

2201 ProLock

3G Test Set For Service



Aeroflex 2201 ProLock – Service Testing for 2G and 3G Mobile Communications

Service centers for mobile phones perform repair on 2G and 3G phones for various manufacturers. Reverse logistics can be expensive, in particular in the no-fault-found case. On the other hand, customer satisfaction is guaranteed if they experience a competent service of defective mobile phones, with the phone being away for a short period only.

For these reasons, Level 1 and 2 service shops filter those phones that are within the specifications or can be repaired locally. This decreases the number of non-faulty phones which are processed in higher level service centers, meaning less cost for the service chain and higher customer satisfaction.

The Aeroflex 2201 ProLock is the most important part in Aeroflex's intelligent 3G test system for service. The system provides a competitive price-performance ratio for filter testing as well as final testing after repair.

Aeroflex's ProLock is capable of performing the measurements necessary for level 1, 2 and 3 service on GSM, WCDMA and TD-SCDMA. With its future proof RF concept, ProLock even supports WCDMA band VII (between 2.5 and 2.7 GHz).

Highlights

- Reliable testing, due to longstanding experience in service
- Supports GSM, GPRS, EDGE, WCDMA, HSDPA and TD-SCDMA
- Intuitive user interface
- Can run without an additional PC
- Low cost, high speed

GSM Measurements

- Output power
- RMS phase error
- Peak phase error
- Frequency error
- Burst length
- Power vs. time
- BER, BLER measurements
- Reported RSSI

WCDMA and HSDPA Measurements

- Minimum output power
- Maximum output power
- Open loop power control
- Inner loop power control
- Error vector magnitude (RMS and peak)
- Magnitude error (RMS and peak)
- Phase error (RMS and peak)
- Frequency error
- Rho
- I/Q offset
- I/Q imbalance
- ACLR
- BER and BLER measurements
- Reported RSCP
- Max. Throughput (HSDPA)
- Median CQI (HSDPA)

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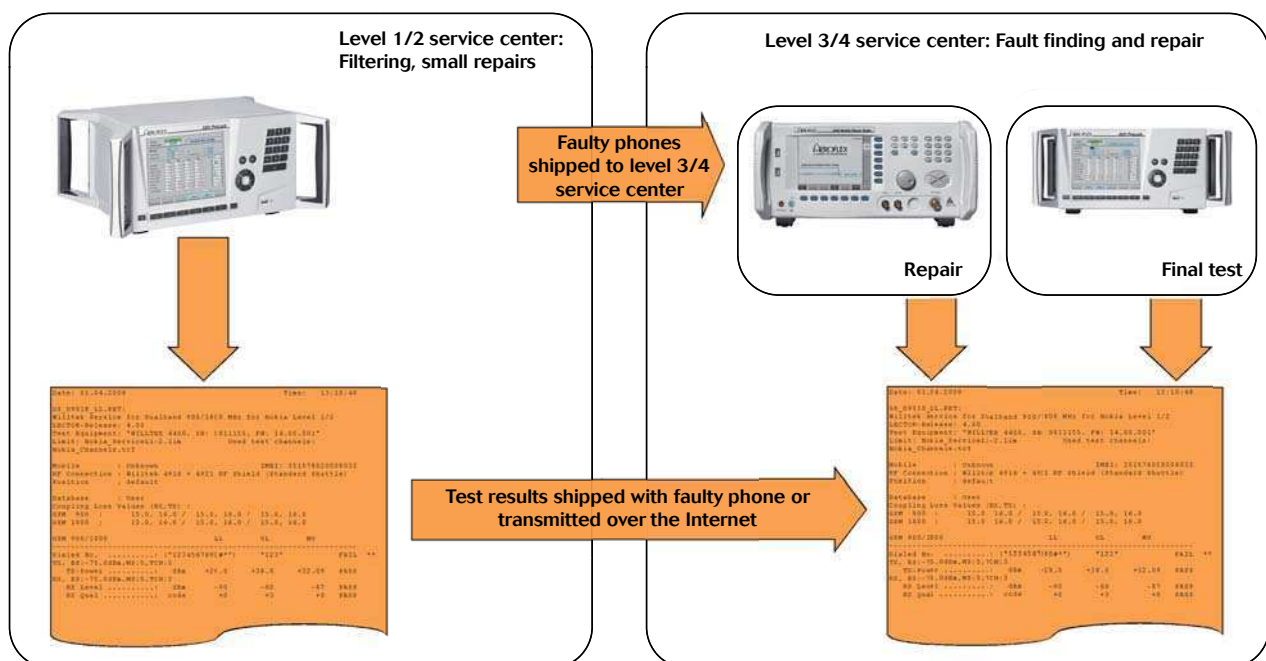
- Minimum output power
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- Error vector magnitude (RMS and peak)
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- Phase error (RMS and peak)
- Frequency error
- Rho
- I/Q offset
- I/Q imbalance
- PCDE
- ON/OFF power
- Time offset
- ACLR
- OBW
- BER and BLER measurements
- Reported RSCP



