

RWC5010A NFC Tester

Product Overview

RWC5010A NFC Tester is a test equipment to test NFC Forum Devices specified in NFC Forum Technical Specifications. It also emulates EMV analog tests and measurements using its own PCD/PICC antenna. It provides very convenient working environment with full control over all system parameters. It supports various kinds of functions such as power vs. time measurement, link analyzer and modulation characteristic and load modulation measurements.



Key Features

RWC5010A is a compact low-cost all-in-one tester which includes NFC protocol (as defined in Digital Protocol Spec. V2.x of NFC Forum and Digital Protocol Spec. of EMVCo), analog hardware (as defined in Analog Spec. V2.x of NFC Forum), and software for tests and measurements, with the following features:

- ⊕ Listen Test, Poll Test, and Sniff mode supported
- ⊕ **NFC-A, NFC-B, NFC-F, NFC-V, EMVCo A/B** supported **HOT!**
- ⊕ All types of NFC tags supported: Type-1, 2, 3, 4 and 5 **HOT!**
- ⊕ Link message logger and analyzer
- ⊕ Link timing measurement such as Frame Delay Time (FDT) and Guard Time (GT)
- ⊕ Graphical Power vs. Time measurement similar to oscilloscopes
- ⊕ **Modulation characteristic** measurement
- ⊕ **Load Modulation** amplitude measurement
- ⊕ **Resonance Frequency** measurement of DUT antenna **HOT!**
- ⊕ User-controllable ASK modulation index
- ⊕ **Receiver Sensitivity** measurement of Polling DUT by adjusting load modulation amplitude **HOT!**
- ⊕ **Receiver Sensitivity** measurement of Listening DUT by adjusting VDC level **HOT!**
- ⊕ User friendly GUI (4.3" TFT LCD and key pad) for easy configuring of all tester parameters
- ⊕ RJ45 and RS232C Remote Control port
- ⊕ Automated **PC Program for Analog Test Cases** specified by NFC Forum

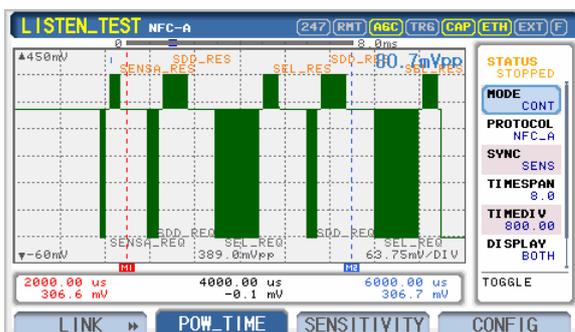
LISTEN Test

Link Analyzer

RWC5010A provides logging and analysis functions of link messages between the Tester and a Listening Device Under Test (DUT). In addition, all link timing values are measured and recorded in real-time during communication such as Guard Time (GT), and Frame Delay Time (FDT) or TRO depending on the type of NFC protocol. The Byte-format of raw data is displayed below the message window. The Tester

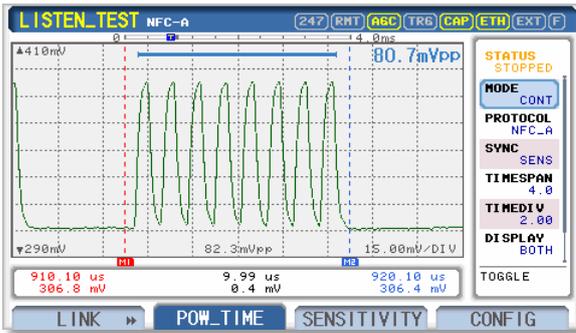
NUM	D	FDT/GT	CMD	CONTENTS	STATUS
530	P	5.00m	SENS_REQ		STOPPED
531	L	86.5u	SENS_RES	NFCID: 7byte	CONT
532	P	500.0u	SDD_REQ_CL1		PROTOCOL
533	L	86.4u	SDD_RES_CL1		NFC_A
534	P	500.0u	SEL_REQ_CL1		MSG_CLR
535	L	91.2u	SEL_RES_CL1	T2_TAG	FILTER
536	P	500.0u	SDD_REQ_CL2		
537	L	86.4u	SDD_RES_CL2	NFCID: 0x04819352233	
538	P	500.0u	SEL_REQ_CL2		
539	L	86.4u	SEL_RES_CL2	T2_TAG	

repeats sending commands according to the built-in scenario.



