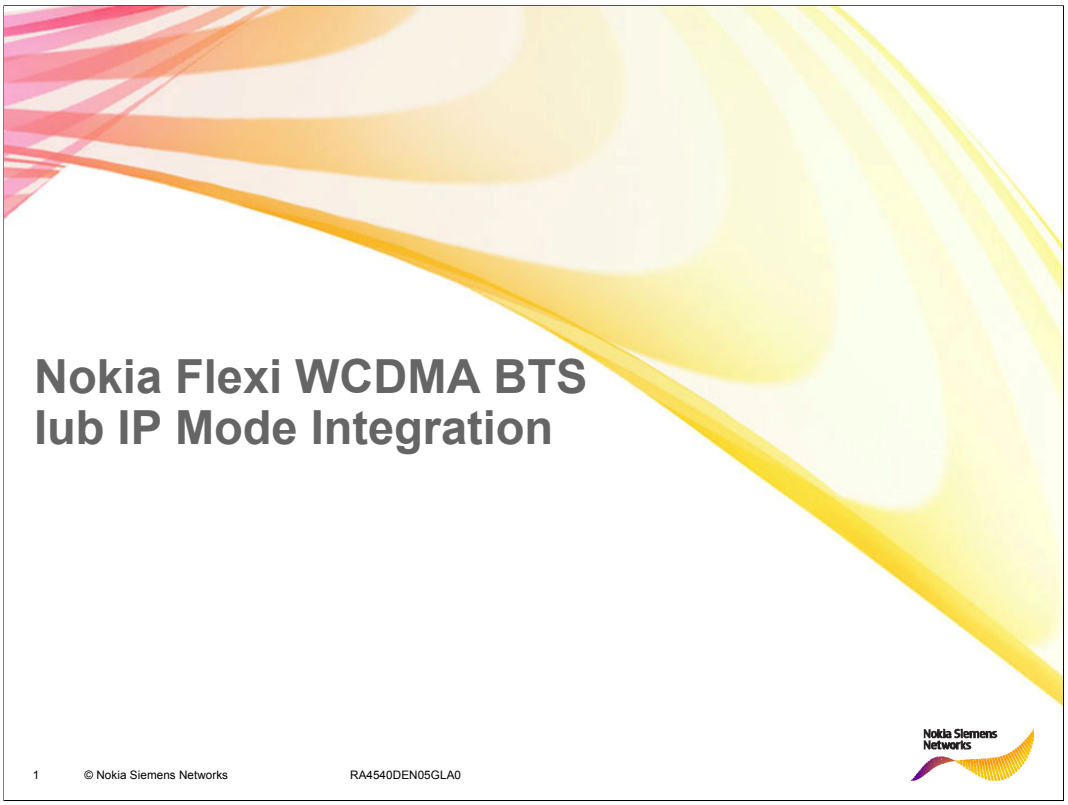
Nokia Flexi WCDMA BTS
Iub IP Mode Integration
1
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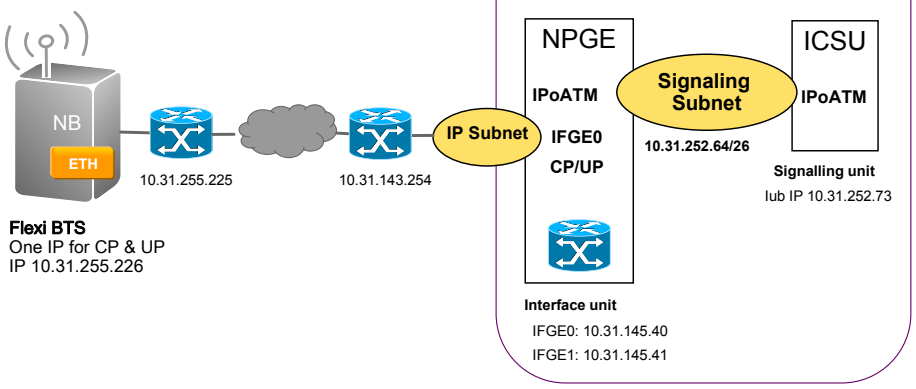
RA4540DEN05GLA0

Flexi WCDMA BTS Integration

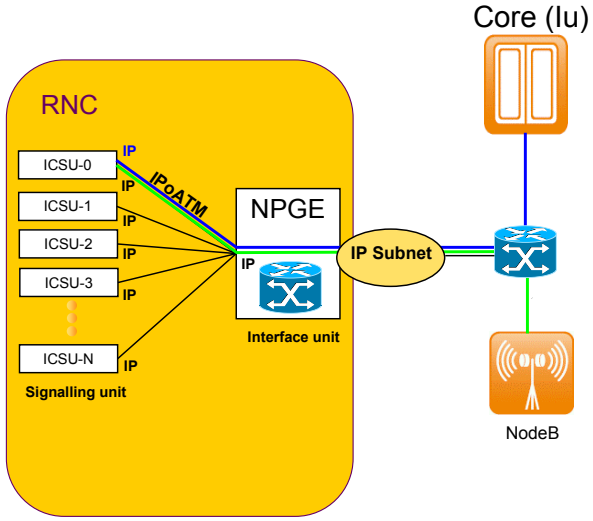
Legal notice

Intellectual Property Rights

IP based Iub Connectivity: MUC testbed

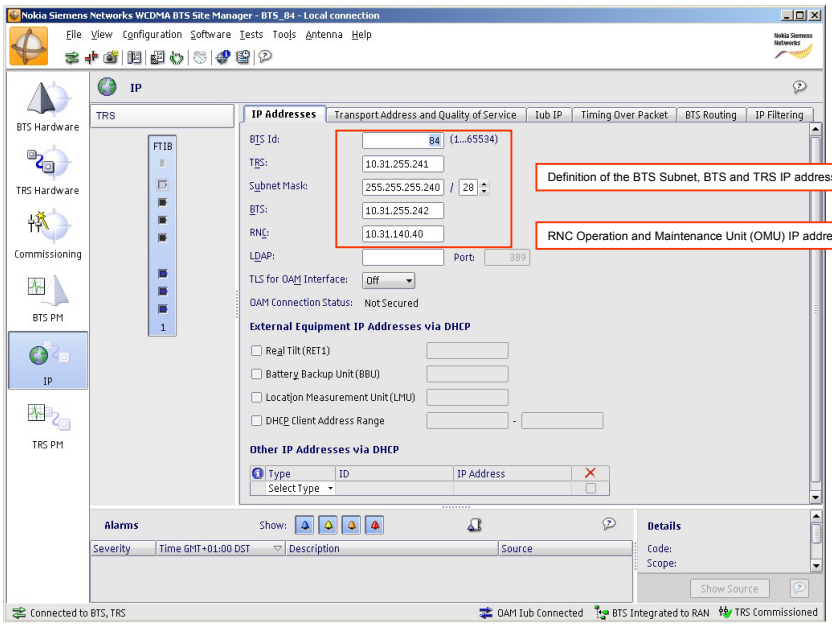


IP based Iu / Iub Connectivity

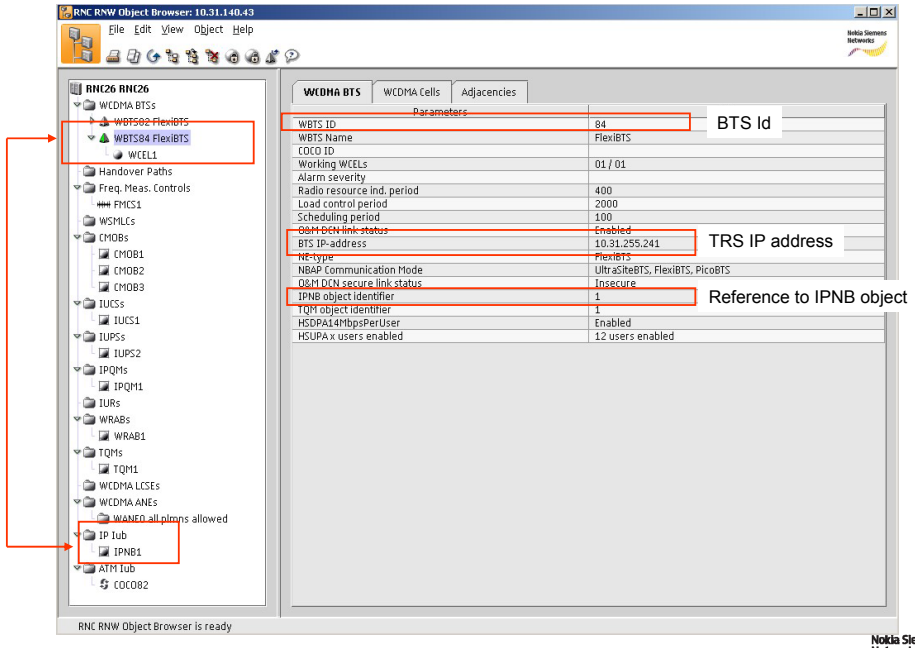


- Internal IPoATM are created automatically (ZQMQ;)
- Fully meshed IPoATM subnet creation is used to create IPs for IP based Iub to ICSU and NPGE
- ICSU gets an additional IP for Iu using same IPoATM as for Iub
- The internal IPoATM is reused for Iu
- Static Routes in ICSU and NPGE to define which NPGE and IF will be used for Core
- Iu
- Iub

