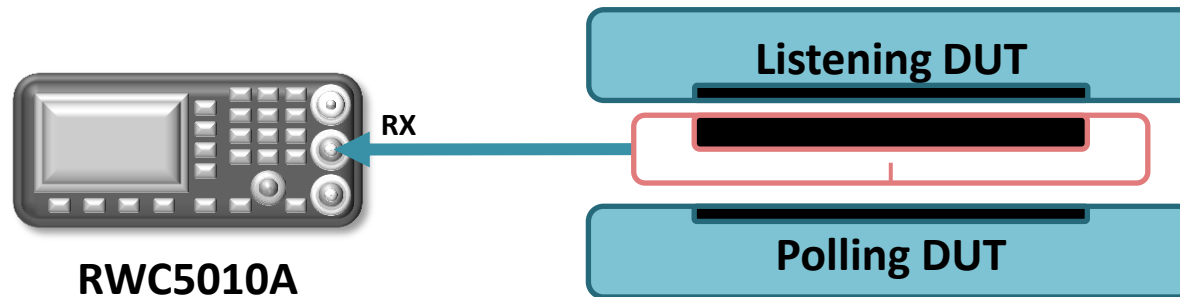
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Test Setup

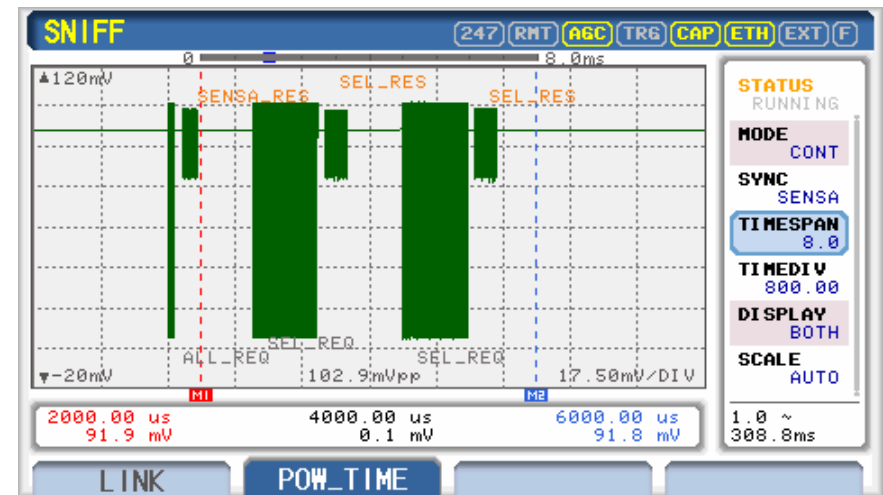
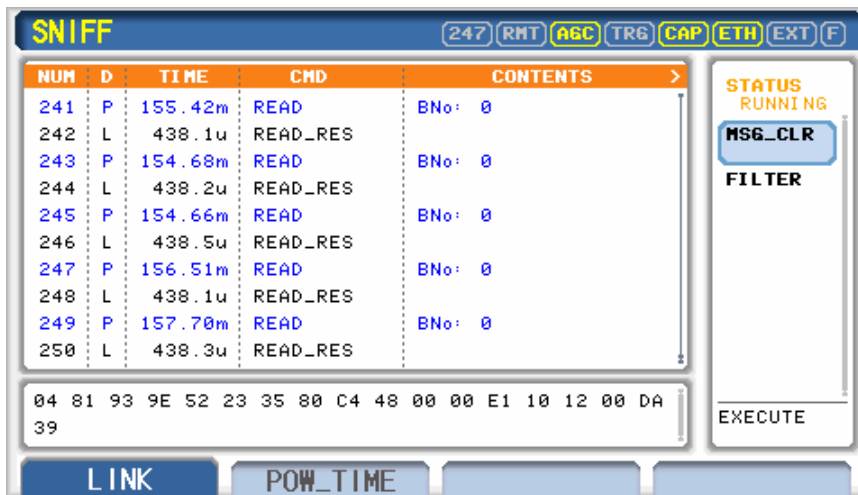
Ver 2.0



