Ericsson GSM MS-Test AUTORUN

Software Option   897 943

Operating Instructions

65_egsau   Doc. Version: 0001-141-A

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☞ **Differences to former software versions:** see the timeline at the end of this supplement.

Introduction

The option Ericsson GSM MS Test AUTORUN (AUTORUN option) allows automatic tests on a mobile station (MS) of the GSM 900 network (Phase 2).
With the newest FEX option installed, tests of GSM 1800/GSM 1900 mobiles and dual-band mobiles are enabled in addition. During all the tests, STABILOCK simulates a base station (BS).

The test results can be

- observed on the monitor of STABILOCK,
- output on a printer,
- stored on a memory card.

Tests with Ericsson GSM MS-Test AUTORUN

The following tests are possible:

- Crossband handover
- MS CALL (call proceeding from MS) with entry of call number 1234567890 by user
- BS CALL (call proceeding from STABILOCK 4032)
- AF Loopback
- Phase and frequency error measurement on low channel (TCH), power level high
- Phase and frequency error measurement on high channel (TCH), power level high
- Power measurement on mid channel (TCH), power level low, mid and high
- Power measurement on low and high channel (TCH), power level high
- Evaluation of power/time template on mid channel (TCH), power level low, mid and high
- RX Qual readout on low, mid and high channel (TCH), power level high, BS power –102 dBm (–100 dBm in the GSM 1800 band)
- RX Level readout on low, mid and high channel (TCH), power level high, BS power –68.5 dBm and –102 dBm (–100 dBm in the GSM 1800 band)
- BS Release

Standard Requirements

- STABILOCK 4031 with firmware version $\geq$ 4.10 or STABILOCK 4032 with firmware version $\geq$ 6.10 (for older STABILOCK 4031 $\geq$ 2.59)
- Hardware option 248 274 (GSM module)
- Software option 897 912 (GSM 1800/1900 MS-Test) in version $\geq$ 4.31

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Requirements for dual-band

- STABILOCK 4032 with firmware version $\geq$ 6.20
- Software option 897 912 (GSM 1800/1900 MS-Test) in version $\geq$ 5.0
- Hardware option 248 274 (GSM module)
- Hardware option 248 295 (FEX) with the following status of hardware revisions:
  ```
  - FEX Duplex  :  -B-
  - FEX RX unit :  -3-
  - FEX TX unit :  -1-
  ```

Test Setup

Connect the test item (MS) via the RF socket (N-type) to STABILOCK (see **Fig. 10.1**).

While testing, always power the MS from a charger to avoid any false results through a drop in battery voltage.
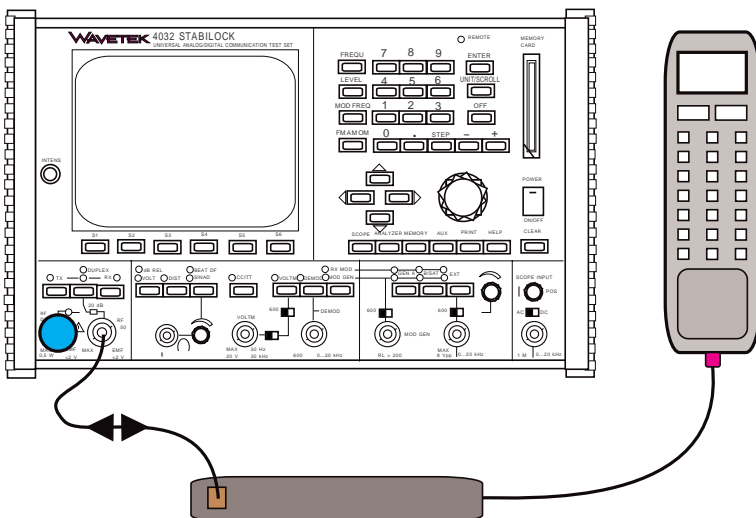

Fig. 10.1: Test setup.