The 2201 ProLock can be used either in manual mode, in Autotest mode or under remote control with the 7310 Lector & Scriptor product family.

In manual mode, the large, high contrast color display and the straightforward operating software ease manual measurements. With just a few clicks on the high quality, click-type keyboard measurements can be set up, started and switched. The 2201 equipped with the 7360 Coupling Factor Upgrade License can identify the type of phone and use the specific coupling factors, making manual operation of a communication test set easier than ever before.

Under remote control, the automated tests of the well known 7311 Lector Basic or 7212 Lector Enhanced can be performed with the 2201 ProLock. The convenient and user friendly PC software runs the same scripts as for other Aeroflex terminal test instruments; this indicates how flexible the 7310 Lector and Scriptor product family is. The test reports always have the same format, independent of the test instrument being used. This helps multi-level service organizations to easily and conveniently maintain the whole service chain, as illustrated in Figure 1.



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The 2261 Autotest Option enables the ProLock to run comprehensive tests without a PC. This makes ProLock a self-contained test station; it still can be connected to a PC via Ethernet to centrally store test results and distribute test scripts, limits, configuration settings and coupling factors. The Autotest option is an alternative to the 7310 Lector-Scriptor; the choice between the two may depend on which way better fits the service environment. Lector and Scriptor, and Autotest use the same scripts and coupling values, making maintenance very simple and avoiding double effort.

Universal Interfaces

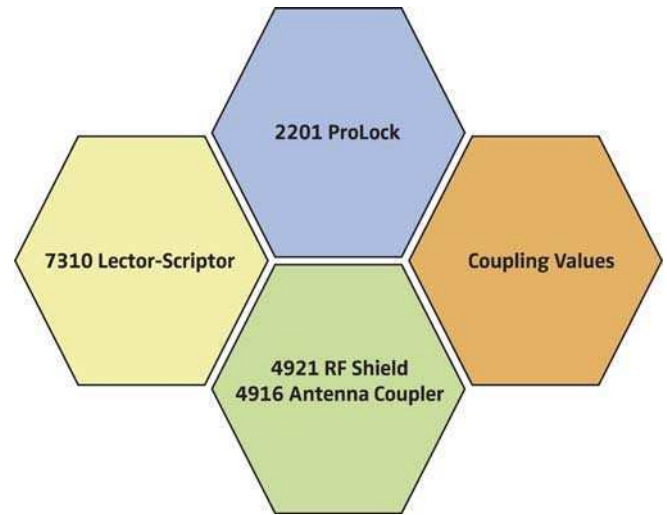
The 2201 comes with multiple USB connections to connect a mouse, a keyboard and a flash drive at the same time. The instrument easily connects as well to the Ethernet; the built-in support of the Dynamic Host Configuration Protocol (DHCP) avoids the need for manual IP address handling.

The RF connector is located at the back of the instrument. This novel approach offers the most convenient connection to the 4921 RF Shield with its 4916 Antenna Coupler and keeps the repair bench clear and tidy, without RF cables lying around on the bench and being damaged.