RF SPY

Ver 2.0

- Captures protocol messages between two NFC devices in real time
- Measures link timing



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NFC Forum Analog Test Cases for Listening Device

Ver 2.0

RWC5010A Utility for NFC Analog Test (V1.131)

Project Name: test Path: C:\Users\rwc\Desktop\nfc_app\test DUT Name: DUT_000 <http://www.redwoodcomm.com>

RWC5010A NFC Tester RWC5010A? RWC5010A NFC Tester, Ver=2.000, SN=RWC50101580018

FORUM TEST QUICK TEST PERFORMANCE UTILITY

Setup DUT LDT Auto PDT Auto

Listening Device Test

RUN

9.1 GROUP 1: LISTENING DEVICE TEST CASES

	9.1.1.1	9.1.1.2	9.1.1.3	9.1.1.4	9.1.1.5	9.1.1.6	9.1.1.7	9.1.1.8	9.1.1.9	9.1.1.10	9.1.1.11	9.1.1.12	9.1.1.13	9.1.1.14	9.1.1.15
9.1.1 GROUP 1.1: RADIO FREQUENCY POWER AND SIGNAL INTERFACE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.1.1.1 POWER RECEPTION TEST FOR NFC-A AT MINIMUM CONDITIONS	PASS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.2 POWER RECEPTION TEST FOR NFC-A AT NOMINAL CONDITIONS	PASS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.3 POWER RECEPTION TEST FOR NFC-A AT MAXIMUM CONDITIONS	PASS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.4 POWER RECEPTION TEST FOR NFC-B AT MINIMUM CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.5 POWER RECEPTION TEST FOR NFC-B AT NOMINAL CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.6 POWER RECEPTION TEST FOR NFC-B AT MAXIMUM CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.7 POWER RECEPTION TEST FOR NFC-F 212 AT MINIMUM CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.8 POWER RECEPTION TEST FOR NFC-F 424 AT MINIMUM CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.9 POWER RECEPTION TEST FOR NFC-F 212 AT NOMINAL CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.10 POWER RECEPTION TEST FOR NFC-F 424 AT NOMINAL CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.11 POWER RECEPTION TEST FOR NFC-F 212 AT MAXIMUM CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.12 POWER RECEPTION TEST FOR NFC-F 424 AT MAXIMUM CONDITIONS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.10 LOADING EFFECT MEASUREMENT	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.1.11 CARRIER FREQUENCY TEST	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9.1.1.12 POWER ON AND OFF TEST FOR NFC-A	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9.1.1.13 POWER ON AND OFF TEST FOR NFC-B	N/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9.1.1.14 POWER ON AND OFF TEST FOR NFC-F 212	N/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9.1.1.15 POWER ON AND OFF TEST FOR NFC-F 424	N/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9.1.2 GROUP 1.2: SIGNAL INTERFACE POLLING DEVICE TO LISTENING DEVICE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.1.2.1 MODULATION POLLING DEVICE TO LISTENING DEVICE AT LIMIT CONDITIONS - NFC-A	PASS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.2.2 MODULATION POLLING DEVICE TO LISTENING DEVICE AT LIMIT CONDITIONS - NFC-B	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.2.3 MODULATION POLLING DEVICE TO LISTENING DEVICE AT LIMIT CONDITIONS - NFC-F 212	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.2.4 MODULATION POLLING DEVICE TO LISTENING DEVICE AT LIMIT CONDITIONS - NFC-F 424	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.3 GROUP 1.3: SIGNAL INTERFACE LISTENING DEVICE TO POLLING DEVICE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.1.3.1 LOAD MODULATION AMPLITUDE FOR NFC-A	PASS	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.3.2 LOAD MODULATION AMPLITUDE FOR NFC-B	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.3.3 LOAD MODULATION AMPLITUDE FOR NFC-F 212	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/A	N/A	N/A	N/A	N/A
9.1.3.4 SUBCARRIER MODULATION - NFC-A	N/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9.1.3.5 SUBCARRIER MODULATION - NFC-B	N/T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