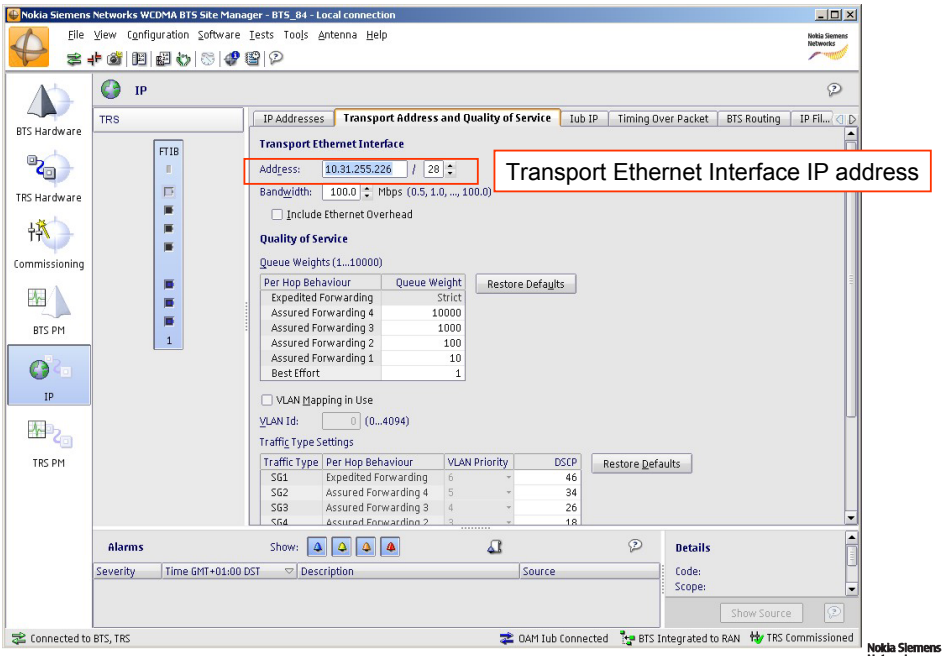
IP Addresses and BTS Id in BTS



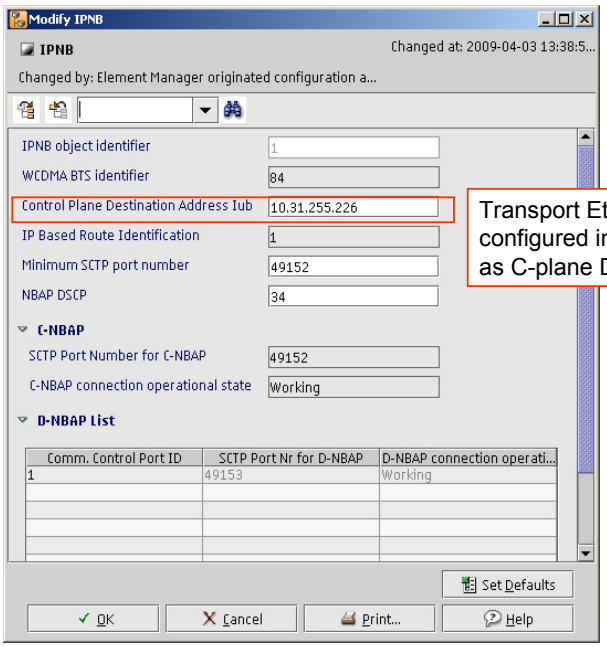
IP Addresses and BTS Id in RNC



IP: Transport Address and Quality of Service

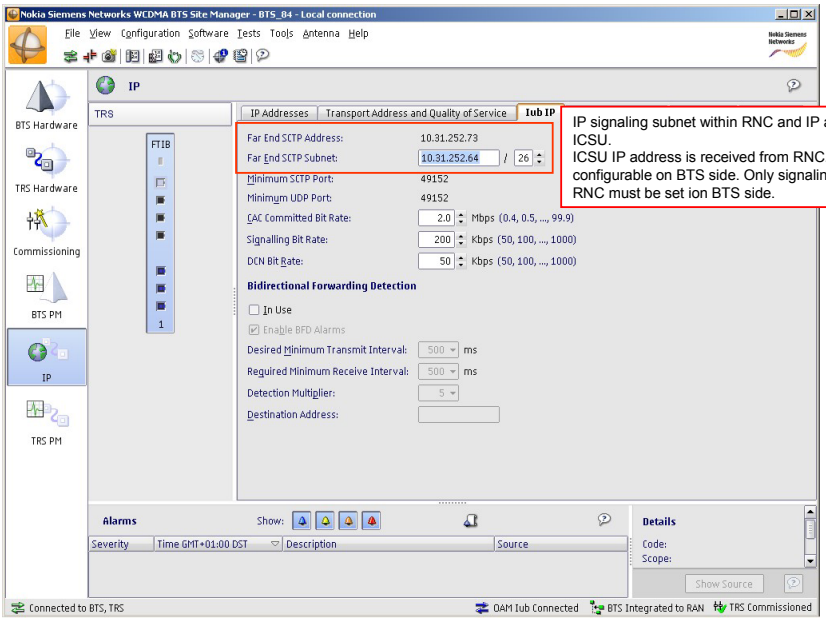


BTS Transport IP Address in RNC: IPNB Object



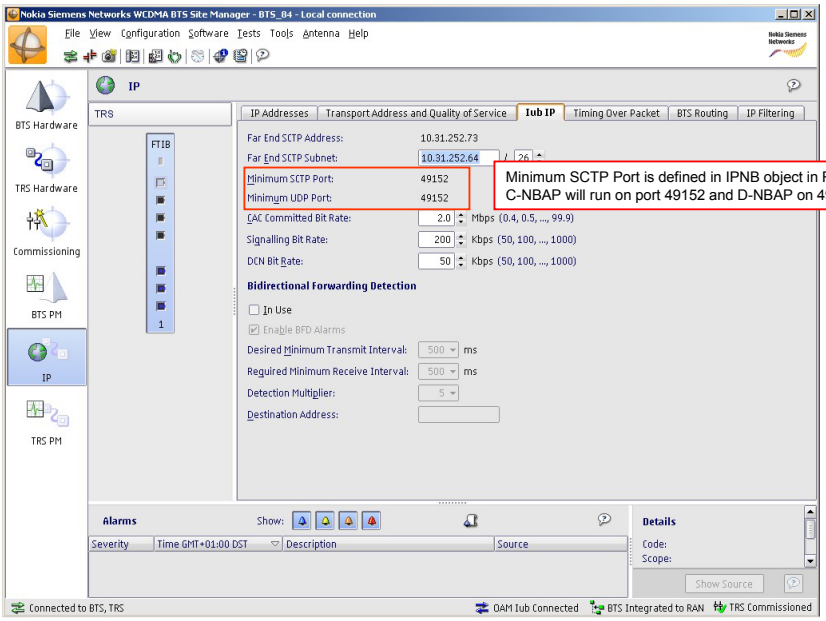
Transport Ethernet IP address as configured in BTS is set in IPNB object as C-plane Destination Address for Iub.

