

**IQnfc+™**

Near Field Communication Test System



## Introduction

Near field communication (NFC) is a set of short-range wireless technologies that communicates through magnetic field induction between electronic devices in close proximity. As NFC offers safe and simple communications between electronic devices, many NFC applications, such as mobile payment and short peer-to-peer transactions, are fast gaining in popularity. It is important to ensure NFC-enabled products meet all measures of quality and provide a consistent and exceptional user experience.

IQnfc+ is a wireless test solution for NFC-enabled devices that focuses on characterizing the NFC physical layer and ensuring product quality. IQnfc+ supports measurements of NFC Forum analog test cases, as well as EMVCo PICC/PCD L1 test cases.

## Simple and Flexible Tests for NFC devices

IQnfc+ consists of two hardware components: the test instrument and test coils. The test instrument contains the main NFC test functional blocks, including analyzer and NFC transceiver. It communicates with an external computer for data transfer and signal processing. The test coils serve as the communication interface with the Device Under Test (DUT). We support all 8 test coils (Poller/PCD and Listener/PICC) that are defined in the NFC Forum and EMVCo.

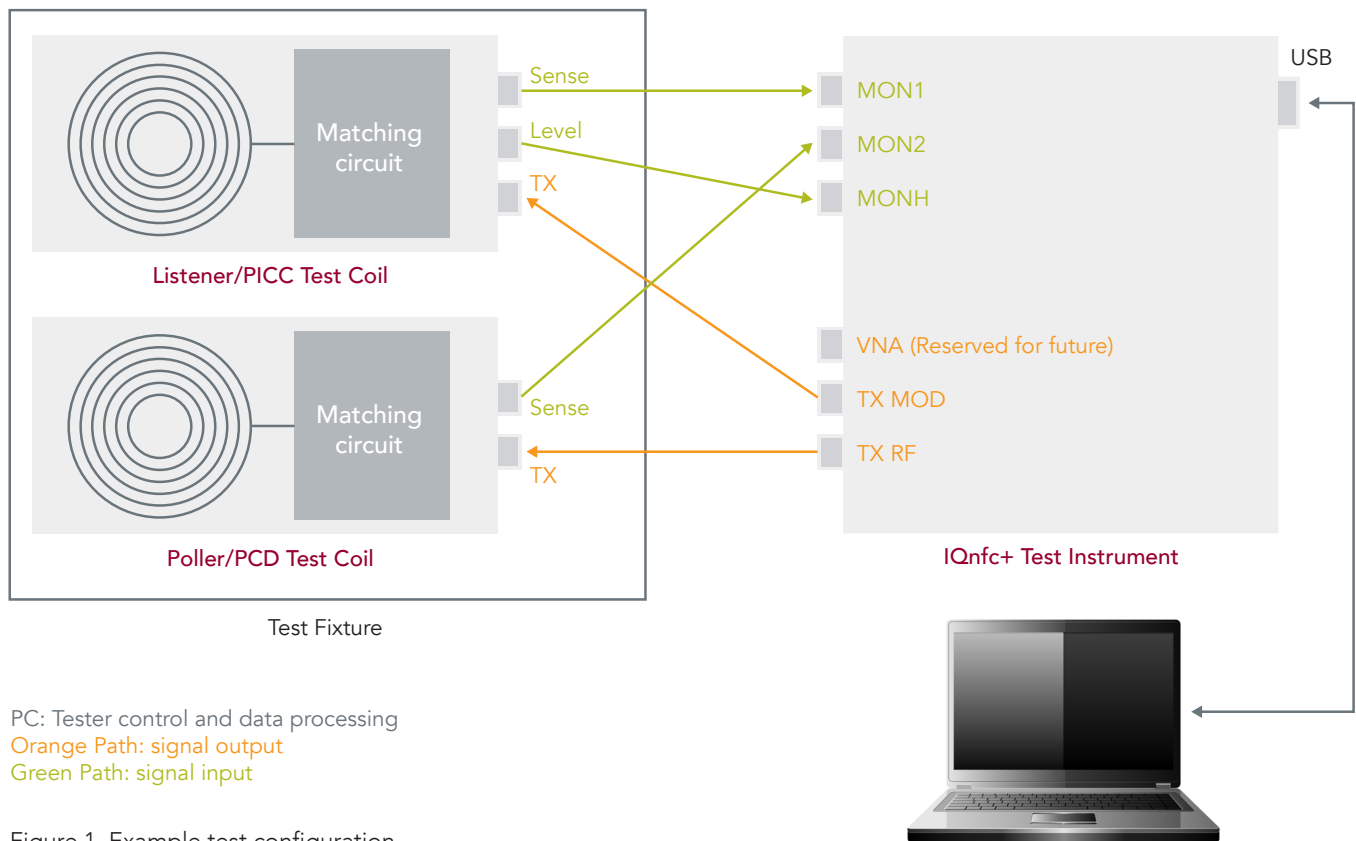


Figure 1. Example test configuration

## IQnfc+ Test Instrument Specifications

### Analyzer

Parameter	Ports	Value
Max input voltage	MON1, MON2	2 Vpp, +/- 1 V Max.
	MONH	30 Vpp, +/- 15 V Max.
Input voltage accuracy	MON1, MON2	+/-5% (50 mVpp to 2 Vpp, +/- 25 mV to +/-1 V)
	MONH	+/-5% (700 mVpp to 30 Vpp, +/- 350 mV to +/-15 V)
Frequency range	MON1, MON2, MONH	12 to 20 MHz
Frequency accuracy	MON1, MON2, MONH	< +/-8 ppm (< +/-100 Hz @ 13.56 MHz)
Quantization	MON1, MON2, MONH	14 bits
Spurious (non-harmonic)	MON1, MON2, MONH	< -60 dBc
Input return loss	MON1, MON2	> 15 dB
Input impedance	MON1, MON2	50 ohms
	MONH	1 Mohm    15 pF