Preparing to Test

1. Insert the system card of the GSM 1800/1900 MS-Test option in the slot (front panel) and load the GSM system program with $\boxed{\text{AUX}}$ + $\boxed{\text{DATA}}$.
2. Remove the system card and insert the memory card of the AUTORUN option in the slot. The memory card must be left in STABILOCK for the entire test because STABILOCK writes data to it.
3. Start the AUTORUN option: $\boxed{\text{MEMORY}}$, look for entry GSM.EXE, $\boxed{\text{RECALL}}$ + $\boxed{\text{AUTORUN}}$ + $\boxed{\text{RUN}}$
4. Select the output medium (see **Fig. 10.2**).

```
┌─ AUTORUN  AUTORUN ERICSSON ──┐
│    ERICSSON GSM MS Test Set   │
│   Version 1.20 Dated 10.06.99 │
│     Copyright (c) 1999 by      │
│        WAVETEK MUNICH          │
│──────────────────────────────│
│ Select Output:   1 = HP Think Jet  │
│                  2 = Epson FX 80    │
│                  3 = ASCII-Printer  │
│                  4 = Mem-Card       │
│                  5 = Screen only    │
└──────────────────────────────┘
```
■ 1 ■ 2 ■ 3 ■ 4 ■ 5 ■ EXIT
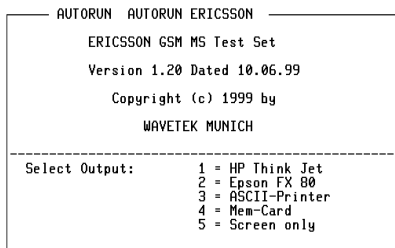
Fig. 10.2: Choosing output medium:
- ① Output on HP Think Jet compatible printer
- ② Output on EPSON FX 80 compatible printer
- ③ Output on ASCII printer without graphics capabilities
- ④ Output on memory card
- ⑤ Output on monitor
- $\boxed{\text{EXIT}}$ Back to AUTORUN mask

5. Set test parameters with $\boxed{\text{SETUP}}$ (see **Fig. 10.3**). See following section for details.

6. Insert the SIM card in the slot in the MS. This must be one of the SIM cards that you received with the GSM 1800/1900 MS-Test option.

7. Switch MS on and off again. This is necessary to ensure a defined state at each test.

8. Switch on the MS. Enter the PIN number of the MS and confirm by pressing #.

9. Start the test: $\boxed{\text{DUAL}}$ starts the dual-band 900/1800 test, $\boxed{\text{900-II}}$ starts the GSM 900 Phase 2 test, $\boxed{\text{1800}}$ starts the GSM 1800 test, $\boxed{\text{1900}}$ starts the GSM 1900 test. $\boxed{\text{EXIT}}$ takes you back to the AUTORUN mask.

```
┌─ AUTORUN  AUTORUN ERICSSON ──┐
│    Ericsson GSM MS Test Set   │
│──────────────────────────────│
│ SIM CARD inserted ?           │
│ Enter PIN = 0000 # on Mobile  │
│                               │
│ Select System to be tested    │
│                               │
│ Test Channel No.(Low,Mid,High) RF Pre-att │
│                               │
│ GSM 900      1,  63, 124    1.5 dB │
│ GSM 1800   512, 699, 885    2 dB   │
│ GSM 1900   512, 661, 810    2.5 dB │
└──────────────────────────────┘
```
■ DUAL ■ 900 II ■ 1800 ■ 1900 ■ SETUP ■ EXIT
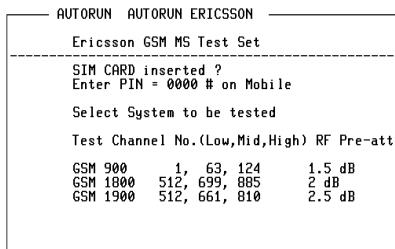
Fig 10.3: Starting test:
- $\boxed{\text{DUAL}}$ Starts GSM 900/1800 dual-band test
- $\boxed{\text{900-II}}$ Starts GSM 900 Phase 2 test
- $\boxed{\text{1800}}$ Starts GSM 1800 test
- $\boxed{\text{1900}}$ Starts GSM 1900 test
- $\boxed{\text{SETUP}}$ To Channel Setup mask
- $\boxed{\text{EXIT}}$ Back to AUTORUN mask

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Channel Setup

In the `Channel Setup` mask, you select the system, the test channel and set the pre-attenuation value (see **Fig. 10.4**).