Part of an Intelligent 3G Test System for Service

Aeroflex's intelligent 3G test system for service does not need much user input for automated tests but determines the technologies, frequency bands and coupling factors independently. The system consists of:

- 2201 ProLock
- 7312 Lector Enhanced
- 4921 RF Shield and 4916 Antenna Coupler
- Coupling values (7360 Coupling Factor Update License)



The experience of phone manufacturers performing a filter test in level 1/2 service shows that about 30% of the returned phones in service are faultless. A filter test can at least identify 60% of those phones before they are shipped to a level 3/4 service center. The strategy for service is more and more changing towards large service hubs which get the phones from small shops. If the intact phones are already filtered in those shops the total service costs for a faultless phone can be decreased. The following example calculation shows the impact of a filter test on the costs:

An average of about 10% of new phones come back to service for various reasons. 30% of these returned phones have no faults. In a country of 10 million new phones per year, these are 300,000 phones returned for nothing. If 60% of those faultless phones can be identified with a filter test locally it means that 180,000 phones will not cause the cost of being processed through the whole service chain – including shipment to and from the service hub.

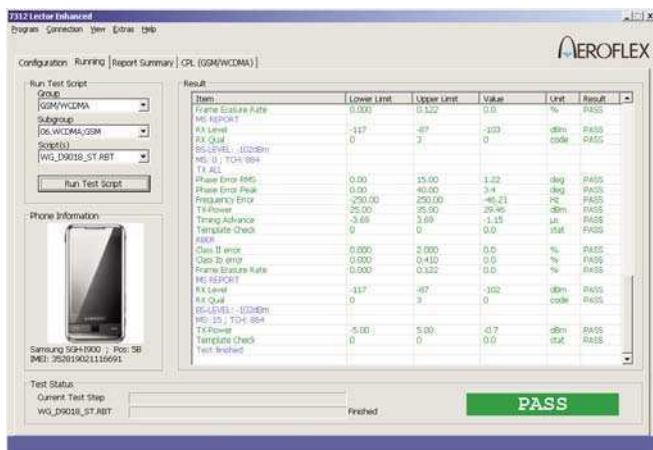


Assuming that each phone would cause 25 € in this service chain, this adds up to a cost saving of 4.5 million € per country per year if the phones were filtered locally.

Another important aspect of a proper filter test is customer satisfaction. Market experience shows that customers are pleased when they get a test protocol of their mobile phone after repair because they can be confident that the phone has been tested properly. This shows customers that they are facing a competent service – in particular outside the warranty period when they have to pay for the repair.

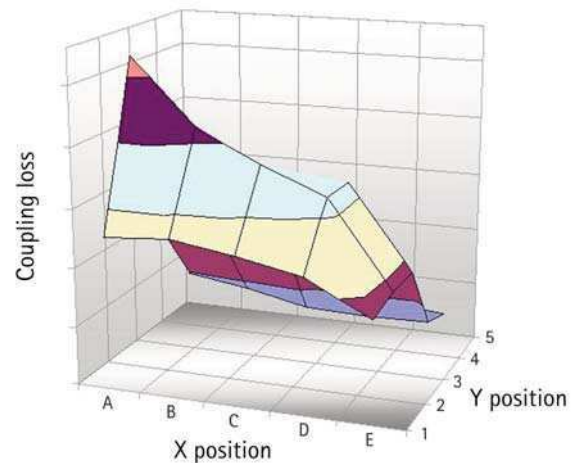
In conjunction with Lector, service shops can prove each mobile phone test with serial number, date and time, and results.

Lector and Scriptor are both capable of controlling 2201 ProLock and all other Aeroflex terminal test instruments remotely and has been well accepted by customers for a long time. 7312 Lector Enhanced offers a large variety of features for service shops and service centers that need automated test scripts with defined limits and clear Go/NoGo verdict. In addition, 7315 Scriptor eases the administrator's work of distributing vendor-specific test scripts and mobile phone settings and allows changing the test setup.



With the 7360 Coupling Factor Update License for 7312 Lector Enhanced and 7315 Scriptor, service shops and repair centers are always up to date with the coupling factor database because new mobile phone settings can be derived from Aeroflex over the Internet. The PC software checks if new updates are available, and downloads and installs them from the Internet. Do not worry about determining the coupling factors of new phones. With this automatic update, manual editing and file handling becomes unnecessary, hence avoids mistakes and saves time. Supported manufacturers and phones are listed on Aeroflex's website in the Lector and Scriptor download area.