9.1.1.2 POWER RECEPTION TEST FOR NFC-A AT NOMINAL CONDITIONS

TCid : TC_AN_LIS_NFCA_02

NFC Listen Device Type: NFC-A
NFC Forum Reference Device: Poller 0
Power Transfer: Nominal
Bit Rate: 106kbps
Carrier Frequency: Nominal
Modulation: NFC-A Condition 1

Acceptance Criteria :
The Listening Device under test shall function properly in each test condition

VERDICT : PASS

STATUS trial NUM=1

Listening Device Support

Test Position (1, 0, 0)

☒ NFC_A
☐ NFC_B
☐ NFC_F-212
☐ NFC_F-424

☒ Tested
☐ Not Tested

NFC Forum Analog Test Cases for Polling Device

Ver 2.0

RWC5010A Utility for NFC Analog Test (V1.131)

Project: Project Name: test Path: C:\Users\rwc\Desktop\nfc_app\test DUT Name: DUT_000 <http://www.redwoodcomm.com>

RWC5010A NFC Tester RWC5010A? RWC5010A NFC Tester, Ver=2.000, SN=RWC50101580018

FORUM TEST QUICK TEST PERFORMANCE UTILITY

Setup DUT LDT Auto PDT Auto

Polling Device Test

RUN

9.2 GROUP 2: POLLING DEVICE TEST CASES

9.2.1 GROUP 2.1: RADIO FREQUENCY POWER AND SIGNAL INTERFACE ☒ Listener 1 ☐ Listener 3 ☐ Listener 6

Test Case	Listener 1	Listener 3	Listener 6
9.2.1.2 MAXIMUM POWER EMISSION MEASUREMENT (82R)	PASS	N/A	N/A
9.2.1.1 MINIMUM POWER EMISSION MEASUREMENT (82OR)	PASS	N/A	N/A
9.2.1.3 CARRIER FREQUENCY MEASUREMENT (82OR)	PASS	N/A	N/A
9.2.1.4 RESET CHARACTERISTICS MEASUREMENT (82OR)	FAIL	N/A	N/A

9.2.2 GROUP 2.2: SIGNAL INTERFACE POLLING DEVICE TO LISTENING DEVICE

Test Case	Listener 1	Listener 3	Listener 6
9.2.2.1 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-A (82OR)	PASS	N/T	N/T
9.2.2.2 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-B (82OR)	N/T	N/T	N/T
9.2.2.3 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-F 212 (82OR)	N/T	N/T	N/T
9.2.2.3 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-F 424 (82OR)	N/T	N/T	N/T
9.2.2.1 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-A (33OR)	PASS	N/T	N/T
9.2.2.2 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-B (33OR)	N/T	N/T	N/T
9.2.2.3 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-F 212 (33OR)	N/T	N/T	N/T
9.2.2.3 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-F 424 (33OR)	N/T	N/T	N/T

9.2.3 GROUP 2.3: SIGNAL INTERFACE LISTENING DEVICE TO POLLING DEVICE

Test Case	Listener 1	Listener 3	Listener 6
9.2.3.1 LOAD MODULATION SENSITIVITY TEST FOR NFC-A (33OR)	PASS	N/T	N/T
9.2.3.2 LOAD MODULATION SENSITIVITY TEST FOR NFC-B (33OR)	N/T	N/T	N/T
9.2.3.3 LOAD MODULATION SENSITIVITY TEST FOR NFC-F 212 (33OR)	N/T	N/T	N/T
9.2.3.3 LOAD MODULATION SENSITIVITY TEST FOR NFC-F 424 (33OR)	N/T	N/T	N/T