Iub IP Mode Settings: Signaling Subnet in RNC



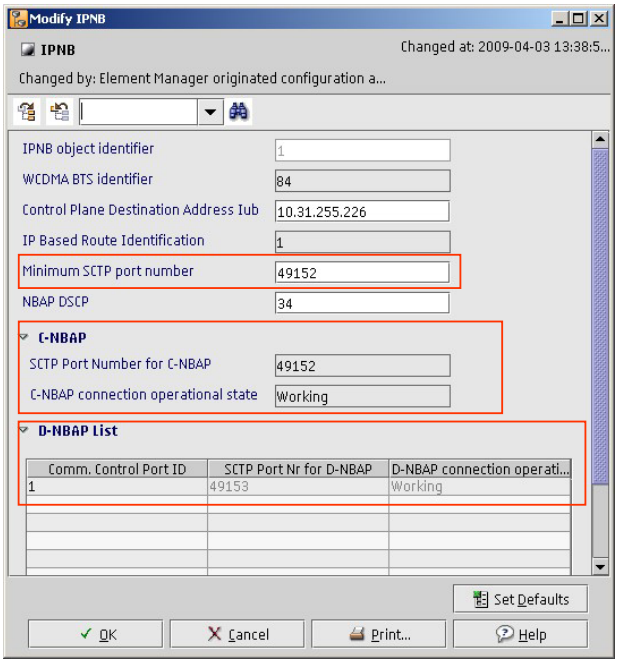
IP signaling subnet within RNC and IP address of the ICSU.
ICSU IP address is received from RNC. It is not configurable on BTS side. Only signaling subnetwork in RNC must be set ion BTS side.

Iub IP Mode Settings: SCTP Port Settings in BTS

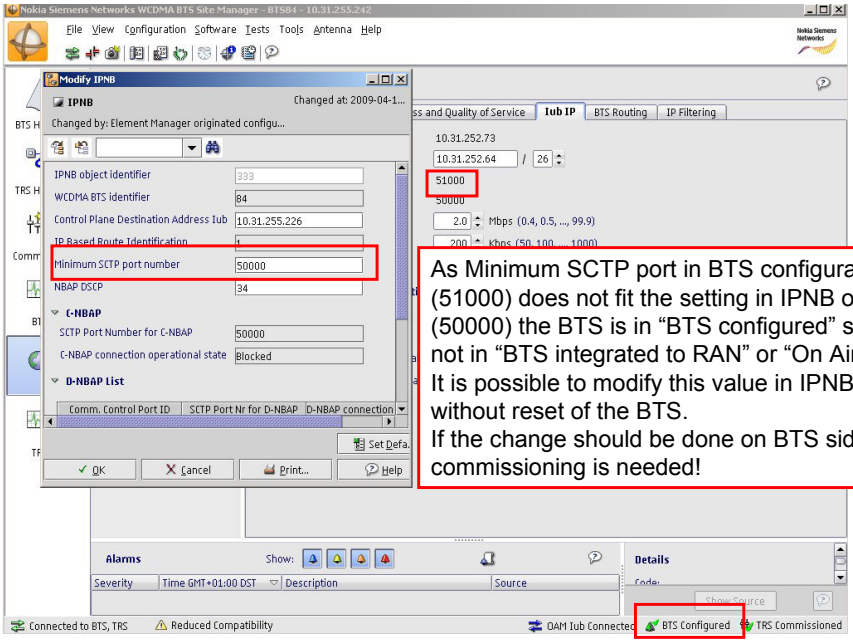


Minimum SCTP Port is defined in IPNB object in RNC.
C-NBAP will run on port 49152 and D-NBAP on 49153.

SCTP Port Settings in RNC: IPNB Object

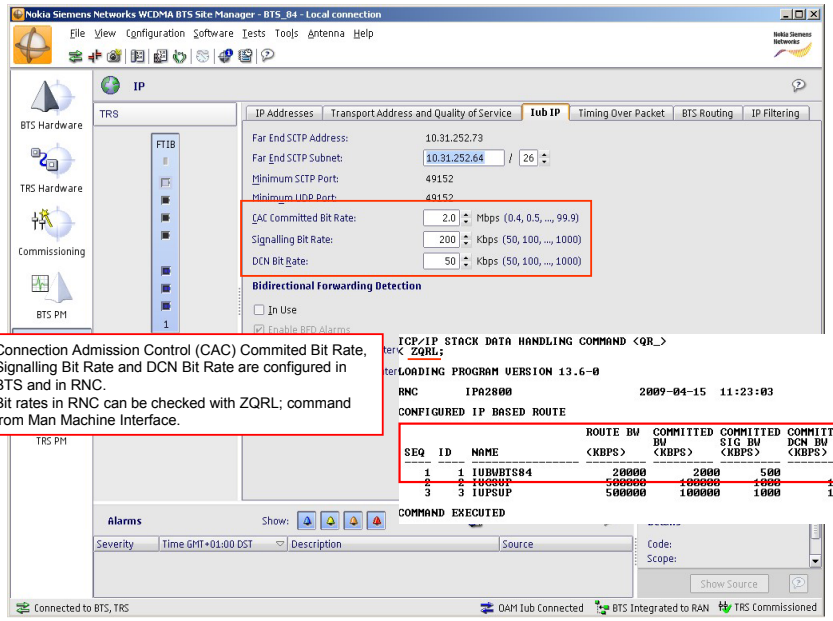


Missmatch between SCTP Port Settings in RNC and BTS



As Minimum SCTP port in BTS configuration (51000) does not fit the setting in IPNB object (50000) the BTS is in “BTS configured” state and not in “BTS integrated to RAN” or “On Air”.
It is possible to modify this value in IPNB object without reset of the BTS.
If the change should be done on BTS side the re-commissioning is needed!

Iub IP Mode Settings: Bit Rates



Connection Admission Control (CAC) Commited Bit Rate, Signalling Bit Rate and DCN Bit Rate are configured in BTS and in RNC.
Bit rates in RNC can be checked with ZQRL; command from Man Machine Interface.

```
ICP/IP STACK DATA HANDLING COMMAND <QR_>
< ZQRL;
LOADING PROGRAM VERSION 13.6-0
RNC        IPA2800                    2009-04-15  11:23:03
CONFIGURED IP BASED ROUTE
                                      ROUTE BW  COMMITTED  COMMITTED  COMMITTED
                                                BW         SIG BW     DCN BW
SEQ  ID   NAME                        (KBPS)    (KBPS)     (KBPS)     (KBPS)     IFC  RATIO
---  ---  --------------------------  --------  ---------  ---------  ---------  ---  -----
  1    1  IUBVBTS84                     20000       2000        500          0  OFF   N/A
  2    2  IUCSUP                       500000     100000       1000        100  OFF   N/A
  3    3  IUPSUP                       500000     100000       1000        100  OFF   N/A
COMMAND EXECUTED
```

Interrogating NPGE card in RNC

```
QRI:NPGE,:;
RNC        IPA2800                    2009-04-15  10:51:18
INTERROGATING NETWORK INTERFACE DATA

            IF       ADM                        IF    ADDR
UNIT        NAME     STATE  MTU  PRIORITY      TYPE  TYPE IP ADDRESS
---------   -------- ------ ---- ----------    ----  ---- ----------------
NPGE-3      IFAI22   UP     1500   -           U     P    10.31.145.40/32
            IFAI67   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.77
            IFAI68   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.76
            IFAI69   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.75
            IFAI70   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.74
            IFAI71   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.73
            IFAI72   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.72
            IFAI73   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.71
            IFAI74   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.70
            IFAI75   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.69
            IFAI76   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.68
            IFAI77   UP     1500   -           U     P    10.31.252.126/32
                                                          ->10.31.252.67
            IFAI78   UP     1500   -           U     P    10.31.145.40/32
                                                P     10.31.252.126/32
                                                          ->10.31.252.66
            IFAI79   UP     1500   -           U     P    10.31.145.40/32
                                                P     10.31.252.126/32
                                                          ->10.31.252.65
            IFGE0    UP     1500   -                 P    10.31.145.40/24
            IFGE1    UP     1500   -                 P    10.31.140.41/24
            LO0      UP     1500   -                 P    10.31.252.126/32

COMMAND EXECUTED
```

IP Interface IFAI71 on NPGE-3 has an IP address 10.31.252.126 which is routed internally to the corresponding ICSU with IP Address 10.31.252.73 (in this example ICSU-8).

Physical Interfaces on NPGE IFGE0 and IFGE1 and Loopback interface LO0.