### Transmitter

Parameter	Ports	Value
Output voltage range	TXRF	0.2 to 20 Vpp (re: 50 ohms)
	TXMOD	Pulse Amplitude: 0 to 5.5 V (re: 50 ohms) Pulse Offset: -2 to +3 V (re: 50 ohms)
Output power P1 dB	TXRF	> 30 dBm
Output voltage accuracy	TXRF, TXMOD	+/- 10% with regard to set level
Output voltage resolution	TXRF	0.25 dB
	TXMOD	1 mV
Output return loss	TXRF	> 23.1 dB
Output impedance	TXRF, TXMOD	50 ohms
Frequency range	TXRF	13.56 +/- 0.01 MHz
Frequency accuracy	TXRF, TXMOD	< +/-8 ppm (< +/-100 Hz @ 13.56 MHz)
Frequency resolution	TXRF	10Hz
Spurious	TXRF	< -60 dBc (13.56 +/-2 MHz)

## NFC Measurement Specifications

Parameter	Ports	Value
Standard	ISO14443A/B, ISO18092, EMVco, Felica, NFC A/B/F/P2P	
Operation mode	Target and Initiator emulation	
Data rate	Support various NFC data rates analysis	106, 212, 424 and 848 kbps
Field strength	Measure carrier field strength (DUT as initiator)	Relative measurement, DUT and Position dependent. Resonator & Q selection dependent.
Frequency accuracy	Measure DUT frequency error (DUT as initiator)	< $\pm 100$ Hz
Target frame delay time	Measure the DUT response time (DUT as target)	Tester contribution < $\pm 20$ ns
Modulation depth/index/ timing profile	Measure waveform shape (DUT as initiator and target)	This is a relative measurement: dependent on DUT, position, resonator and Q selection.
Overshoot	Overshoot following the rising and falling edges	< $\pm 0.5$ %
Rise and Fall time	Measure the rise and fall time as defined in the standards	< $\pm 2/f_c$ seconds
Rx sensitivity	Min detectable field strength (DUT as initiator and target)	This is a relative measurement: dependent on DUT, position, resonator and Q selection.
Payload data	Provide results of received payload data (DUT as initiator and target)	
CRC error	Provide results of CRC error (DUT as initiator and target)	

## IQnfc+ Test Instrument Port Description

### Front Panel



I/O	Function	Type
MON1	Listener/PICC signal input	BNC female
MON2	Poller/PCD signal input	BNC female
MONH	Listener/PICC level input (DC+RF)	BNC female
VNA	Resonant sweep output	BNC female
TX MOD	Listener/PICC signal output	BNC female
TXRF	Poller/PCD signal output	BNC female
TEST HEAD	Digital control and power for control of test head	Proprietary
Status Indicator	Blinking Green: application loading Green: No fault detected, ready to use Orange: software fault Red: power on without established USB connection Off: Power off	LED

### Rear Panel



I/O	Function	Type
Reference input	13.56 MHz clock reference	BNC female
Marker out / trigger in 1	TTL compatible	BNC female
Marker out / trigger in 2	TTL compatible	BNC female
USB	USB 2.0 compatible connection to external controller	USB Type B
AC in	AC power input	100 to 240 VAC (automatically switched) 50 to 60 Hz Includes hard power switch

## General and Environmental

Dimensions	14.782" L X 16.707" W X 2.093" H
Weight	7.9 pounds
Power requirements	90-260 VAC, 47-63 Hz; <92W
Power consumption	<35W (Maximum), <24W (standby)
Recommended computer	Intel® Core i5 2.5 GHz with 1 GB of RAM or better
Operating system	Windows 7 (32 or 64 bits)
Operating temperature	+10°C to +55°C (IEC EN60068-2-1, 2, 14)
Storage temperature	-20°C to +70°C (IEC EN60068-2-1, 2, 14)
Specification validity temperature	+20°C to +30°C
Operating humidity	15% to 95% relative humidity, non-condensing (IEC EN60068-2-30)
EMC	EN 61326 Immunity for industrial environment, Class B emissions
Safety	IEC 61010-1, EN61010-1, UL3111-1, CAN/CSA-C22.2 No. 1010.1
Mechanical vibration	IEC 60068, IEC 61010 and MIL-T-28800D, class 5
Mechanical shock	ASTM D3332-99, Method B
Recommended calibration cycle	36 months
Warranty	12 months hardware 12 months software updates

## Order Codes

0100-INFC-003	IQnfc+ test system. It supports standard based analogue test cases for NFC Forum and EMVCo
0300-INFC-001	Advanced NFC Measurement Suite includes: <ul style="list-style-type: none"> <li>• Advanced measurement suite for packet analysis</li> <li>• Felica (NFC-F) analysis suite</li> <li>• NFC Reader mode analysis suite</li> </ul>
0150-INFC-001	IQnfc+ test fixture for standard test coils. It allows easy movement on the x, y, z axis.
0150-INFC-002	The NFC Forum test package, which includes 2 standard test coils (Poller 0 and Listener 1)
0150-INFC-003	The EMVCo test package, which includes 2 standard test coils (PCD and PICC)

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