9.2.1 GROUP 2.1: RADIO FREQUENCY POWER AND SIGNAL INTERFACE ☐ Poller 0 ☐ Poller 3 ☐ Poller 6

9.2.1.5 THRESHOLD LEVEL TEST N/A N/A N/A

LOAD R=330 ohm

Automatic Load_R

IP Config: 192 168 0 247

Documentation: ☒ Forum LDT ☐ QT LDT ☐ LoadMod ☐ Gen I Sens ☐ Gen P Sens ☒ Forum PDT ☐ QT PDT ☐ Generate Report

Result Window

9.2.2.1 MODULATION POLLING DEVICE TO LISTENING DEVICE - NFC-A (82OR)

TCid : TC_AN_POL_NFCA_01

NFC Listen Device Type: NFC-A
NFC Forum Reference Device: Listener 1
Listen Load for Measurement: 820 ohm

Acceptance Criteria :
The waveform characteristics of the NFC-A modulation provided by the Polling Device under test, shall be compliant with the specification

VERDICT : PASS

STATUS: trial NUM=1

Polling Device Support

Test Position (1,0,0)

☒ NFC_A
☒ NFC_B
☒ NFC_F-212
☒ NFC_F-424

Tested (blue square)
Not Tested (white square)

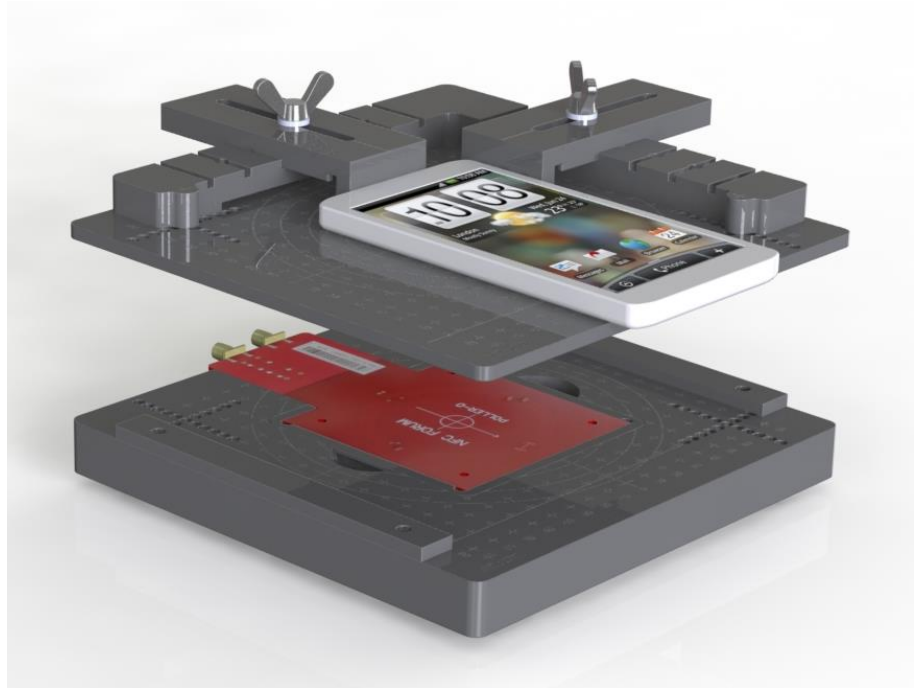
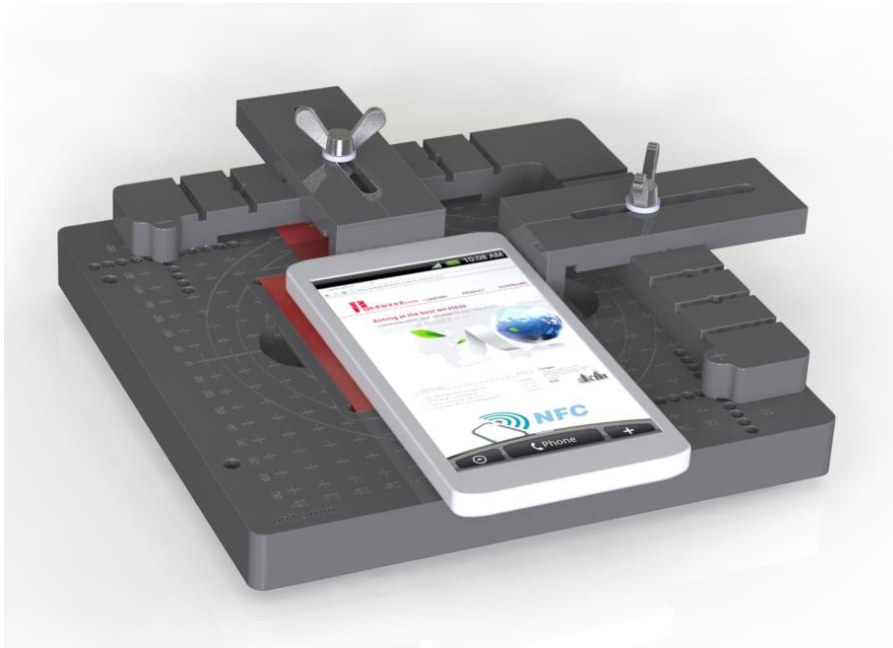
Contents