Fig 10.4: `Channel Setup` mask:

```
┌── AUTORUN  AUTORUN ERICSSON ──────┐
│       Channel Setup               │
│ ───────────────────────────────── │
│   Test Channel Low  =     1       │
│   Test Channel Mid  =     63      │
│   Test Channel High =     124     │
│                                   │
│   Test System:    GSM  900        │
│                                   │
│   RF Pre-attenuation = 1 dB (ATTEN)│
│                                   │
└───────────────────────────────────┘

  ▌ LOW ▐  ▌ MID ▐  ▌ HIGH ▐ ▌ SYSTEM ▐ ▌ ATTEN ▐ ▌ EXIT ▐
```

(LOW)   Lowest test channel
(MID)   Middle test channel
(HIGH)   Highest test channel
(SYSTEM)   To `Select Test System` mask
(ATTEN)   Set cable loss compensation (pre-attenuation)
(EXIT)   Back to the calling mask

☞ The altered values can be saved to memory card after quitting the mask (select (YES) at the following prompt).

☞ Without the FEX option being installed, STABILOCK tests in the GSM 900 system only. Softkey 4 then shows (DEFAULT) instead of (SYSTEM). (DEFAULT) resets the channels to their default values.

Select test channels

With (LOW), (MID) and (HIGH) in the `Channel Setup` mask, you select the three channels for the dual-band, GSM 900-II, GSM 1800 and GSM 1900 tests (see **Fig. 10.5**).

Fig 10.5: Selecting LOW channel.

```
┌── AUTORUN ──── USER INPUT ──────┐
│                                 │
│   Enter Test Channel No. Low    │
│                                 │
│                                 │
│      ▌ 5.0000  _ ▐              │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘

  ▌         C O N T I N U E        ▐
```

Select system

$(\underline{SYSTEM})$ in the Channel Setup mask calls up the Select System mask. Here you select the tested system (see **Fig. 10.6**)

```
┌─── AUTORUN  AUTORUN ERICSSON ────┐
│          Select Test System      │
│──────────────────────────────────│
│                                  │
│          1 = GSM 900             │
│          2 = GSM 1800            │
│          3 = GSM 1900            │
│                                  │
│                                  │
│                                  │
│                                  │
└──────────────────────────────────┘
```
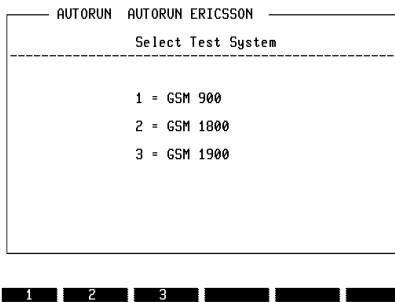
Fig 10.6: Select System mask.

■ 1 ■ 2 ■ 3 ■ ▬ ▬ ▬

☞ After quitting the mask, all channels are reset to their default values (stored on the memory card).

☞ The Select System mask can be called up only if the FEX option is installed.

Cable loss (pre-attenuation)

With $(\underline{ATTEN})$ in the Channel Setup mask you can compensate the loss of the RF cable (see **Fig. 10.7**). This increases measuring accuracy. A guideline figure is 0.8 dB per meter.

```
┌─── AUTORUN ── USER INPUT ────┐
│                              │
│                              │
│    Enter RF Preattenuation   │
│                              │
│                              │
│      ▬▬▬ dB                  │
│                              │
│                              │
└──────────────────────────────┘
```
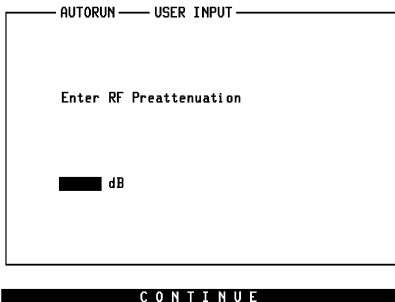
Fig 10.7: Compensating cable loss.

■ C O N T I N U E ■

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Performing Test

Starting test

1. Configure the equipment as described in the "Test Setup" section.
2. Make your preparations and start with (DUAL), (900–II), (1800) or (1900), as described in the "Preparing to Test" section.

Test procedure

MS CALL

For MS CALL the AUTORUN option will tell you to enter a call number on the MS and then send the call (**Fig. 10.8**).

Fig 10.8: MS CALL.