The 4916 Antenna Coupler connects the mobile phone with the test instrument over the antenna, thus rendering an RF (radio frequency) cable connection unnecessary and including the antenna in the test. As a side effect, the RF radiation between the phone and the instrument can affect real networks and vice versa. The 4921 RF Shield is a high quality shielding chamber ensuring that the measurements are not impaired by interference from nearby base stations. The 4921 features a guaranteed attenuation of 80 dB for all GSM and WCDMA bands. Aeroflex tests each RF Shield and verifies its conformance to ensure that it's suitable for your measurement requirements. The results are documented in a detailed test report and are available on request.



PRELIMINARY SPECIFICATIONS

Specifications valid after 60 minutes warm-up time at ambient temperature, specified environmental conditions and typical measurement range, within a period of one year after calibration.

The published accuracies are determined in accordance with GUM (Guide to the Expression of Uncertainty in Measurement) and EA (European Co-operation for Accreditation) application document EA4/02: "Expressions of the Uncertainty of Measurements in Calibration".

BASIC RF DATA

Input/Output Impedance

50 Ω

VSWR

<1.4

RF Connector

N-type, female

Frequency Resolution

100 kHz step

Signal Bandwidth

6 MHz switchable 250 kHz

Narrow band

Maximum Input Level

+35 dBm (burst)

INTERNAL TIME BASE

Reference Frequency

10 MHz

Aging

10⁻⁶/year

EXTERNAL TIME BASE (INPUT)

Sync Input

BNC, 50 Ω

Frequency

10 MHz

Input Level

0 to 17 dBm

FREQUENCY RANGE

GSM850, GSM900, GSM1800, GSM1900, WCDMA bands 1 – 10
TD-SCDMA band a

RF OUTPUT

Output Level

-110 to -30 dBm

Resolution

0.1 dB

Absolute Accuracy

Level \geq -60 dBm \pm 1.5 dB

Level < -60 dBm \pm 2.0 dB

WCDMA AND HSDPA MEASUREMENTS

POWER MEASUREMENTS

Input Power Level

-85 to +35 dBm

Absolute Accuracy

Transmit power \geq -30 dBm \pm 1.0 dB

Transmit power < -30 dBm \pm 1.5 dB

Transmit power < -55 dBm \pm 2.5 dB

Relative Accuracy (Inner Loop)

0.5 dB

EVM MEASUREMENT

Accuracy

4% RMS (residual vector error)

Range

Up to 30%

Resolution

0.1%

FREQUENCY ERROR

Accuracy

20 Hz

Range

\pm 5 kHz

Resolution

1 Hz

SUPPORTED PROCEDURES

Registration

Mobile originated call

Mobile terminated call

Loopback mode (RMC)

Speech loopback

Call clearing by UE

Call clearing by BS

Channel and band handover

MEASUREMENTS

Min/Max output power

Modulation quality (EVM, freq. error)

Open loop power control

Inner loop power control

ACLR

BER, BLER measurements

Reported RSCP

Maximum Data Throughput Test (HSDPA)

Median CQI (HSDPA)

TD-SCDMA MEASUREMENTS

POWER MEASUREMENTS

Input Power Level

–75 to +35 dBm

Absolute Accuracy

Transmit power ≥ -30 dBm ± 1.0 dB

Transmit power < -30 dBm ± 1.5 dB

Transmit power < -55 dBm ± 2.5 dB

Relative Accuracy (Inner Loop)

0.5 dB

EVM MEASUREMENT

Accuracy

4% RMS (residual vector error)

Range

Up to 30%

Resolution

0.1%

FREQUENCY ERROR

Accuracy

20 Hz

Range

± 5 kHz

Resolution

1 Hz

SUPPORTED PROCEDURES

Registration

Mobile originated call

Mobile terminated call

Loopback mode (RMC)

Speech loopback

Call clearing by UE

Call clearing by BS

Channel and band handover

MEASUREMENTS

Min/Max output power

Modulation quality (EVM, freq. error, PCDE)

Open loop power control

Inner loop power control

ACLR and OBW

ON/OFF power

Time offset

BER, BLER measurements

Reported RSCP

GSM MEASUREMENTS

POWER MEASUREMENTS

Range (In-burst meas.)