Interrogating ICSU cards in RNC

UNIT	IF NAME	ADM STATE	MTU	PRIORITY	IF TYPE	ADDR TYPE	IP ADDRESS
ICSU-0	AA510	UP	1436	-	U	L	10.31.255.97/32 ->10.31.145.40
						L	10.31.252.65/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.255.97/32
						L	10.31.252.65/32
ICSU-1	AA510	UP	1436	-	U	L	10.31.255.98/32 ->10.31.145.40
						L	10.31.252.66/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.255.98/32
						L	10.31.252.66/32
ICSU-2	AA510	UP	1436	-	U	L	10.31.252.67/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.67/32
ICSU-3	AA510	UP	1436	-	U	L	10.31.252.68/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.68/32
ICSU-4	AA510	UP	1436	-	U	L	10.31.252.69/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.69/32
ICSU-5	AA510	UP	1436	-	U	L	10.31.252.70/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.70/32
ICSU-6	AA510	UP	1436	-	U	L	10.31.252.71/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.71/32
ICSU-7	AA510	UP	1436	-	U	L	10.31.252.72/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.72/32
ICSU-8	AA510	UP	1436	-	U	L	10.31.252.73/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.73/32
ICSU-9	AA510	UP	1436	-	U	L	10.31.252.74/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.74/32
ICSU-10	AA510	UP	1436	-	U	L	10.31.252.75/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.75/32
ICSU-11	AA510	UP	1436	-	U	L	10.31.252.76/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.76/32
ICSU-12	AA510	UP	1436	-	U	L	10.31.252.77/32 ->10.31.252.126
	LO0	UP	33204	-		L	10.31.252.77/32

ICSU-8 own IP address and routing to IFAI71 on NPGE

Interrogating static routes in RNC (ZQKB;)

```
IP ROUTING DATA HANDLING COMMAND <QK_>
< B;

RNC        IPA2800                    2009-04-15   10:58:49

INTERROGATED STATIC ROUTES

UNIT       DESTINATION          GATEWAY ADDRESS     ROUTE TYPE  PREFERENCE  NBR
---------  -------------------  ------------------  ----------  ----------  ----
OMU-0      DEFAULT ROUTE        10.31.140.254       LOG         0           1
OMU-0      10.31.255.194/31     10.31.255.193       LOG         0           5
NPGE-3     DEFAULT ROUTE        10.31.145.254       PHY         0           2
ICSU-0     DEFAULT ROUTE        10.31.145.40        LOG         0           3
ICSU-1     DEFAULT ROUTE        10.31.145.40        LOG         0           4
ICSU-2     DEFAULT ROUTE        10.31.252.126       LOG         0           6
ICSU-3     DEFAULT ROUTE        10.31.252.126       LOG         0           7
ICSU-4     DEFAULT ROUTE        10.31.252.126       LOG         0           8
ICSU-5     DEFAULT ROUTE        10.31.252.126       LOG         0           9
ICSU-6     DEFAULT ROUTE        10.31.252.126       LOG         0           10
ICSU-7     DEFAULT ROUTE        10.31.252.126       LOG         0           11
ICSU-8     DEFAULT ROUTE        10.31.252.126       LOG         0           12
ICSU-9     DEFAULT ROUTE        10.31.252.126       LOG         0           13
ICSU-10    DEFAULT ROUTE        10.31.252.126       LOG         0           14
ICSU-11    DEFAULT ROUTE        10.31.252.126       LOG         0           15
ICSU-12    DEFAULT ROUTE        10.31.252.126       LOG         0           16
ICSU-8     10.31.255.226/32     10.31.252.126       LOG         0           17

COMMAND EXEC
```

10.31.252.126 -> IP address of NPGE-3 -> IFAI71
10.31.145.254 -> IP address of the router near to RNC

Interrogating Local Subnet in RNC (ZQML;)

```
ZQML:;
EXECUTION STARTED

RNC        IPA2800                    2009-04-15  11:11:10
INTERROGATE LOCAL SUBNET
SUBNET ID  SUBNET  ADDRESS  MASK LENGTH
---------  ---------------  -----------
        1     10.31.252.64           26
INTERROGATE LOCAL SUBNET BASED SCTP LINK PARAMS

                                        ASSOC MAX  PATH MAX  HEARTBEAT  SACK
SUBNET ID  RTO INIT  RTO MIN  RTO MAX   RETRANS    RETRANS   INTERVAL   PERIOD
---------  --------  -------  -------   ---------  --------  ---------  ------
        1      1000      750     2000           5         5       1000     200
COMMAND EXECUTED
```

Signaling Subnet is also configured in BTS.

Change of Administrative State on NPGE Interface

```
QRN:NPGE,3:IFAI71,:::::DOWN

/* EXECUTION  DETERMINATION:
   ; .. COMMAND EXECUTION
   N .. NO EXECUTION        */

QRN:NPGE,3:IFAI71,:::::DOWN:;

RNC        IPA2800                    2009-04-15  11:39:39

CONFIGURED NETWORK INTERFACE

            IF        ADM                          IF   ADDR
UNIT        NAME      STATE  MTU  PRIORITY  TYPE TYPE IP ADDRESS
----------  --------  -----  ---- --------- ---- ---- ----------------------
NPGE-3      IFAI71    DOWN   1500   -        U    P    10.31.252.126/32
                                                      ->10.31.252.73

COMMAND EXECUTED
```

IUB Links

OAM Iub Connected BTS Configured TRS Commissioned

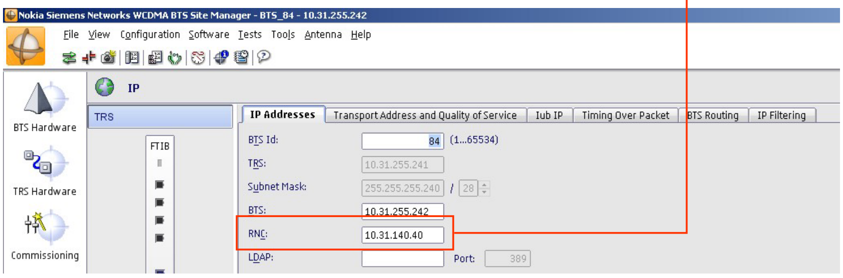
HW Unit	Link Type	Link Status
FSMB 1		
	CNBAP	Disconnected
	DNBAP	Disconnected
	OAM	Connected
	SAAL2	Connected

Interrogating OMU card in RNC

```
QRI:OMU,0:;
RNC         IPA2800                       2009-04-24  11:41:28
INTERROGATING NETWORK INTERFACE DATA

            IF        ADM                           IF    ADDR
UNIT        NAME      STATE   MTU   PRIORITY       TYPE  TYPE IP ADDRESS
---------   --------  ------  ----  ---------      ----  ---- ------------------------
OMU-0       EL0       UP      1500    -                  L    10.31.140.40/24

COMMAND EXECUTED
```



