


NMT 450/900 BS-Test

Software Option 897 905

Operating Instructions

16_nmtbs Doc. Version: 9401-230-A

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Introduction

The system program NMT 450/900 BS-Test checks the data exchange between an NMT 450 Scandinavia or NMT 900 Scandinavia Scandinavia base station and the (MTX) (mobile telephone exchange).

Performance Test

Input/output sockets

Output for transmit telegrams: MOD GEN socket

Input for reply telegrams: VOLTM socket

The internal signal paths for output or decoding of telegrams are switched correctly automatically as soon as the performance test is started with (RUN).

- ☞ The performance test calls for connection of Bu 15 (AF DETECTOR) and Bu 99 (DATA MODULE) on the back panel of the STABILOCK with the special cable 384 766. The third connector of this cable can be left open or be connected to Bu 95 of the OPTION CARD.

Test mask

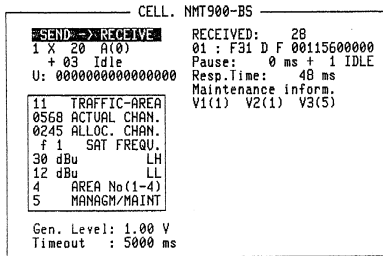


Fig. 10.1: Test mask .

NMT450 NEXT TEL LAST TEL DISP:ALL : RUN : RETURN

Definition

Note the following definitions when reading the manual:

- Transmit telegram telegram output by STABLOCK (**no** idle telegram)
- Reply telegram telegram received by STABLOCK (**no** idle telegram)
- Telegram any telegram, **also** idle telegram

Entries

All entry fields are in the left half of the mask. Fields without a name are named after the field content entered in the illustrated test mask.

- SEND -> RECEIVE Scroll field with four scroll variables for selecting the mode. The available modes are as follows:
 - SEND CONT
 - SEND ONLY
 - SEND - RECEIVE
 - RECEIVE
- 1 X Numeric field for entering the repeat factor. This determines how often the standard transmit telegram selected with the following scroll field is output.
- 20 A(0) Scroll field for selecting one of the standard transmit telegrams from the MTX to the base station.

+ 03 Numeric field for entering a 2-digit decimal value. This value determines how often an idle telegram is transmitted following the selected standard transmit telegram or user telegram.

Example: When the following entry is made:

```
2 X 20 A(0)
+ 03 Idle
```

the transmitted telegram sequence will be as follows:

20 A(0)	Idle	Idle	Idle	20 A(0)	Idle	Idle	Idle
---------	------	------	------	---------	------	------	------

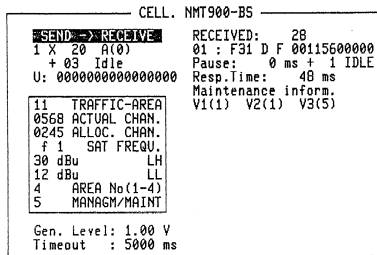
U: Numeric field for hexadecimal entry of an individually defined user telegram. This telegram is only transmitted if USER is entered in the scroll field for selection of the transmit telegrams.

TRAFFIC-AREA Numeric field for entering the traffic area (country code, radio zone).

ACTUAL CHAN. Numeric field for entering the call-channel number.

ALLOC. CHAN. Numeric field for entering the test-channel number (telegrams 21b/21c/26).

SAT FREQU. Scroll field for setting the SAT frequencies (available scroll variables f1 / f2 / f3 / f4 / no f).



NMT450 NEXT TEL LAST TEL DISP:ALL : RUN: RETURN

LH Scroll field for selecting the upper alarm level in dBμ.

LL Scroll field for selecting the lower alarm level in dBμ. The alarm levels apply to the base station. They define a range of field strength in which the measured receiving level (signal from MS) may lie without instructions being given to alter the level of transmitting power.

AREA No. (1-4) Numeric field for entering "additional information" required for calculating telegram no. 30.

MANAGM/MAINT Numeric field for entering V1(x) information (other management/maintenance orders) that is to be transmitted with telegram 22 from the (MTX) to the base station (permissible entries: 0 to F).

Gen. Level Numeric field for entering the level (max. 1.59 V) at which the telegrams are output on the MOD GEN socket. After every change between the NMT 450 Scandinavia and NMT 900 Scandinavia base-station test this numeric field will contain the appropriate default value (NMT 450 Scandinavia: 134 mV; NMT 900 Scandinavia: 208 mV).

Timeout Numeric field for entering a 4-digit timeout value. Timeout is only used in the Send -> Receive and Receive modes and ends the readiness for decoding if no telegram appears within the selected time interval (entry 0 = no timeout is effective).

Send->Receive: At the end of the first transmit telegram output by the STABLOCK the timeout counter is started and the decoder goes into readiness. If a telegram then appears in good time, the timeout counter is started again immediately after the end of this telegram.