Ver 2.0

- Overview
- Key Features
- Listening Device Test
- Polling Device Test
- Sniff
- Automated PC Software
- Test Jig

DUT Positioning

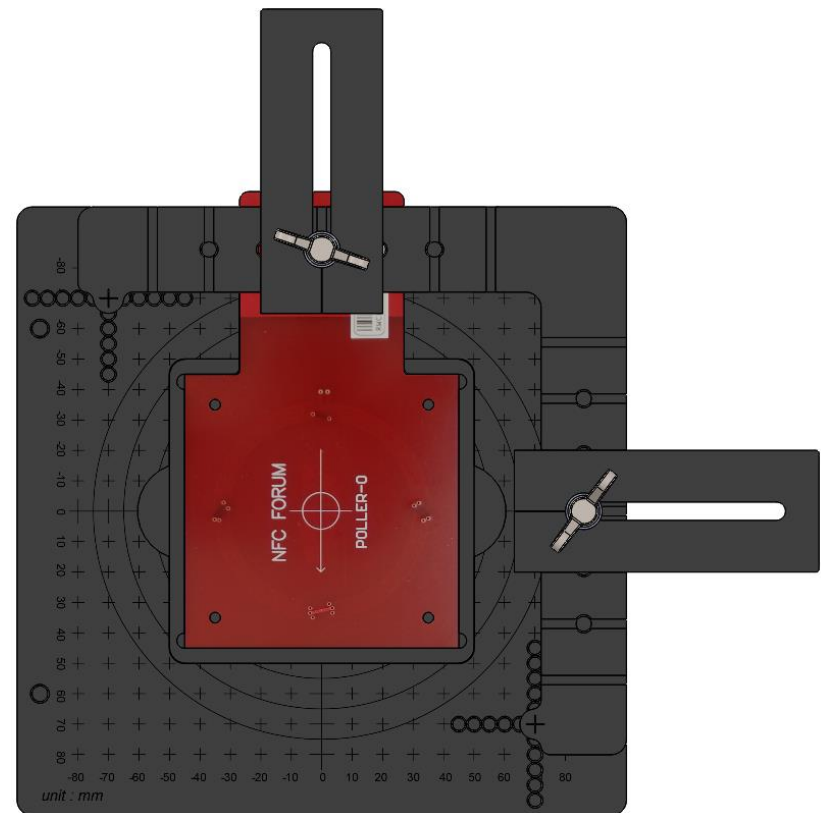
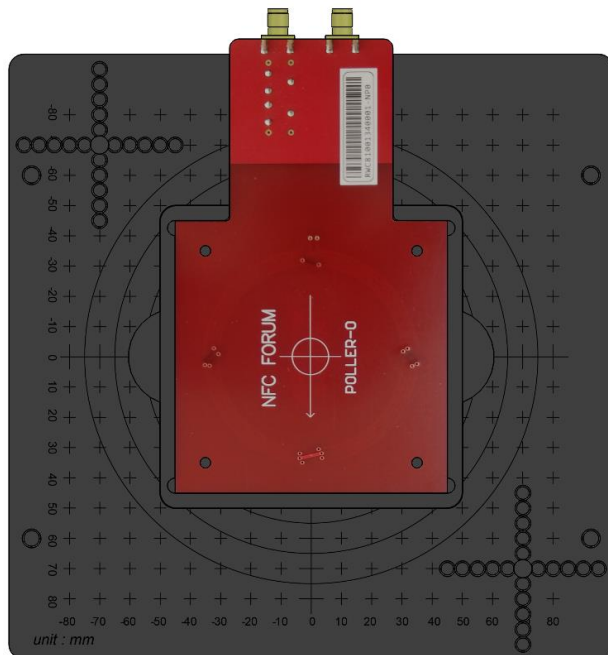
Ver 2.0