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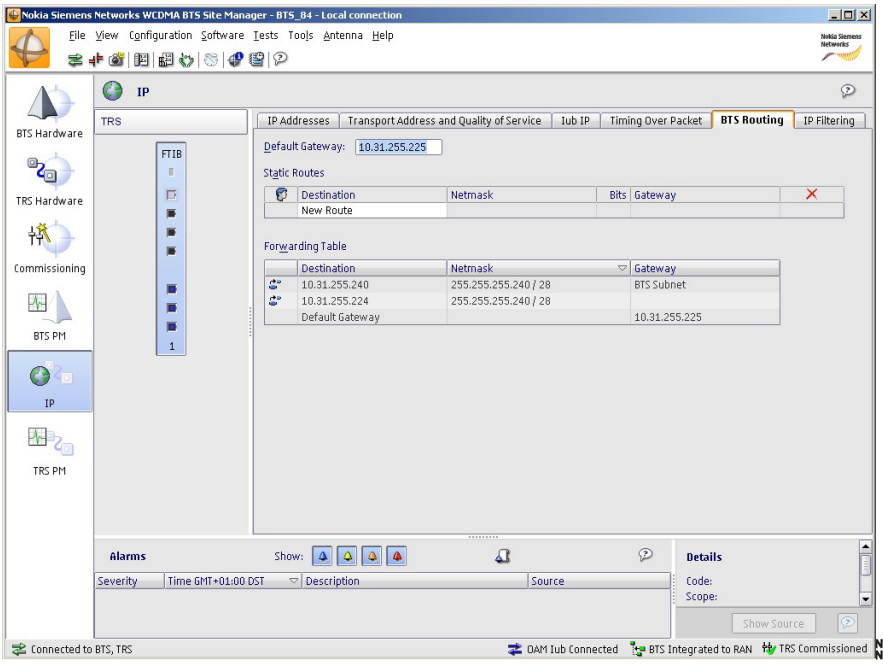
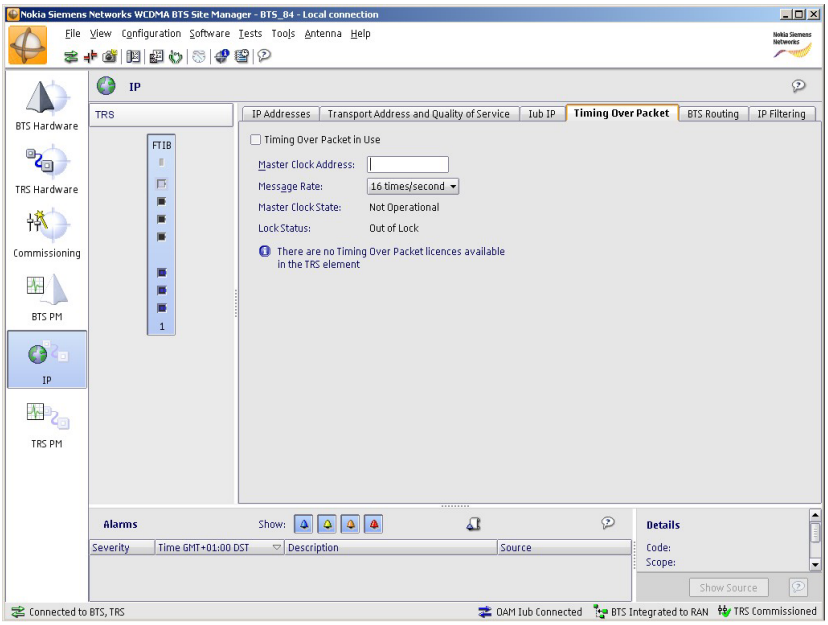
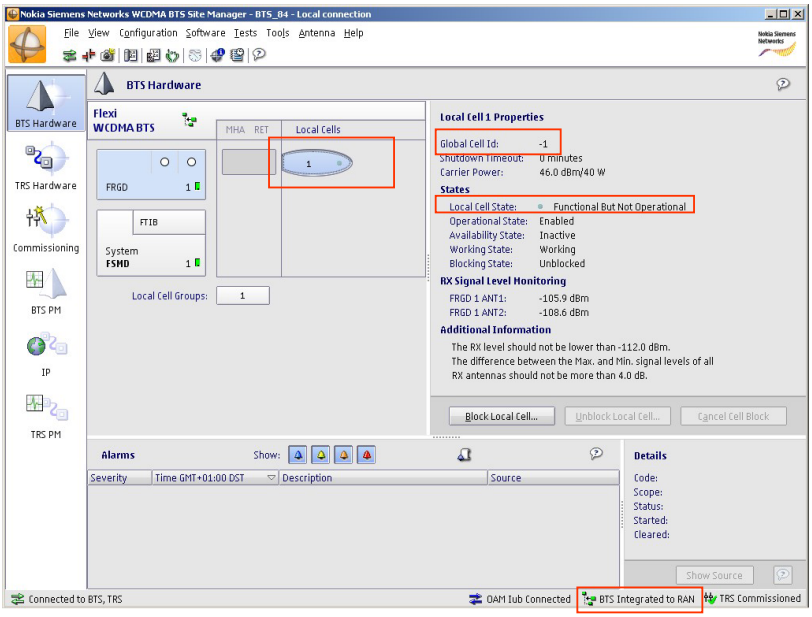
BTS Routing



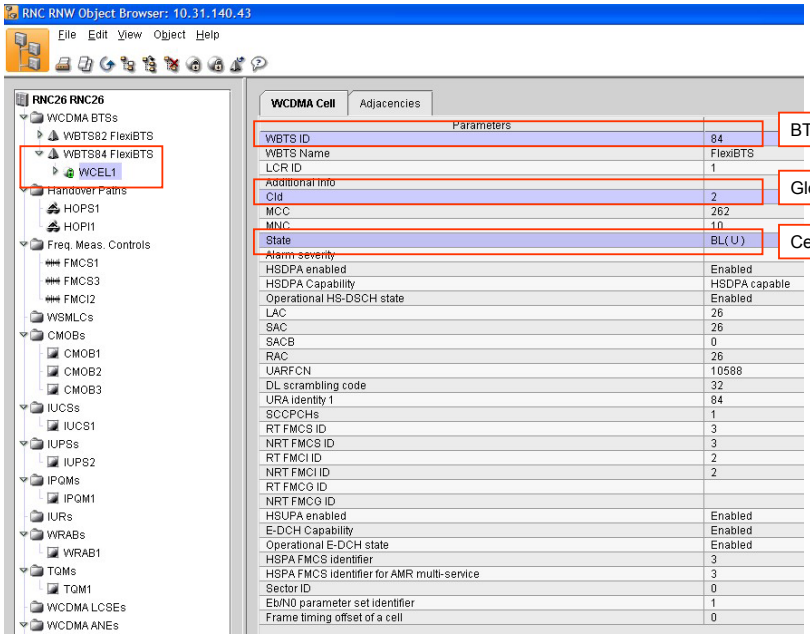
Timing over Packet (ToP) settings



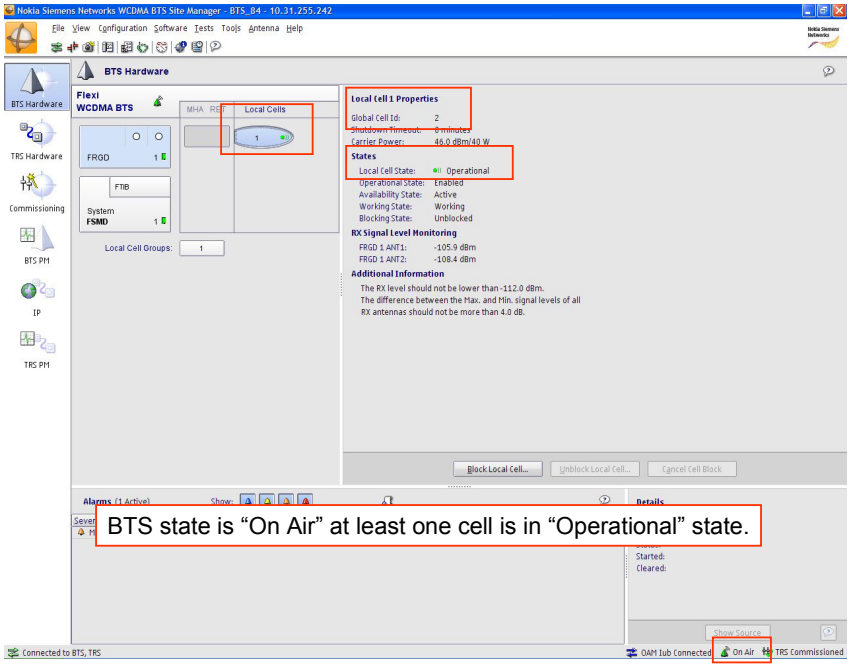
Cell Locked in RNC



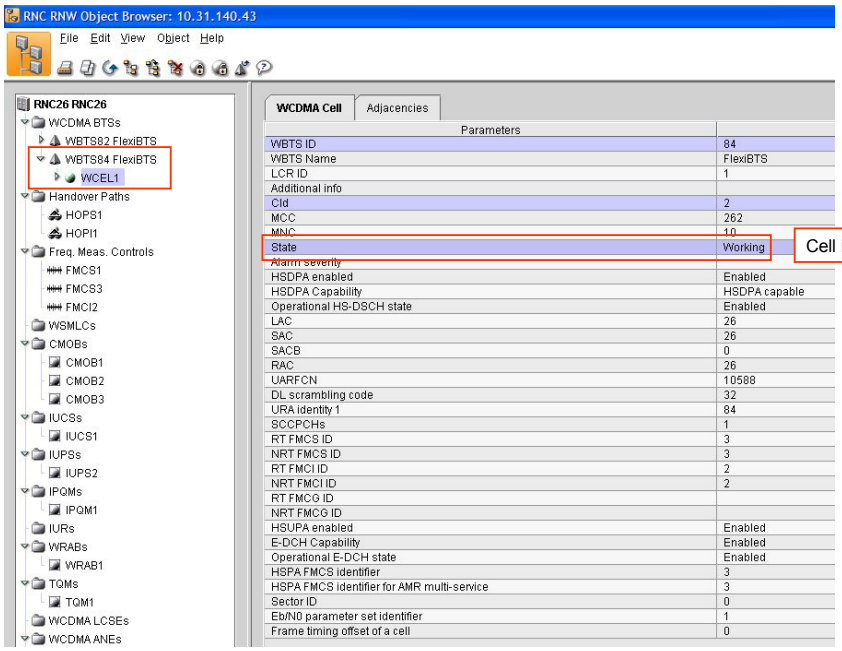
Cell Locked in RNC (cont)