–30 to +35 dBm

Absolute Accuracy

Transmit power ≥ -30 dBm ± 1.0 dB

Transmit power < -30 dBm ± 1.5 dB

PHASE ERROR MEASUREMENT

Accuracy (residual phase error)

1.5° RMS

Range

Peak Measurement

1.0° to 45°

RMS Measurement

1.0° to 20°

FREQUENCY ERROR

Accuracy

20 Hz

Resolution

1 Hz

Range

± 50 kHz

SUPPORTED PROCEDURES

Registration

Mobile originated call

Mobile terminated call

Speech loopback

Call clearing by UE

Call clearing by BS

Channel and band handover

MEASUREMENTS

Output power

RMS phase error

Peak phase error

Frequency error

Burst length

Power vs. time

BER, BLER measurements

Reported RSSI

GENERAL DATA

USB Interface

USB 1.1 (Full Speed)

Serial Interface

RS-232 (115,200 kbit/s)

Network Interface

Ethernet, 100 Mbit/s, TCP/IP

DC Supply Voltage

11 to 15 V

Mains Power Supply**AC Voltage Range**

100 to 250 V

Voltage Frequency

50 to 60 Hz

Power Consumption

<40 W

Storage Temperature

-20°C to +50°C

Operating Temperature

+5°C to +40°C (40°F to 105°F)

Humidity

<80%

Size (W x H x D)

310 x 170 x 250 mm

(12.2 x 6.7 x 9.8 in)

Weight

5.5 kg (12.1 lbs.)

STANDARD DELIVERY

Mains power supply

AC power cord

7311 Lector Basic (CD)

USB flash drive

1103 Test USIM Card

ORDERING INFORMATION

2201 ProLock AG 100 301

Software Options (Select at least one)

2231 GSM Option AG 897 450

2232 GPRS Option AG 897 453

2233 EDGE Option AG 897 454

2234 WCDMA Option AG 897 451

2235 WCDMA/GSM Speed and
Handover Option AG 897 458

2236 HSDPA Option AG 897 459

2237 TD-SCDMA Option AG 897 460

2238 TD-SCDMA/GSM Speed and
Handover Option AG 897 461

2250 WCDMA Handover Option AG 897 464

2251 WCDMA and GSM Speed Option AG 897 465

More Software Options

2242 IO Trace Option AG 897 463

2260 Coupling Factor Update License (1 year) AG 897 456

2261 Auto-Test Option AG 897 457

2262 CPL Wizard Option AG 897 468

Accessories

1103 Test USIM Card AG 860 164

Mains Power Supply AG 248 328

1489 Bluetooth Connectivity Test Package AG 248 510

1491 WiFi Connectivity Test Package AG 248 499

Coupling4921 RF Shield & 4916 Antenna Coupler
with XY Shuttle AG 248 721

4916 Antenna Coupler with XY Shuttle AG 248 720

Remote Control Software**Individual Licenses**

7312 Lector Enhanced AG 897 310

7315 Scriptor AG 897 311

7360 Coupling Factor Update License (1 year) AG 897 312

7360 Coupling Factor Update License (2 years) AG 897 328

Scriptor Upgrade from 7312 to 7315 AG 897 314

Network Licenses

USB Network Dongle for max 10 users AG 860 570

USB Network Dongle for max 50 users AG 860 571

USB Network Dongle for max 250 users AG 860 572

7312 Lector Enhanced (Network License) AG 897 326

7360 Coupling Factor Update License
(Network License) AG 897 327

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The Aeroflex logo features a stylized 'A' with a blue triangle inside, followed by the word 'AEROFLEX' in a bold, sans-serif font.

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Our passion for performance is defined by three attributes represented by the icons pictured above: solution-minded, performance-driven and customer-focused.

Part No. 46891/387, Issue 3, 07/11