Listening Device Test Setup

Ver 2.0

- $z=0\text{mm}$, Poller-0

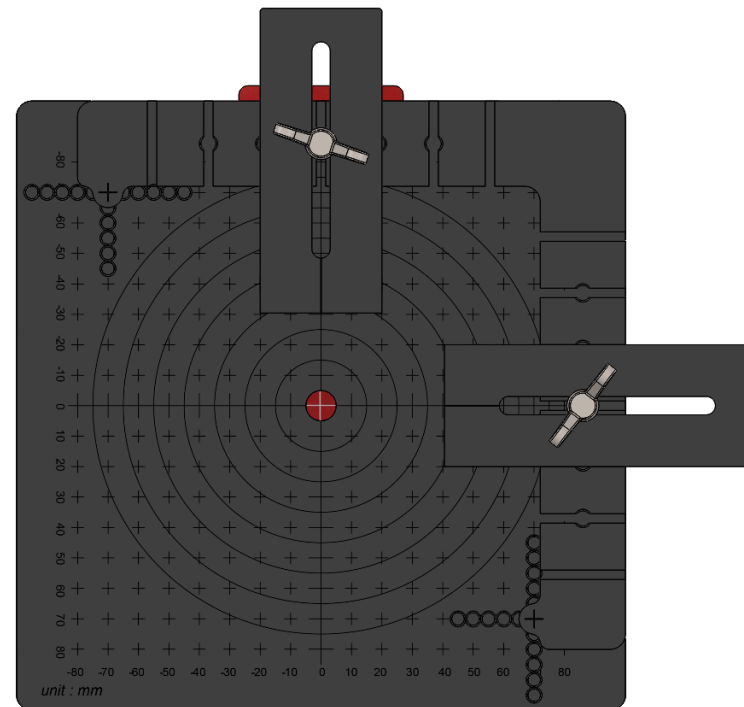
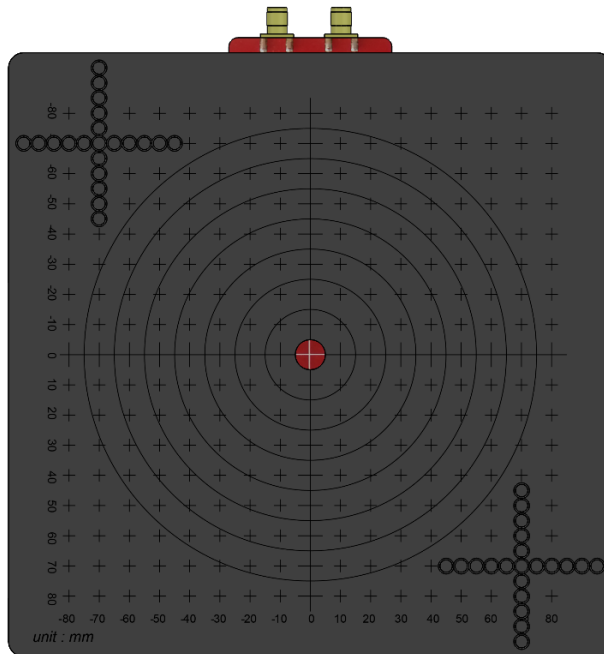