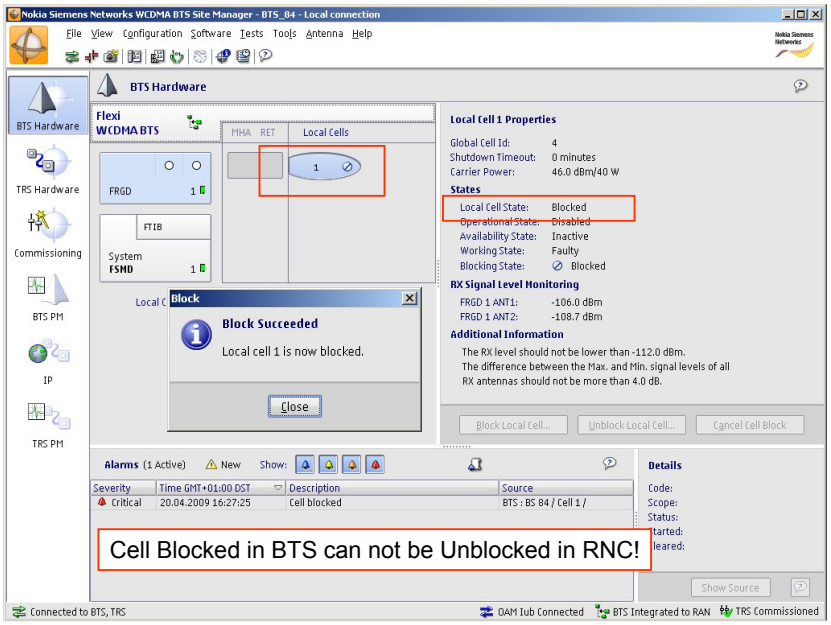
Unlock Cell in RNC



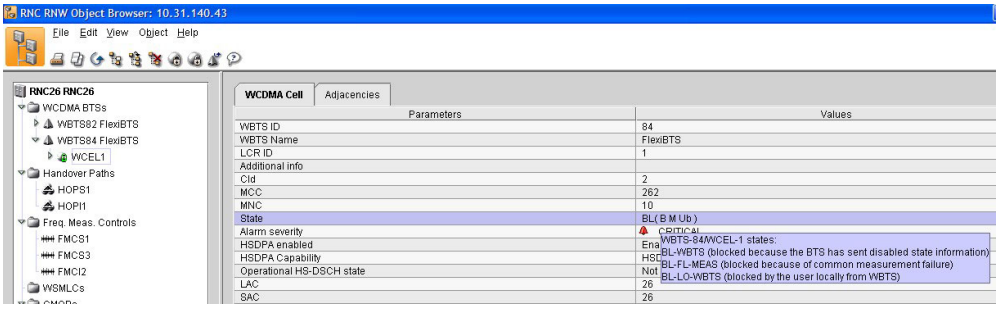
Unlock Cell in RNC (cont)



Cell Blocked in BTS

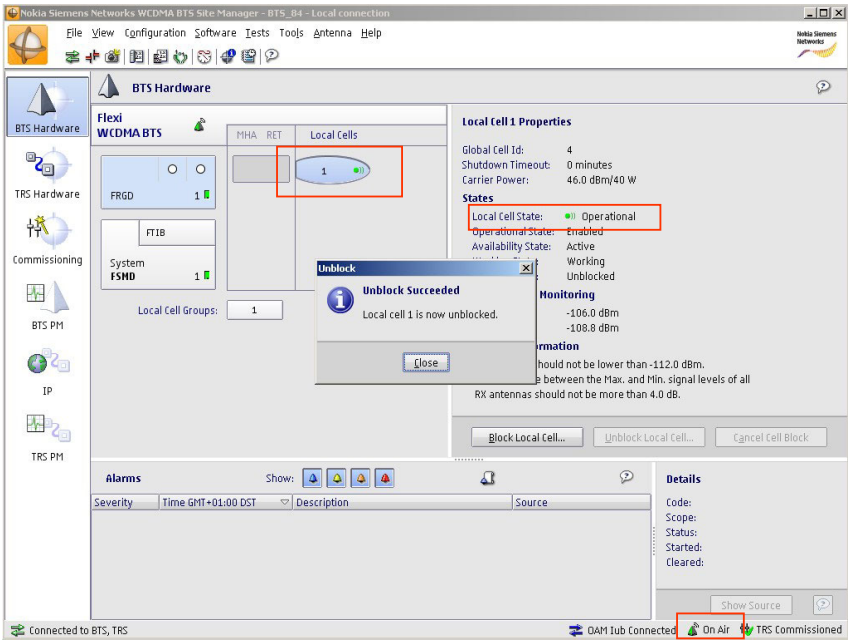


Cell Blocked in BTS (cont)

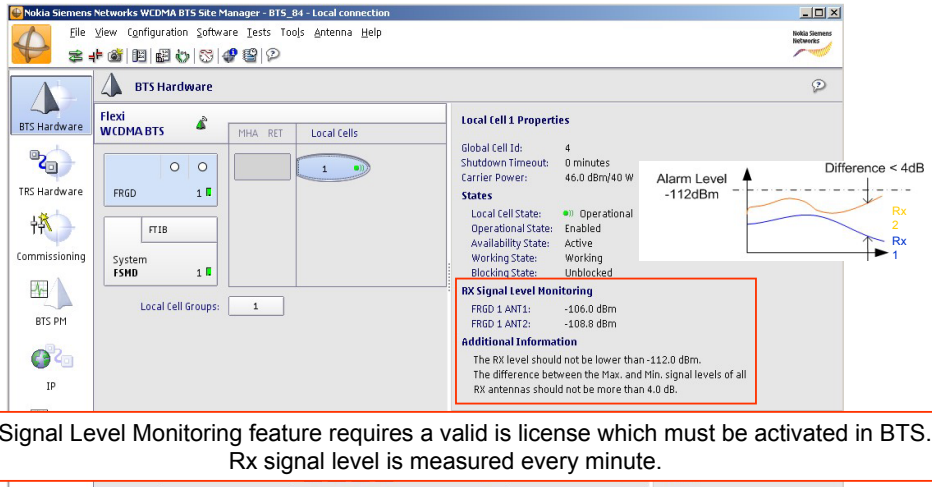


Cell Blocked in BTS can not be Unblocked in RNC!