First press (CONT) or (INUE), then enter call number on MS and send call. MS and STABILOCK will then set up connection. (EXIT) halts the test. Then STABILOCK shows the Starting test mask (**Fig. 10.3**) again.

```
┌─ AUTORUN  AUTORUN ERICSSON ──────┐
│                                  │
│              MS-Call             │
│                                  │
│                                  │
│           Press CONTINUE then    │
│       Dial a number on the MS and send │
│                                  │
│                                  │
│                                  │
└──────────────────────────────────┘
```

C O N T I N U E ■■■■■ ■■■■■ ■■■■■ EXIT

As soon as the connection is set up, STABILOCK measures the specific data of the MS and evaluates its measurement report (**Fig. 10.9**).

Fig 10.9:
Measurement report and AF loop.

```
┌─ AUTORUN  AUTORUN ERICSSON ──────┐
│       Autotest Ericsson GSM 900 Phase II │
│                                  │
│ MS Class:     4        Rev Lev:   1  │
│ IMSI:   001011234567890  SMS/EXT:  1/0 │
│ IMEI:   448058514139200  A5 (123):  000 │
│         Dialed Number: 1234567890 │
│                                  │
│ ──────────────────────────────── │
│                                  │
│        To stop AF-Loopback mode, │
│                                  │
│        press CONTINUE !          │
│                                  │
└──────────────────────────────────┘
```

C O N T I N U E ■■■■■ ■■■■■ ■■■■■ EXIT

Measured figures

MS-Class	Indicates what power class the MS belongs to, ie what its maximum transmitter power is.
IMSI:	International mobile subscriber identity (telephone number of the subscriber in the network).
IMEI:	International mobile equipment identity (electronic "serial number" of the MS). Coded in the IMEI are: producer, country where manufactured, location of type inspection and the producer's own serial number.
Rev Lev	States, according to GSM specifications, whether the MS supports phase 1 or 2.
SMS/EXT	Indicates whether the MS supports short message services (SMS) and whether it can use the extended frequency band. Example 0/1: no SMS but extended frequency band is supported.
A5(123)	Shows as a bit mask what A5 algorithms the MS can use for cyphering.
Dialed Number	The number you dialed when asked to do so (MS CALL).

If a printer is chosen as the output medium, the figures will also be output in print.

If your output medium is a memory card, the figures will additionally be stored on it.

(CONT) or (INUE) stops the loopback function and continues the test.

(EXIT) halts the test. Then, STABILOCK shows the Starting test mask (**Fig. 10.3**) again.

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AF loopback

What is important is what comes out, in this case the human voice, which a mobile must be able to transmit without corrupting it. This is how the loopback function in STABILOCK works (see **Fig. 10.10**).
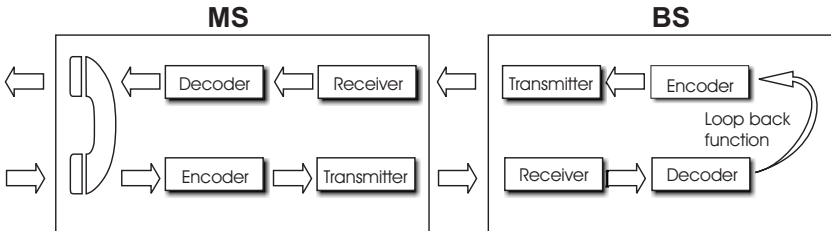

Fig. 10.10: AF loopback

Speech signals are transmitted from MS to BS (STABILOCK), STABILOCK immediately feeds signals into its transmitter and sends them back to MS. Result: you hear your own voice with delay of about half a second and thus judge the quality of the mobile's speech transmission.

(CONT) or (INUE) stops the loopback function and continues the test.

Test Report

The results measured in the dual-band, GSM 900-II, GSM 1800 and GSM 1900 tests are not lost. While testing you can

- either read them out straight to the printer,
- or store them on the memory card of the AUTORUN option so that they can be printed out later.