With DUT Fixture

Listening Device Test Setup

Ver 2.0

- z=5mm, Poller-0

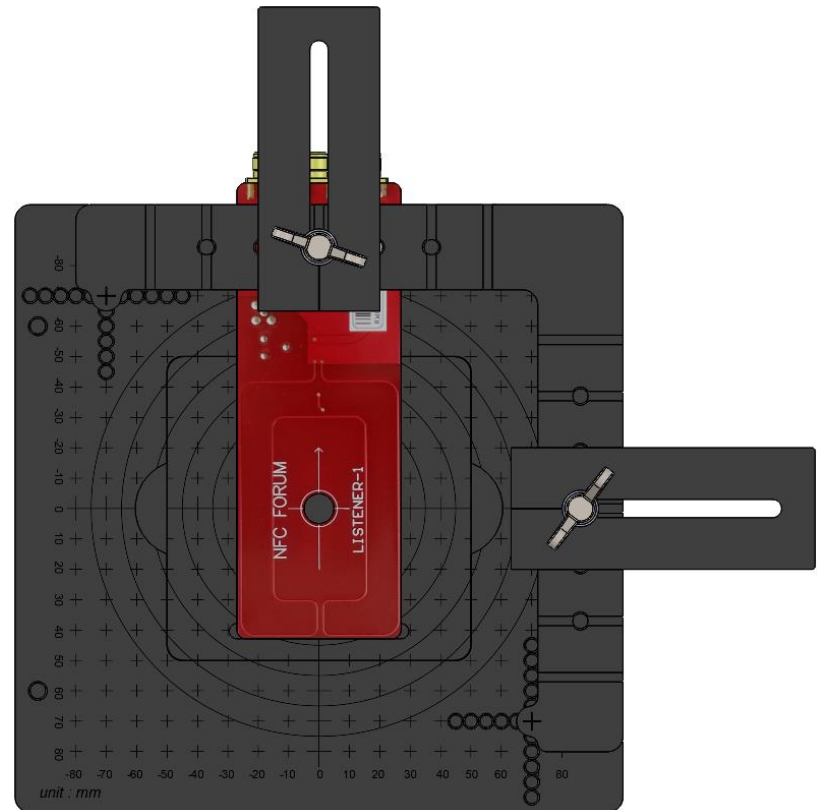
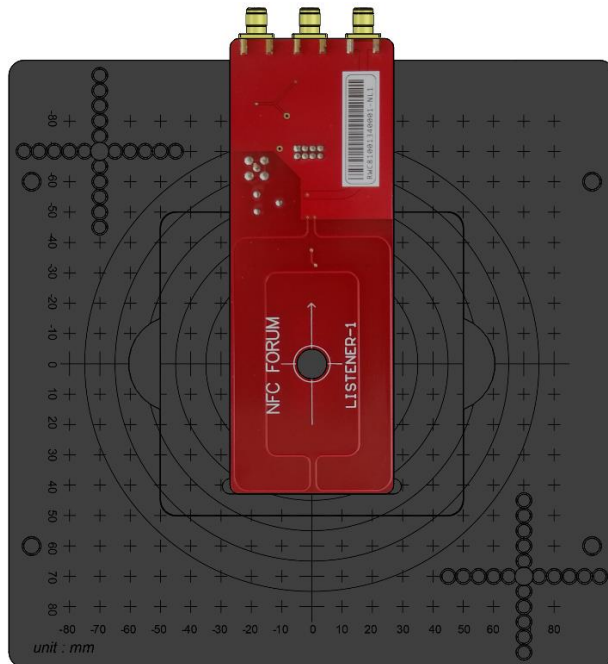