Unblock Cell in BTS

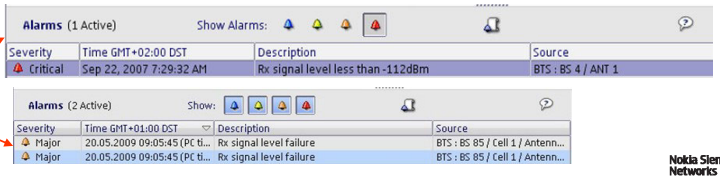


RX Signal Level Monitoring

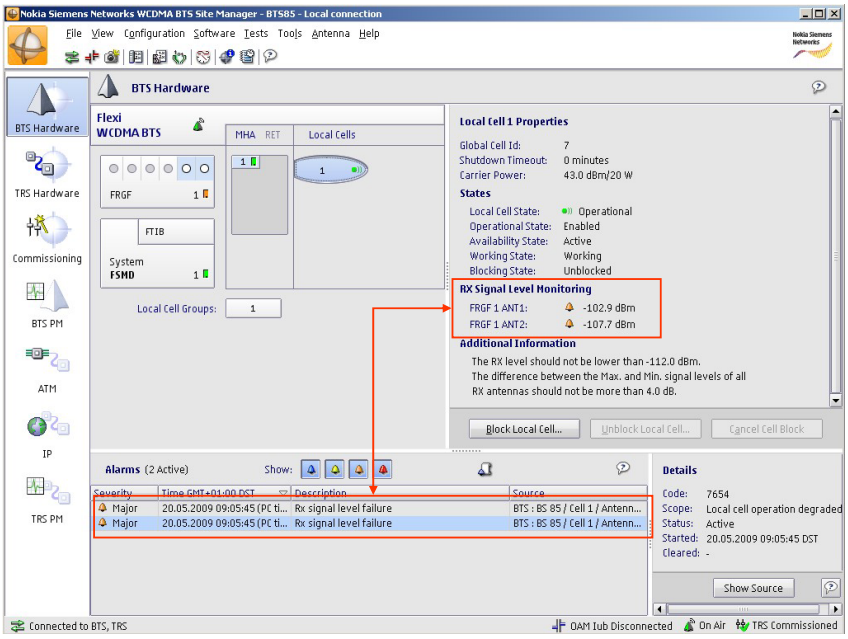


RX Signal Level Monitoring feature requires a valid is license which must be activated in BTS. Rx signal level is measured every minute.

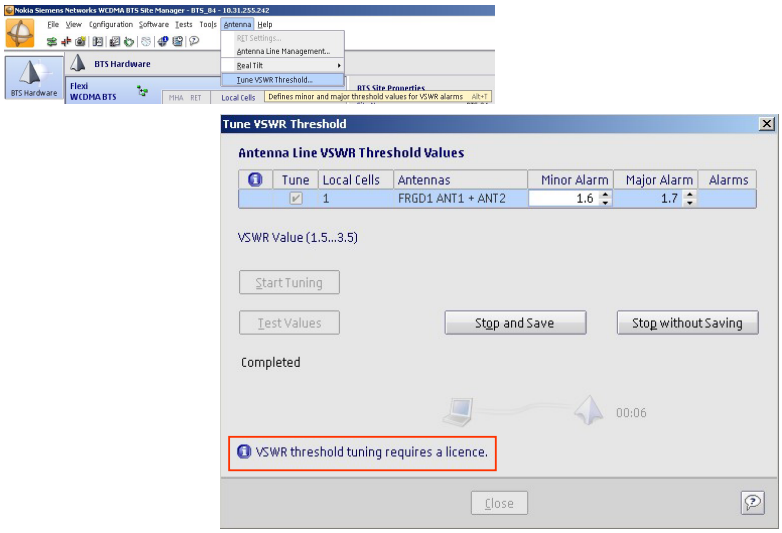
Alarm is raised if one of thresholds is exceeded



RX Signal Level Monitoring (cont)



VSWR Threshold Tuning



Start tuning: system calculates thresholds.
Change threshold manually and Test Values becomes active.
After the test is finished it is possible to stop tuning with or without saving.

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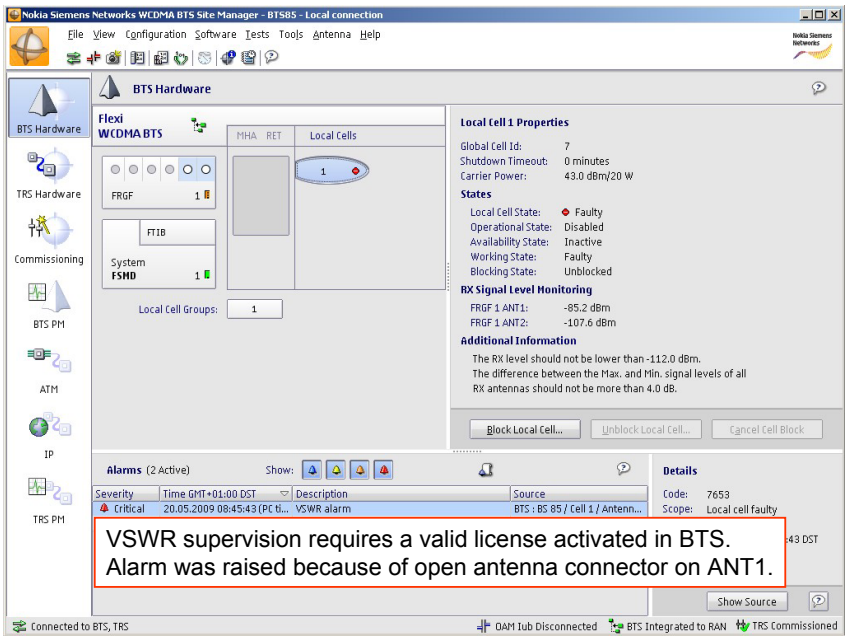
VSWR threshold tuning requires a valid license installed in Flexi WCDMA BTS (Antenna Line Supervision License Key).

VSWR Alarm



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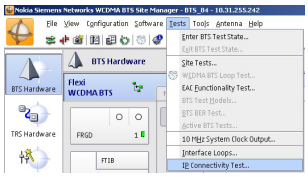
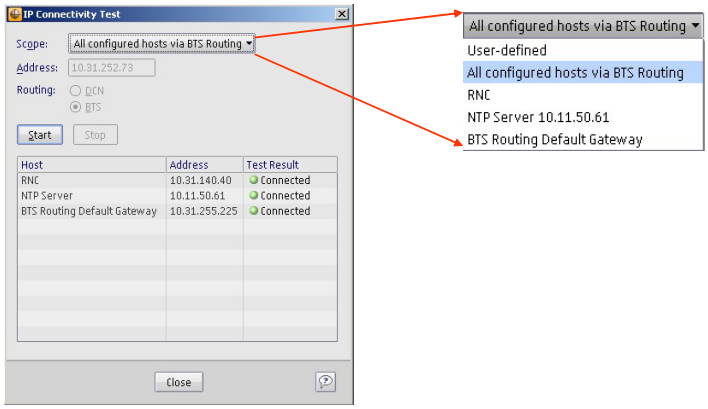
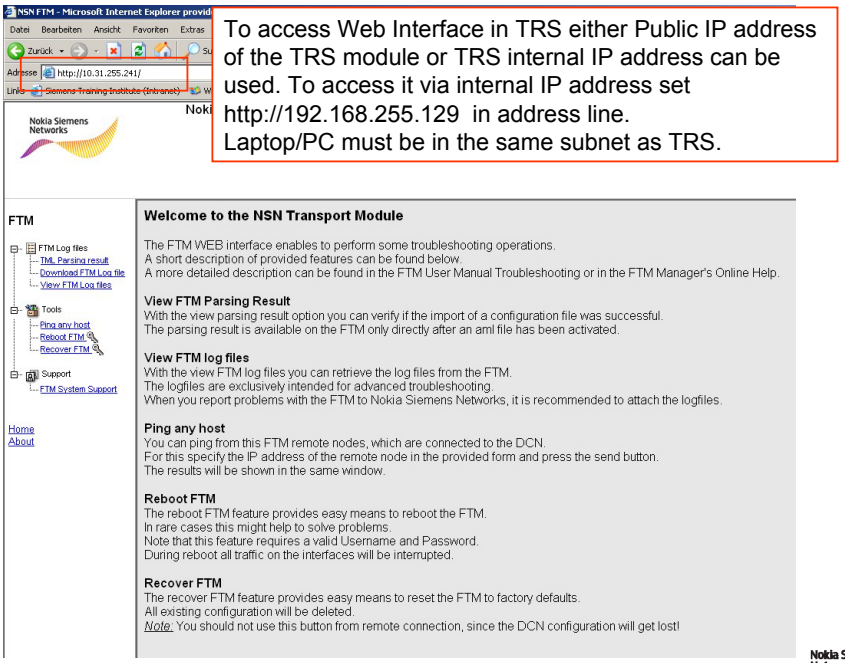
VSWR threshold tuning requires a valid license installed in Flexi WCDMA BTS (Antenna Line Supervision License Key).