Receive: The timeout counter starts at the end of the first telegram received. If a subsequent telegram appears in good time, the timeout counter is started again immediately afterwards.

```

      CELL. NMT900-BS
-----
SEND->RECEIVE:  RECEIVED:  28
1 X 20 A(0)      01 : F31 D F 00115500000
+ 03 Idle       Pause:    0 ms + 1 IDLE
U: 00000000000000000000000000000000
Resp.Time:     40 ms
Maintenance inform.
V1(1) V2(1) V3(5)

11 TRAFFIC-AREA
0568 ACTUAL CHAN.
0245 ALLOC. CHAN.
f 1 SAT FREQU.
30 dBu LH
12 dBu LL
4 AREA No(1-4)
5 MANAGM/MAINT

Gen. Level: 1.00 V
Timeout : 5000 ms
    
```

NMT450 NEXT TEL LAST TEL DISP ALL RUN RETURN

Meaning of softkeys

(NMT-450)	Triggers the change to NMT-450 base station test. At the same time the softkey function changes to (NMT-900) . So striking the softkey again will call up the NMT-900 base station test.
(NEXT TEL)	If several reply telegrams are received (max. 20) in the course of a test, their decoding will be called up in ascending order each time the (NEXT TEL) softkey is operated (right half of display). Which of the max. 20 evaluations is momentarily displayed can be seen from the counter reading (see section "Results display").
(LAST TEL)	Like (NEXT TEL) but called up in descending order.
(DISP ALL)	Hexadecimally coded display of all received reply telegrams.
(RUN)	Starts the test run according to the selected mode. For as long as the test is in progress, the function of the (RETURN) softkey is (STOP) (terminate test).
Send only	Output of the set telegram sequence with the current repeat factor.
Send cont.	Continuous output of the set telegram sequence.
Send -> Receive	Output like for Send only. As soon as the first transmit telegram has been output, the decoder, independently of the continuing transmission, goes into readiness. At the same time the timeout counter is started. The decoding is terminated as soon as more than 20 reply telegrams have appeared or the timeout criterion is not maintained. Afterwards the decoding of the first reply telegram received can be read in the right half of the display (see section "Results display").
Receive	As soon as the first telegram has appeared, the timeout counter is started. The decoding is terminated as soon as more than 20 reply telegrams have appeared or the timeout criterion is not maintained. Afterwards the decoding of the first reply telegram received can be read in the right half of the display (see section "Results display").
(RETURN)	Takes you back to the OPTION CARD mask.

Operating steps for testing

Step 10 is omitted for the NMT 450 base station test.

1. Select operating mode. In `RECEIVE` mode continue with step 12.
2. Enter generator level, repeat factor of transmit telegram to be output and number of idle telegrams.
3. Select transmit telegram by scroll field. For transmit telegram no. 20 coding of variable A is selected at same time (eg 20 A(2)). If telegram selection is set to `USER`, complete transmit telegram must then be entered in entry field `U`: . Continue with step 12.
4. Enter `TRAFFIC AREA`.
5. Enter `ACTUAL CHAN`.
6. Enter `ALLOC.CHAN`. (only for telegram no. 21b and 21c).
7. Select `SAT FREQU`. (only for telegram no. 20, 21b and 21c).
8. Enter `LH` (only for telegram no. 20).
9. Enter `LL` (only for telegram no. 20).
10. Enter `AREA No (1-4)` (only for telegram no. 30).
11. Enter `MANAGM/MAINT` (only for telegram no. 22).
12. Enter timeout value.
13. Start test run with `(RUN)`.
14. If necessary, terminate with `(STOP)`.
15. Call up decoding of reply telegrams with `(NEXT TEL)`, `(LAST TEL)` or `(DISP ALL)`.

Polling results via IEEE controller

Result	Polling IEEE command
Code number of received reply telegramms	RESULT1
Received reply telegramms (hex-codiert)	RESULT2
Pause (both values)	RESULT3
Resp. Time	RESULT4

Results display

In the `SEND -> RECEIVE` or `RECEIVE` modes the arriving reply telegrams are decoded and displayed in hexadecimally coded form. All test results are shown in the right half of the mask and can be polled via IEEE Controller.

28 :	Code number of received reply telegram.
01 :	Counter (1 to 20) for the received reply telegrams.
F31 D F 001...	Hexadecimally coded display of the received reply telegram.
Pause	The first value signals the sum of the pauses before the arrival of the momentarily displayed reply telegram (see examples).

The second value signals how many idle telegrams were recorded between the momentarily displayed reply telegram and the reply telegram that arrived last. If the transmission begins with idle telegrams, their number is counted until the arrival of the first reply telegram (see examples). If the STABLOCK does not register any idle telegrams, the display is omitted. If there were more than 255 idle telegrams, the pause can no longer be calculated; "-----" is then displayed instead of the first value.