Printer as output medium

If you chose `HP Think Jet` or `EPSON FX 80` as the output medium when starting the AUTORUN option (see **Fig. 10.2**), the results will be read out on the printer while the test is running.

```
Autotest Ericsson GSM 900 II

RF output  -68.5    dBm
Traffic channel 63
Power level 5                  ( 33 dBm)
MS Class:      4            Rev Lev:    1
IMSI:    001011234567890    SMS/EXT:   1/1
IMEI:    520034510186420    A5 (123):   000
Dialed Number:  123

Power level 5                  ( 33 dBm)
Tx Power        PASS   33.1 dBm      ( 31 - 35 dBm)
Power Time Template PASS
RX level        PASS   43    ( 38 - 44 )
RF output -102.0    dBm
Power level 12                 ( 19 dBm)
Tx Power        PASS   20.1 dBm      ( 16 - 22 dBm)
Power Time Template PASS
RX level        PASS   9     ( 5 - 11 )
RX quality      PASS   0     ( 0 - 2 )
Power level 19                 ( 5 dBm)
Tx Power        PASS   5.5 dBm       ( 0 - 10 dBm)
Power Time Template PASS
Power level 5                  ( 33 dBm)
Traffic channel 1
Tx Power        PASS   32.4 dBm      ( 31 - 35 dBm)
RMS phase       PASS   2.86 deg      ( 0 - 5 deg)
Peak phase      PASS   8.85 deg      ( 0 - 20 deg)
Freq. error     PASS   43   Hz       (-90 - 90   Hz )
RX level        PASS   9     ( 5 - 11 )
RX quality      PASS   0     ( 0 - 2 )
RF output  -68.5    dBm
RX level        PASS   43    ( 38 - 44 )
Power level 5                  ( 33 dBm)
Traffic channel 124
Tx Power        PASS   33.2 dBm      ( 31 - 35 dBm)
RMS phase       PASS   2.8 deg       ( 0 - 5 deg)
Peak phase      PASS   7.64 deg      ( 0 - 20 deg)
Freq. error     PASS   57   Hz       (-90 - 90   Hz )
RX level        PASS   43    ( 38 - 44 )
RF output -102.0    dBm
RX level        PASS   9     ( 5 - 11 )
RX quality      PASS   0     ( 0 - 2 )
RF output  -68.5    dBm
```

Bild 10.11: Report of GSM 900 Phase II test printed on HP Think Jet.

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Memory card as output medium

If you chose `Memory Card` as the output medium when starting the AUTORUN option (see **Fig. 10.2**), the results will be stored on the memory card of the AUTORUN option while the test is running (see also Chapter 8, "AUTORUN Test Reports").

Fig 10.12: Memory card as output medium. Test results are stored on memory card of AUTORUN option in `RESULT.RES` file, which can be output on printer with (RECALL).

```
┌──────────────── MEMORY 2────────────┐
│ EXECUTABLE PROGRAMS                  │
│   ERICSSON .EXE                      │
│   GSM OPTION.SYS            Ver.: 5.00│
│                                      │
│ FILES ON MEMORY CARD 32 KB           │
│   ERASE    .SET          GSM    .EXE │
│            .SET          RESULT .RES │
│            .SET                      │
│            .SET                      │
│            .SET                      │
│            .SET                      │
│            .SET                      │
│            .SET                      │
│            .SET                      │
│            .SET                      │
│            .SET                      │
│                                      │
│ MOVE CURSOR TO SELECT FILE           │
└──────────────────────────────────────┘
  ▮ ETC  ▮ STORE ▮ RECALL ▮AUTORUN▮ RENAME ▮ RETURN
```

☞ If you output the RESULT.RES file on the printer with (RECALL), only pure text will be seen in the printout. Graphics, like power/time templates for instance, will not appear.

☞ Erase the RESULT.RES file after each printout. Otherwise new test results will be added to the file and and old results will be printed out with each printout.

Timeline

The chronological timeline tells you what modifications have been made to the software (SW) and the operating instructions. After a software update the timeline helps you to find out quickly about all major changes (see code) in the updated operating instructions that are supplied.

Code: C = Correction, IN = Important Note, NF = New Feature, M = Modification

SW	Doc. Version	Δ pages	Code	Changes
1.20	9906-120-A	no	–	First edition of manual
1.21	0001-141-A	no	NF	Implementation of "waits"
1.41	0001-141-A	5 to 9	NF	Implementation of dual-band test
		10	M	GSM 900 Phase 1 test eliminated

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