NOKIA

C33525.90_H0
Nokia MetroHub Transmission Node Rel. C3

# Alarms and LEDs in Nokia MetroHub

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# 1 Alarm list for ITN-related transmission products

The alarms detected by the node managers are listed at the end of this section. Each alarm has an alarm description that shows how the transmission node reacts to the alarms. Each alarm description also gives a short description of the fault generating the alarm and provides some guidelines on how to remedy the fault.

The alarm descriptions give the following information:

*Title row* shows the fault code and the alarm name.

*Severity* shows the default severity class of the alarm as it appears in the node manager.

- *Critical* is used to indicate a fault situation that requires immediate measures. A critical alarm indicates possible service degradation.
- *Major* is used to indicate a fault situation that requires some measures during normal working hours.
- *Minor* is used to indicate a fault situation that does not require any measures. The alarm is cancelled when the fault situation is cleared.
- *Warning* can be used to provide information. A warning is not an alarm, and it does not indicate a fault. Warnings are not cancelled.

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Note

Alarm severity can be modified in the Alarm Properties dialogue box. The modified alarm severity is visible in the local manager alarm window. The alarm is reported to the NMS and BSC with an alarm code. Local alarm severity modification does not override global severity settings in the NMS or BSC.

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*Fault reason* gives the possible cause of the alarm.


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*Description* contains location and consequence information. *Location* shows the unit and block indicating the alarm. *Consequence* shows whether an indication signal is sent upstream or downstream.

*Instructions* gives instructions on how to remedy the fault.

*Cancelling* gives instructions on how the alarm is cancelled.

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## Note

For instructions on how to replace units or carry out other maintenance tasks, please refer to *Overview of replacing units* and other upgrading hardware instructions. Also refer to related maintenance instructions in Nokia UltraSite EDGE BTS and Nokia MetroSite EDGE BTS documentation.

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# 2 Common node alarms

## 2.1 20 Blocked from use

**Severity**

Major

**Fault reason**

When a node has a cross-connection terminated in an interface, which is not in use, the cross-connection bank shows pending cross-connections. The cross-connections are also set to pending state, if a slave unit with cross-connections is removed without uninstalling it first. In these cases the cross-connection remains in the cross-connection bank, but it is not set in the hardware.

**Description**

Location: Node cross-connection bank

**Instructions**

Check that all interfaces, in which cross-connections have been created, are in use. Remove cross-connections that are connected to non-existing interfaces. Reinstall the removed unit(s).

**Cancelling**

Automatically cancelled when there are no blocked cross-connections.

## 2.2 62 No connection

**Severity**

Critical


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#### Fault reason

Enabling Trunet has failed, because the cross-connection capacity required is not free.

#### Description

Location: Node Trunet

#### Instructions

Disable Trunet and remove the cross-connections that are using the capacity needed for Trunet. After performing this action, re-enable Trunet.

#### Cancelling

Automatically cancelled when Trunet can create the cross-connections that are needed.

## 2.3 112 Frequency error

#### Severity

Minor

#### Fault reason

1. The node is running on the internal clock as configured in the timing priority list, as none of the Rx or external clock sources defined in the timing priority list is valid.
2. The Rx source signal in use has its MCB in state '1'. An Rx source signal with MCB state '1' is selected as the synchronisation source if all other configured synchronisation sources have failed. If there are two synchronisation sources with the MCB state '1', the source with higher priority is selected.

#### Description

Location: Node sychronisation setup

#### Instructions

Check the incoming signals in the sychronisation priority list.


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### Cancelling

Automatically cancelled when at least one Rx signal in the priority list is valid.

## 2.4 122 Synchronizing fault

### Severity

Major

### Fault reason

Synchronisation is stuck to a currently active source. Switching off this source did not succeed.

### Description

Location: Backplane

### Instructions

Reset all units by selecting **Maintenance → Resets → HW reset**. If the reset does not cancel the alarm, first replace the unit that provides the active synchronisation source. If this does not cancel the alarm, replace the unit in slot 1 (master unit).

### Cancelling

If the alarm is caused by internal deadlock of the synchronisation system, the alarm is cancelled after reset. If the alarm is caused by a defect in HW, the alarm is cancelled after the replacement of the defect unit.

## 2.5 124 Synchronising fault in clock recovery

### Severity

Major

### Fault reason

A missing signal from an external synchronisation input clock signal. The signal has been configured as an available synchronisation source in the timing priority list.


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### Description

Location: Node synchronisation setup

### Instructions

Check the external synchronisation input clock signal is present at the synchronisation input interface. If the external synchronisation input clock signal is not needed, remove the related entry in the timing priority list.