Examples: RT = reply telegram

Idle	50 ms Pause	RT	Pause = 50 ms + 1 IDLE
------	-------------	----	------------------------

Idle	50 ms Pause	Idle	80 ms Pause	RT	Pause = 130 ms + 2 IDLE
------	-------------	------	-------------	----	-------------------------

RT	60 ms Pause	RT	Pause = 60 m
----	-------------	----	--------------

RT	Idle	50 ms Pause	Idle	RT	Pause = 130 ms + 2 IDLE
----	------	-------------	------	----	-------------------------

Resp. Time

Response time (time between end of transmit telegram and beginning of first received telegram). The response time is only displayed in the SEND -> RECEIVE mode.

```

CELL. NMT900-BS
SEND->RECEIVE
1 X 20 A(0)
+ 03 Idle
U: 000000000000000000

11 TRAFFIC-AREA
0568 ACTUAL CHAN.
0245 ALLOC. CHAN.
f 1 SAT FREQ.
30 dBu LH
12 dBu LL
4 AREA No(1-4)
5 MANAG/MAINT

RECEIVED: 28
01: F31 D F 00115600000
Pause: 0 ms + 1 IDLE
Resp.Time: 48 ms
Maintenance inform.
Vi(1) V2(1) V3(5)

Gen. Level: 1.00 V
Timeout : 5000 ms
    
```

NMT450 NEXT TEL LAST TEL DISP ALL RUN RETURN

Apart from the number of received reply telegram, the entire reply telegram in hex code and the response time, important digits of the telegram are displayed separately in other fields and their meaning is given in plain text.

```

CELL. NMT900-BS
SEND->RECEIVE
1 X 20 A(1)
+ 03 Idle
U: 7622F00100000000

11 TRAFFIC-AREA
0568 ACTUAL CHAN.
0245 ALLOC. CHAN.
f 1 SAT FREQ.
30 dBu LH
12 dBu LL
4 AREA No(1-4)
4 MANAG/MAINT

RECEIVED: 25
01: 709 9 F 00100000000
Pause: 0 ms
Resp.Time: 106 ms
Chn. status inform.
A=1:
Acknowledge idle
radio channel

Gen. Level: 1.00 V
Timeout : 5000 ms
    
```

NMT450 NEXT TEL LAST TEL DISP ALL RUN RETURN

Fig. 10.2: Example: Upon reception of the reply telegram no. 25, the plain text shows that this is channel status information (Chn. status inform.). Also the value of "A" is displayed (in this example A=1) and its precise meaning "Acknowledge idle radio channel" in plain text. See also SYSTEM DESCRIPTION, NMT-DOC. 900.

```

NNN P Z Data          NNN P Z Data
1:500 4 F 000000000000 11:500 9 F 000000000000
2:500 4 F 000000000000 12:500 9 F 000000000000
3:500 9 F 000000000000 13:500 9 F 000000000000
4:500 9 F 000000000000 14:500 9 F 000000000000
5:500 9 F 000000000000 15:500 9 F 000000000000
6:500 9 F 000000000000 16:500 9 F 000000000000
7:500 9 F 000000000000 17:500 9 F 000000000000
8:500 9 F 000000000000 18:500 9 F 000000000000
9:500 9 F 000000000000 19:500 9 F 000000000000
10:500 9 F 000000000000 20:500 9 F 000000000000
    
```

RETURN

Fig. 10.3: After the completion of a performance test all received reply telegrams can be displayed on the monitor, hexadecimally coded, by means of (DISP ALL).

System data

System	NMT 450 Scandinavia	NMT 900 Scandinavia
Number of channels	180	1000 (2000)
Frequency range of MS		
for receive (upper band)		
Channel 1	463.000	935.0125 MHz
last channel	467.475	959.9875 MHz
for transmit (lowerband)		
Channel 1	453,000	890.0125 MHz
last channel	457.475	914.9875 MHz
Channel spacing	25 kHz	25 kHz (12.5 kHz)
Duplex spacing	10 MHz	45 MHz
Data transmission	FFSK (1200 Bd)	FFSK (1200 Bd)
Data modulation	±3.5 kHz	±3.5 kHz
Coding of Z (Z = 1st place of subs. no.)	5 = Denmark 6 = Sweden 7 = Norway 8 = Finland	5 = Denmark 6 = Sweden 7 = Norway 8 = Finland
Coding von Y1/Y2 (Y1/Y2 = 1st/2nd place of traffic area)	Y1 corresponds to Z Y2 = 0...9	Y1 = 1 = Denmark 2 = Sweden 3 = Norway 4 = Finland 5 = Switzerland Y2 = 0 to F