With DUT Fixture

Polling Device Test Setup

Ver 2.0

- $z=0\text{mm}$, Listener-1

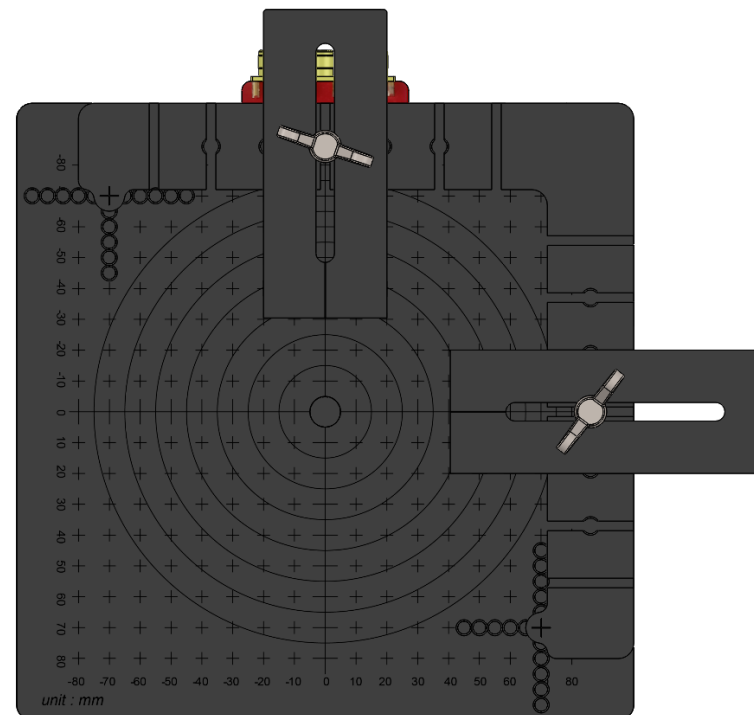
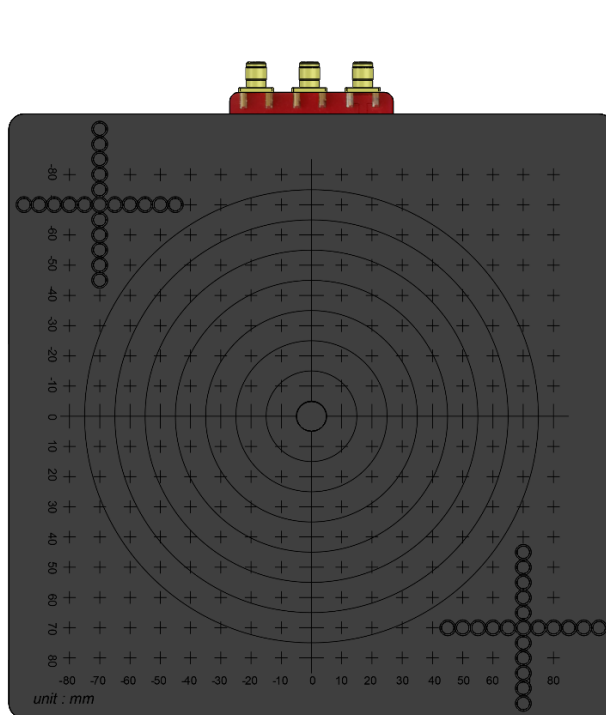


With DUT Fixture

Polling Device Test Setup

Ver 2.0

- $z=5\text{mm}$, Listener-1



With DUT Fixture

Comparison to Certification Tester

Ver 2.0

- Load Modulation Measurement
- VDC Measurement
 - Refer to the documents

Case study

Ver 2.0

- Investigation of Correlation between Sensitivity Test Results and Field Performances
 - DUT : Tag
 - DUT : Reader
 - [Refer to the documents](#)

Thank you!
