


NMT 450 i

Software Option 897 916
Part of Package 897 911

Operating Instructions

40_nmt4i Doc. Version: 9407-100-A

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Entering channel parameters

The NMT 450 i system program differs from the other NMT system programs in particular in that all channel parameters can be defined individually in the GENERAL PARAMETERS mask.

First load the system program with (AUX) + (DATA) and then call up the GENERAL PARAMETERS mask. Enter the required channel parameters in the fields *Channel space* (0.0 to 99.9 kHz), *Duplex space* (0.0 to 999.9 MHz), *Channel* (0 to 9999), *Corresp. frequ.* (1.0000 to 999.9999 MHz) and *Channel no.* (Freq.↓ or Freq.↑). To simulate the system C NET (Austria) for example, the following entries are necessary: 20.0 kHz, 10.0 MHz, 1, 455.7300 MHz and Freq.↓

The entered channel parameters are stored on the SYSTEM CARD; thus they apply automatically even after loading the system program again.

Basic tasks

Test mask

```

NMT450i
-----
56 TRAFFIC-AREA   DEV.DATA   : 3.5 kHz
9999999 SUBS.NO   DEV.SAT    : 0.3 kHz
010 CALLING CHN  RAND IF SIS: 1111111
2    POWER LEVEL SREG: AC10AC10AC10

CALL FROM MTX    SUB: 9999999
CALL FROM MOBILE NO.: 2251999999913999
                NO.: 33C0E905

025 TRAFFIC CHN  ERR:  +0.04 kHz
1    POWER LEVEL DEV:  +0.37 kHz
4045 Hz SAT-FREQ PWR:  -0.36 kHz
RF-Level: - 60.0 dBm SLEEP: 9T Res.:
RX = Upper Band

```

Fig. 10.1: Test mask.

ETC HANDOFF CLEARING MOBILE MTX RETURN

Entries

| | |
|--------------|---|
| TRAFFIC-AREA | Home traffic area the mobile is registered in. |
| SUBS . NO | Mobile subscriber number. |
| CALLING CHN | Calling channel number. |
| POWER LEVEL | Transmitter output power on calling channel. |
| TRAFFIC CHN | Traffic channel number. |
| POWER LEVEL | Transmitter output power on traffic channel. |
| SAT-FREQ | SAT frequency (scroll field with scroll variables 3955 Hz/3985 Hz/4015 Hz/4045 Hz/NO SAT). |
| RF-Level | RF output level. Set Level/50 or Level/EMF on RX or duplex mask. |
| RX = | Scroll field with scroll variables <i>Lower Band</i> and <i>Upper Band</i> . Depending on set scroll variable, transmit frequency of STABLOCK is assigned upper or lower band when test is started (eg with (MTX)). |
| DEV . DATA | 2-digit numeric field for entering data deviation (0.0 to 9.9 kHz). |
| DEV . SAT | 2-digit numeric field for entering SAT deviation (0.0 to 9.9 kHz). |

| | |
|-------------|---|
| RAND IF SIS | 7-digit hexadecimal entry field for the RANDOM challenge number. The entered number only affects the test "Mobile initiated call". If the entry field is filled in with 0000000, any mobile can be tested. Other entries are only permissible if an SIS-encoded mobile is tested: then the mobile receives the RANDOM challenge number, combines this with the mobile's own secret number and sends the 4-digit result back to the base station (STABLOCK). The STABLOCK produces the result in the SRES display field. |
| SLEEP | Scroll field for "sleeptime". During the sleeptime the receiver and transmitter of the handheld radio are switched off (battery economy). Scroll variables: 0T/3T/5T/7T/9T/11T/14T/ 21T/28T/35T where T = 1.107 s (duration of eight frames). |