Pow-Time Measurement

Power vs. Time measurement is provided with graphical display window, similar to an oscilloscope function, which includes markers, delta marker, zoom-in/out, and so on. This measurement is command-selective which is user-configurable by 'SYNC' parameter to choose the target command for measurement. The corresponding message logs are also displayed on each measured signal.



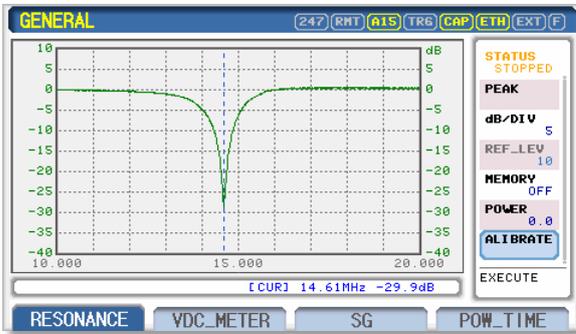
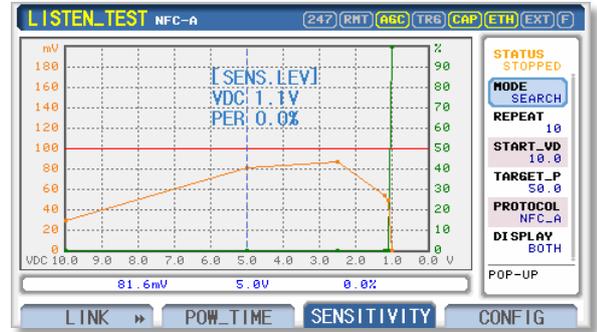
It automatically measures and displays the load modulation amplitude of a Listening DUT, based on the standard measurement procedures of the Specifications.

Receiver Sensitivity Test

Receiver Sensitivity Test validates the responsiveness of a Listening DUT with user-configurable VDC level. Three operating modes are provided:

‘SEARCH’ finds automatically the

resultant sensitivity level at which DUT responds, ‘VDC’ sweeps fully VDC values within the defined range, and ‘TIME’ monitors link quality with fixed conditions. In addition, it can be tested according to various location or direction of the Reference Poller antenna on the Test Jig provided optionally. The combination of the above may set up various test conditions.



Resonance Frequency Measurement

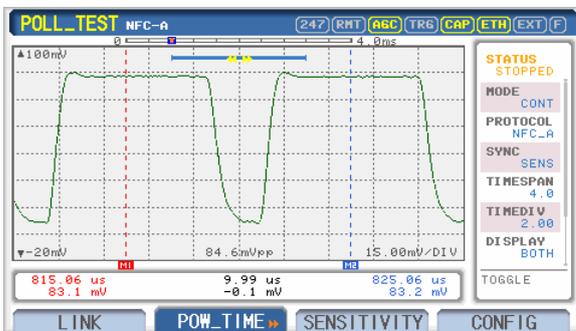
Especially in case of Listening DUT it is required frequently to check or tune its resonance frequency during development and test, and mostly network analyzers are used for it. However RWC5010A excludes the necessity of such kind of expensive equipment since it provides a special function to measure the resonance frequency within NFC frequency band in a way similar to S11 measurement of network analyzers.

POLL Test

Link Analyzer

RWC5010A also provides logging and analysis functions of link messages between the Tester and a Polling DUT. In this mode, the Tester operates as a role of the reference Listening Device, sending the corresponding responses to commands of a Polling DUT. NFC protocol parameters of Listening Device can be configured in ‘CONFIG’ screen as for users’ test purposes.