IP Connectivity Test



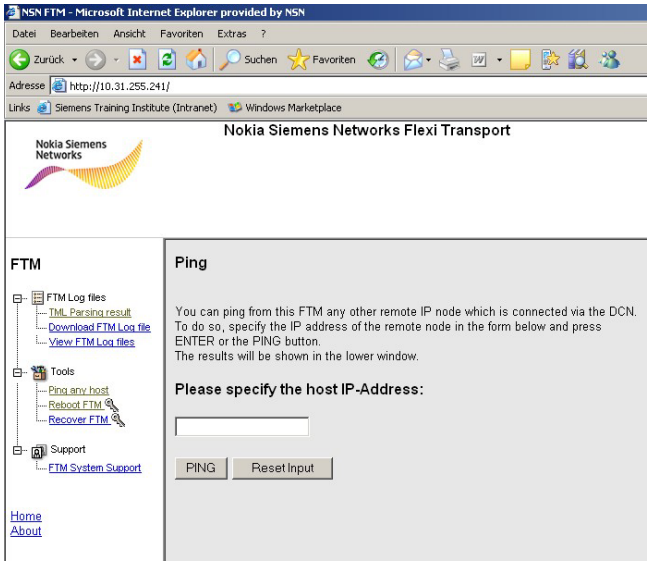


TRS Web Interface

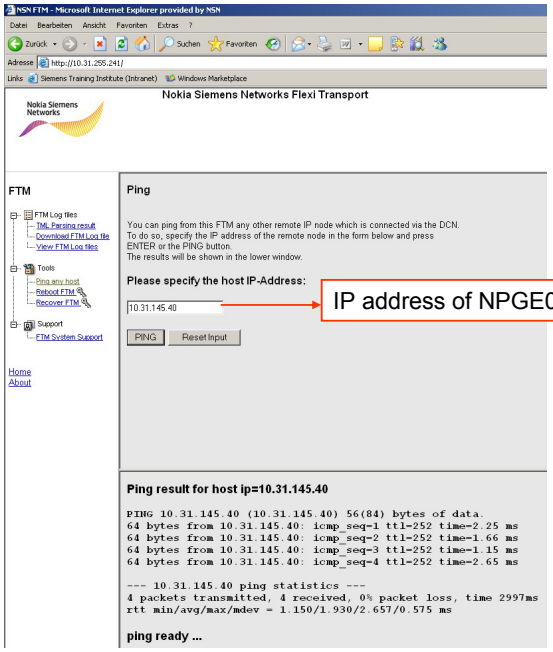


To access Web Interface in TRS either Public IP address of the TRS module or TRS internal IP address can be used. To access it via internal IP address set http://192.168.255.129 in address line.
Laptop/PC must be in the same subnet as TRS.

TRS Web Interface: Ping any Host



Ping from TRS to NPGE IFGE0 in RNC

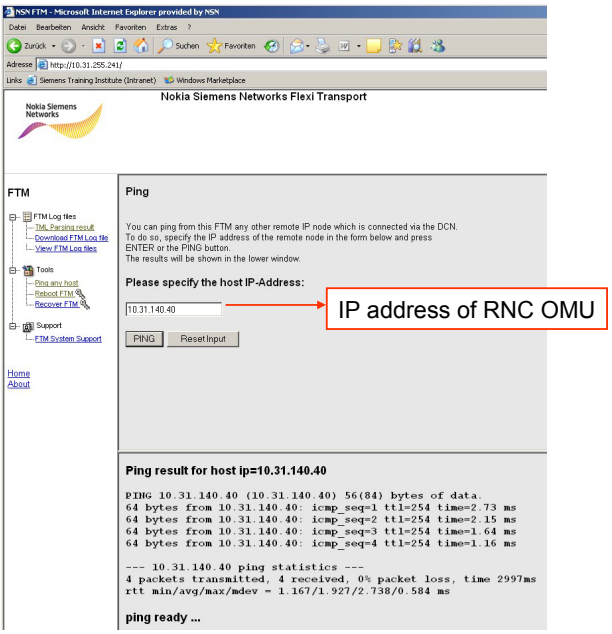


Ping from NPGE IFGE0 to TRS

```
QRX:NPGE,3:IP=10.31.255.241:PING:;

RNC        IPA2800                        2009-04-23  17:32:28

PING, SENDING UNIT: NPGE-3
PING 10.31.255.241 (10.31.255.241): 56 data bytes
64 bytes from 10.31.255.241: icmp_seq=0 ttl=61 time=10.000 ms

--- 10.31.255.241 ping statistics ---
1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 10.000/10.000/10.000 ms

COMMAND EXECUTED
```

IP address of TRS

Ping from TRS to RNC OMU



Ping from RNC OMU to TRS

```
< QRX:OMU,0:IP=10.31.255.241:PING:;

LOADING PROGRAM VERSION 13.6-0

RNC        IPA2800                      2009-04-24  13:23:04

PING, SENDING UNIT: OMU-0
PING 10.31.255.241 (10.31.255.241): 56 data bytes
64 bytes from 10.31.255.241: icmp_seq=0 ttl=63 time=2.337 ms

----10.31.255.241 PING Statistics----
1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 2.337/2.337/2.337 ms

COMMAND EXECUTED
```

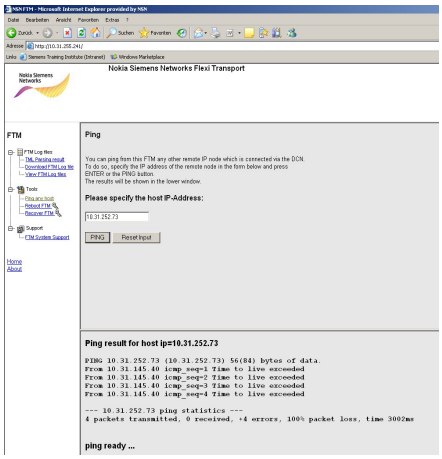
IP address of TRS

Ping from RNC (NPGE IFGE0) to Transport Ethernet Interface on TRS

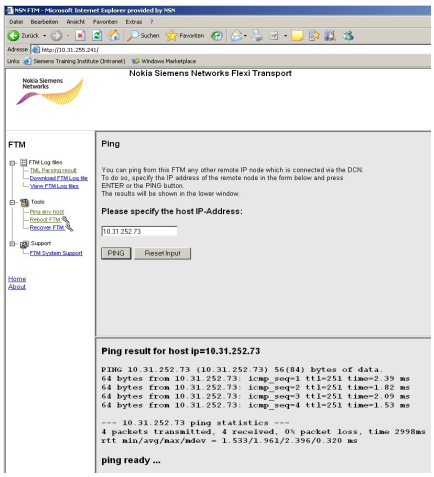
```
< QRX:NPGE,3:IP=10.31.255.226:PING:;

LOADING PROGRAM VERSION 13.6-0

RNC        IPA2800                    2009-04-23  17:35:57

PING, SENDING UNIT: NPGE-3
PING 10.31.255.226 (10.31.255.226): 56 data bytes
64 bytes from 10.31.255.226: icmp_seq=0 ttl=61 time=0.005 ms

--- 10.31.255.226 ping statistics ---
1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 0.005/0.005/0.005 ms

COMMAND EXECUTED
```

IP address of the Transport Ethernet Interface on TRS

Ping from TRS to ICSU-8 in RNC



Signaling network in RNC NOT configured.



Signaling network in RNC configured.

Ping from ICSU-8 in RNC to TRS and Transport Ethernet Interface

```
QRX:ICSU,8:IP=10.31.255.226:;

RNC       IPA2800

PING, SENDING UNIT: ICSU-8
PING 10.31.255.226 (10.31.255.226): 56 data bytes
64 bytes from 10.31.255.226: icmp_seq=0 ttl=60 time=1.461 ms

----10.31.255.226 PING Statistics----
1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 1.461/1.461/1.461 ms

COMMAND EXECUTED


ICP/IP STACK DATA HANDLING COMMAND <QR_>
<


MAIN LEVEL COMMAND <___>
< QRX:ICSU,8:IP=10.31.255.241:;

LOADING PROGRAM VERSION 13.6-0

RNC       IPA2800                    2009-04-24  13:31:24

PING, SENDING UNIT: ICSU-8
PING 10.31.255.241 (10.31.255.241): 56 data bytes
64 bytes from 10.31.255.241: icmp_seq=0 ttl=60 time=2.888 ms

----10.31.255.241 PING Statistics----
1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 2.888/2.888/2.888 ms

COMMAND EXECUTED
```

IP address of the Transport Ethernet Interface on TRS

IP address of TRS

GPS Synchronisation Option