

# Automated Mobile Testing System Software (AMTS) MT910 Series

## Introduction

Mobile phones must guarantee proper functioning in non-ideal real-world environments, such as a lost or damaged antenna, usage in a tunnel or locker, being held close to the body or in a pocket surrounded by coins, etc. Each of these scenarios can be regarded as non-ideal from an RF standpoint, meaning non-50Ω. We are able to use a single tuner to vary the VSWR magnitude and phase seen by the antenna port of the phone and test its performance in transmit and receive mode.

The Maury Automated Mobile Test System Software (AMTSv3) is a standalone application designed specifically to automate the testing of mobile phones in transmit and receive modes, for output power and sensitivity respectively, as a function of VSWR magnitude and phase.

## What AMTSv3 Can Do For You

AMTSv3 offers a simple, fast and cost-effective solution tailored for mobile phone testing outside of the 50Ω environment. This solution automates mobile phone testing in TX/RX modes over a multitude of channels/frequencies, battery voltages and power levels. It works by combining:

- Maury's MT910 Series Automated Mobile Testing System software to
  - control the system;
  - de-embed VSWR and power levels to DUT reference;
  - control variable DC supply to mimic battery voltages; and
  - automate measurements;
- a Maury MT98x Automated Tuner, which sets non-50Ω impedance; and
- a Keysight or Rohde & Schwarz Wireless Communications Test Set, which (acting as a base station) sets active channel and power levels, and measures power and bit-error-rate.



By analyzing the test results obtained using this solution you can learn:

- What level of antenna mismatch is acceptable, based on real-life testing against your VSWR requirements
- If your mobile phone meets the minimum performance requirements under pre-defined VSWR and voltage conditions
- If your phone's performance degrades after a large VSWR sweep plan
- If thermal stability issues exist
- If your phone's design is acceptable as is, or if some components need to be redesigned
- If specific performance problems result from batch manufacturing

These are just a few of the ways you can use Maury MT910 AMTS software and ATS tuners to extend your mobile phone testing capability beyond the 50Ω environment.

## Available Models - Supported Wireless Data Communications Standards

Model	Description (See details on page 2 of 2.)
MT910*	Mobile Phone Tester
MT910A	GSM Standard
MT910B	WCDMA Standard
MT910C	CDMA2000 Standard
MT910D	LTE Standard
MT910E	TD-SCDMA Standard

\* MT910 requires at least one standard (MT910A, MT910B, MT910C, MT910D or MT910E).

## MT910: Mobile Phone Tester

**Transmit Load Pull** — The goal of load pull in the phone's transmit mode is to measure the output power as a function of VSWR magnitude and phase. A Wireless Communication Test Set is used in signaling mode to establish a call with a mobile phone, specify a channel/frequency (e.g., ARFCN 128 is 824 MHz uplink and 869 MHz downlink for GSM850), set the power control level (e.g., PCL 5 is 33 dBm at GSM850) and measure the power delivered from the phone at given VSWR magnitude and phase.

**Receive Load Pull** — The goal of load pull in RX mode is the sensitivity-measurement of the phone; at what power level will a user-specified bit-error rate (BER) be achieved, as a function of VSWR magnitude and phase. A Wireless Communication Test Set is used in signaling mode to establish a call with a mobile phone, specify a channel/frequency, and send a low-power burst (in the order of -105 to -110 dBm) to the phone and measure the resulting BER. Maury MT910 series software will vary the burst-power until the required BER is achieved.

**Manual Testing** — Simple manual testing is achieved by entering single values of channel/frequency, battery voltage, VSWR magnitude and phase.

**Test Automation** — The measurement routine is automated thanks to the use of an advanced graphic test sequencer which allows the user to enter a list of channels/frequencies, battery voltages, VSWR magnitudes and phases.

**Compatible Instruments** — Keysight 8960, Keysight E7515A UXM, R&S CMU200, R&S CMW500.

## MT910A: GSM Standard

Adds GSM Standard to MT910 Mobile Phone Tester

**Supported Technology:** GSM 850,900,1800,1900.

**Measurements Supported:**

- TX power – Transmit Power
- Modulation – Frequency Error & Phase Error (RMS & PEAK)
- Spectrum – due to Modulation [23 frequencies]
  - due to Switching [9 frequencies]
- Sensitivity (search algorithm w/adjustable start level)
  - 2.439% RBER

## MT910B: WCDMA Standard

Adds WCDMA Standard to MT910 Mobile Phone Tester

**Supported Technology:** WCDMA Bands I, II, V, VI, VIII

**Measurements Supported:**

- TX power – Transmit Power
- Modulation – Freq Error, MAG Error, Phase Error, EVM (Avg)
- Spectrum – ACLR at 5 and 10 MHz [ + and – ]
- Sensitivity (search algorithm w/adjustable start level)
  - 0.1% BER

## MT910C: CDMA2000 Standard

Adds CDMA2000 Standard to MT910 Mobile Phone Tester

**Supported Technology:** CDMA2000 BC0, BC1

**Measurements Supported:**

- TX power – Transmit Power
- Modulation – Carrier Frequency Error, Waveform Quality
- Spectrum – ACP at 870, 885, 900 & 1,980 MHz [ + and – ]
- Sensitivity (search algorithm w/adjustable start level)
  - 0.5% FER with Confidence Level >95%

## MT910D: LTE Standard

Adds LTE Standard to MT910 Mobile Phone Tester

**Supported Technology:** LTE Standard

**Measurements Supported:**

- TX power – Transmit Power
- Modulation – EVM, Mag Error, Phase Error, Frequency Error, IQ Offset
- Spectrum – ACLR at UTRA frequencies
- Sensitivity (search algorithm w/adjustable start level)
  - 5.0% BER

## MT910E: TD-SCDMA Standard

Adds TD-SCDMA Standard to MT910 Mobile Phone Tester

**Supported Technology:** TD-SCDMA Standard

**Measurements Supported:**

- TX power – Transmit Power
- Modulation – EVM, Mag Error, Phase Error, Frequency Error
- Spectrum – ACLR at  $\pm 1.6$  MHz and  $\pm 3.2$  MHz
- Sensitivity (search algorithm w/adjustable start level)
  - 0.5% BER