NUM	D	FDT/ST	CMD	CONTENTS
759	L	606.2u	READ_RES	
760	P	3.10m	SLP_REQ	
761	P	11.31m	ALL_REQ	
762	L	91.1u	SENS_RES	NFCID: 7byte
763	P	660.4u	SEL_REQ_CL1	
764	L	86.4u	SEL_RES_CL1	
765	P	656.8u	SEL_REQ_CL2	NFCID: 0x04340002782
766	L	86.4u	SEL_RES_CL2	T2_Tag
767	P	147.79m	READ	BNo: 0
768	L	601.5u	READ_RES	



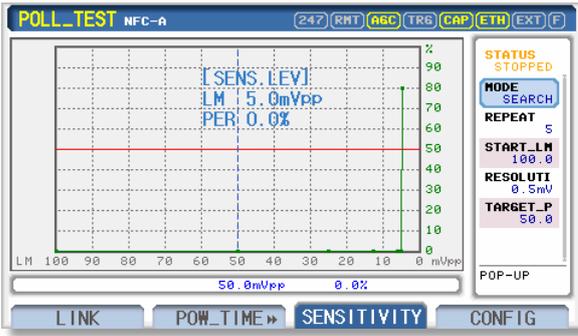
Pow-Time Measurement

Pow-Time in POLL Test may be used mainly for measurement of modulation characteristics of a Polling DUT. It automatically captures a target command signal of DUT and then measures the modulation parameters. The portion of data for measurement is marked as green or red bar above the signal graph depending on the test verdict.

ITEM	MIN	AVG	MAX	LL	UL	UNIT
V _{av}	-	4.74	-	4.10	-	V
V _{av,rst}	-	0.00	-	3.50	-	mV _{rms}
FREQ	-	13.559958	-	13.553	13.567	MHz
t1	2.23	2.23	2.24	2.06	2.99	us
t2	1.01	1.02	1.05	0.52	2.23	us
t3	0.60	0.61	0.62	0.55	1.18	us
t4	0.36	0.37	0.38	0.00	0.44	us
t5	0.00	0.00	0.00	0.00	0.50	us
V _{ou}	0.031	0.031	0.033	0.000	0.074	-

Modulation Characteristics

In addition of graphical measurement, modulation characteristic measurement results are reported automatically on the screen, which include rise time, fall time, bit duration, overshoot (undershoot), modulation



index, and so on. CW on/off power and carrier frequency of DUT are also measured. The upper/lower limits for each are also automatically calculated according to the Analog Specification.

Receiver Sensitivity Test

To validate the receiver sensitivity of a Polling DUT, the Tester provides setups for load modulation amplitude in the range of limits as specified in the Analog Specification. Three operating modes are also provided and various test conditions can be set up as explained in LISTEN Test.

SNIFF Mode

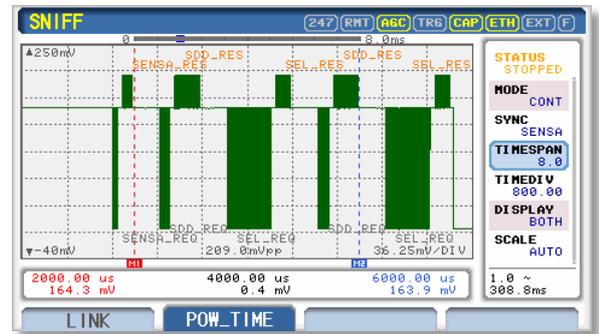


Link Analyzer

RWC5010A provides logging and analysis functions of link messages between a Listening DUT and a Polling DUT, or between two NFC devices by 'sniffing'. In this mode, the Tester enables only its receiver to capture all messages between them. This feature may be useful in checking the interoperability among various types of NFC devices, since it shows all messages including erroneous ones that happen in real communication. It also captures power on/off operation as well as all NFC protocol messages (NFC-A, NFC-B, NFC-F, and EMVCo A/B).

Pow-Time Measurement

Pow-Time in SNIFF Mode captures and displays all signals of protocol messages between two NFC devices. It automatically captures a target command signal of DUT with 'SYNC' parameter. It also shows message logs on each signal.



Test Jig