Result display

| | |
|------|--|
| SRES | Reports the result sent back to the base station by SIS-encoded mobile stations from combining the RANDOM challenge number and secret mobile number. The 4-digit result is sent three times, meaning that the display is 12-digit. |
| SUB | 1st line: subscriber number of mobile (ident). 2nd line: last frame sent containing ident and security code. |
| NO. | Selected call number. If SIS-encoded mobile stations with a RANDOM challenge number differing from zero are tested in "Mobile initiated call", the field will display the call number enciphered. |
| ERR | Carrier-frequency offset of Mobile. |
| DEV | Carrier-frequency deviation of Mobile. |
| PWR | RF transmitting power of Mobile. |
| RES. | Actual sleeptime of handheld radio. |

Meaning of softkeys, first level

- ETC-** Switches softkey assignments to second level.
- HANDOFF** Performs change of traffic channel or SAT or power level.
- CLEARING** Drops the call.
- MOBILE** Starts "Mobile initiated call".
- MTX** Starts "MTX initiated call".
- RETURN** Leads back to OPTION CARD mask.

```

NMT450i
53 TRAFFIC-AREA   DEV.DATA   : 3.5 kHz
9999999 SUBS.NO   DEV.SAT    : 0.3 kHz
010 CALLING CHN
2 POWER LEVEL    RAND IF SIS: 0000000
SREG:

CALL FROM MTX     SUB: 9999999
CALL FROM MOBILE NO.: 2251999999913999
                  NO.: 00948540

025 TRAFFIC CHN  ERR: +0.05 kHz
1 POWER LEVEL   DEV: +0.35 kHz
4045 Hz SAT-FREQ PWR: -0.36 kHz
RF-Level: - 60.0 dBm SLEEP: 9T Res.:
RX = Upper Band
    
```

Fig. 10.2: Softkeys, first level.

-ETC- HANDOFF CLEARING MOBILE MTX RETURN

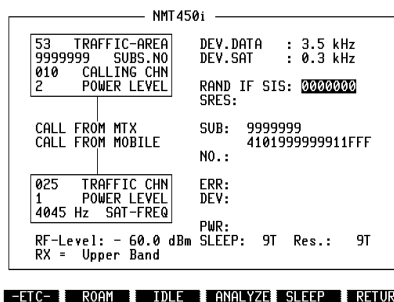
Meaning of softkeys, second level

- ETC-** Switches softkey assignments to first level.
- ROAM** Allows change to another traffic area. If mobile subscriber number unknown (**ROAM**) reads subscriber number automatically into entry field `SUBS.NO.`
- IDLE** The base station (STABLOCK) sends the idle frame continuously. The status line displays `sending testframe.`
- ANALYZE** Calls up the analyzer mask. The report is displayed of the last test performed (see description of analyzer mask).
- SLEEP** Triggers a test of the sleeptime.
- RETURN** Leads back to OPTION CARD mask.

Note: If the subscriber number read into the entry field is not identical with the actual subscriber number of the mobile, the softkey functions cannot be correctly performed.

Exception: In the "Mobile initiated call" test the call number of the mobile is determined from the first response telegram of the mobile and corrected in the `SUBS.NO` entry field.

Fig. 10.3: Softkeys, second level.



Polling results via IEEE controller

| Result | Polling IEEE command |
|----------------|----------------------|
| SRES | RESULT1 |
| SUB (1st line) | RESULT2 |
| SUB (2nd line) | RESULT3 |
| NO. | RESULT4 |
| Res. | RESULT5 |

Test procedure step by step

Mobile initiated call

Requirement: mobile is idle (receiver on-hook).

1. Press **(MOBILE)**.
2. Dial a number and press "Send". Then the mobile sends out the dialed number and is handed off to the calling channel.
Display of the measured results in the righthand half of the screen.

MTX initiated call

Requirement: mobile is idle (receiver on-hook).

1. Press **(MTX)**.
2. Lift handset when mobile rings or "Call Received" indicator lights up.
Display of the measured results of the mobile in the righthand half of the screen.

Change of channel, SAT change and power matching

Requirement: mobile is in call status.

1. Alter one or more of the following parameters: traffic-channel number, SAT frequency, SAT deviation, power level.
2. Strike **(HANDOFF)** softkey. The mobile then sets itself to the new parameters. The new measured values appear in the righthand half of the screen.

Note: NMT-450 System does not provide simultaneous change of traffic channel and power level. However all other combinations are allowed.

Changing traffic area

Requirement: mobile is in call status.

1. Enter new traffic area into field **TRAFFIC-AREA** and press softkey **(ROAM)**. The mobile sends roaming update and its identity to the MTX of new traffic area. The decoded subscriber number will be read automatically into the entry field **SUBS NO.**

Note: A roaming update can only be performed if the stored traffic area is not identical to the newly entered one.

Measuring sleeptime

Requirement: mobile is idle (receiver on-hook).

- 1) Set sleeptime in **SLEEP** entry field.
- 2) Press **(SLEEP)**.
Display of the actual sleeptime in the **Res.** field.

Call release

Requirement: mobile is in call status.

1. Press **(CLEARING)**.

Analyzer mask

Signaling report of the last test performed. The received response telegrams from the mobile are decoded and displayed in hexadecimal form. In this way errors in the signaling can be detected immediately (missing, wrong or corrupted telegrams). (RETURN) takes you back to the basic mask.

Fig. 10.4: Analyzer mask.

| | |
|---------------------|--|
| HANDOFF: Channel | |
| BS: 3a - S - 3b - 6 | |
| MS: - S - 10b - | |
| 3b->10b:MS Seizure | |
| 10:0341123456700000 | |

RETURN

Meaning of display fields

Top

- Header Performance test whose signaling is being displayed.
- BS: Telegrams transmitted from the base station (STABILOCK) when signaling is correct.
- MS: Telegrams expected from the mobile when signaling is correct.

Example: In the test of channel handoff the STABILOCK starts the signaling with telegram 3a and then switches to the new channel. After that, the STABILOCK sends telegram 3b, to which the Mobile responds with telegram 10b.

Bottom

The bottom part of the analyzer mask shows the decoded response telegrams of the Mobile in hexadecimal form. For easier interpretation the associated telegram sequence (transmitted telegram -> response telegram) and its meaning are also shown in symbolic form.

The decoder in the STABILOCK goes into standby as soon as the STABILOCK sends its telegrams. All response telegrams are decoded until the arrival of the correct response telegram. In this way the STABILOCK also logs faulty signaling.

The evaluation of the next telegram sequence is not started until the first telegram sequence has been completed successfully (correct response telegram received).

System specifications

| | |
|--|--|
| Channels | max. 999 |
| Frequency range of | |
| Mobile receiver (upper band) | Channel 1 variable |
| Mobile transmitter (lower band) | Channel 1 variable |
| Channel spacing | variable |
| Duplex offset | variable |
| Signaling rate | FFSK (1200 Bd) |
| Signaling deviation | ± 2.8 kHz |
| Coding of Z (Z = 1st digit of SUBS.NO) | 5 = Denmark 6 = Sweden 7 = Norway 8 = Finland |
| Coding of Y1/Y2 (Y1/Y2 = 1st/2nd digit of TRAFFIC AREA) | Y1 like Z Y2 = 0 to 9 |

Remaining system specifications according to:
 NORDIC MOBILE TELEPHONE, SYSTEM DESCRIPTION, NMT-DOC. 1. 1980
 (Published by PTTs of Denmark, Finland, Norway and Sweden).

Lifeline

The chronological lifeline tells you what modifications have been made to the software (SW) and the operating instructions. After a software update the lifeline 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

| SW | Doc. Version | Δ pages | Code | Changes |
|-----------|---------------------|----------------|-------------|----------------|
| 1.00 | 9407-100-A | all | | First edition. |
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