### Cancelling

Automatically cancelled.

## 2.6 125 Loss of synchronisation signals

### Severity

Critical

### Fault reason

All synchronisation sources from the priority list are unavailable.

The active synchronisation source does not provide the clock signal on the backplane.

### Description

Location:

Node synchronisation setup

Backplane

### Instructions

1. Check the incoming signals in the synchronisation priority list.

2. Ensure that location of the alarm is backplane. Reset all units by selecting **Maintenance → Resets → HW reset**. If the reset does not cancel the alarm, replace first the unit that provides the active synchronation source. If this does not cancel the alarm, replace the unit in slot 1 (master unit).


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### Cancelling

Automatically cancelled when at least one synchronisation source in the priority list is available.

If the alarm is caused by internal deadlock of the synchronisation system, the alarm is cancelled after reset. If the alarm is caused by a defect in HW, the alarm is cancelled after the replacement of the defect unit.

## 2.7 139 Subrack is missing units

### Severity

Critical

### Fault reason

The unit is logically installed, but it has been physically removed, or it is broken.

### Description

Location:

1. Node HW setup
2. DIU (only MetroHub)
3. FAN (only MetroHub)
4. Power supply 1/2 (only MetroHub)
5. Battery (only MetroHub)

### Instructions

Uninstall the removed unit logically, or replace the broken unit.

### Cancelling

Automatically cancelled.


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## 2.8 140 Subrack has excessive units

### Severity

Major

### Fault reason

A unit, which is physically present, has not been logically installed with the manager.

### Description

Location:

1. Node HW setup
2. FAN (only MetroHub)
3. Power supply 1/2 (only MetroHub)
4. Battery (only MetroHub)
5. DIU (only MetroHub)
6. DIPx (only MetroHub)

### Instructions

Install the unit.

### Cancelling

Automatically cancelled when the excessive unit has been installed logically with the manager.

## 2.9 142 Fault in installation of equipment

### Severity

Critical

### Fault reason

The installed FXC or outdoor unit has been changed to a unit of a different type than specified in the installation.


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### Description

Location: Node HW setup

### Instructions

Uninstall the unit that is of the wrong type, or run the "Install all" command. You can also replace the unit with the same type of unit as used earlier.

### Cancelling

Automatically cancelled.

## 2.10 162 Database full

### Severity

Warning

### Fault reason

Fault management event history database is full. New events are not recorded in the database. This happens when the poller (NMS/BSC) is unable to poll the unit and thus it clears the alarm history.

### Description

Location: Node or FXC unit event history

### Instructions

Check that the polling is working.

### Cancelling

Warnings are not cancelled.

## 2.11 221 Version mismatch

### Severity

Critical


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#### Fault reason

At least one slave unit is not compatible with the master unit.

#### Description

Location: Node HW setup

#### Instructions

Check the SW versions of the slave units and upgrade them to the same level as the master unit.

---

Note

The 221 Version mismatch alarm has to be cancelled in order to manage the node successfully.

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#### Cancelling

Automatically cancelled when all units are compatible with the master unit.

## 2.12 240 Active alarm point

#### Severity

Major

#### Fault reason

External alarm is active, user-defined alarm is on, or EAC incorrectly defined.

#### Description

Location: DIUA EAC input 1...10 in MetroHub.

VIFA unit in MetroSite EDGE and ConnectSite 10 BTSs.

BOI unit in UltraSite EDGE and ConnectSite 100 BTSs.

#### Instructions

Check that the definition is correct and that the external circuitry works correctly.


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### Cancelling

Automatically cancelled.


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# 3 Specific alarms for Nokia MetroHub transmission nodes

## 3.1 0 Fault in power supply

**Severity**

Critical

**Fault reason**

1. Flexbus over-current protection circuit has cut off + 55 V power feed.
2. Fault in the power supply.

**Description**

Location:

1. FXC RRI Flexbus.
2. Power supply 1/2.

Consequence:

1. AIS is connected to all received Flexbus channels.
2. Some function may not be working in the node.

**Instructions**

1. Check the OU cabling, remove short circuits and re-connect the power feed with the manager.


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Note

Switch off the DC power feed when connecting the OU to the Flexbus interface. If the OU is connected to a Flexbus interface with the DC power feed on, the over-current protection may cut the power feed.

2. Some of the power output voltages are not within the defined range. The power supply has to be replaced.

**Cancelling**

Automatically cancelled.

## 3.2 1 Total loss of power supply

**Severity**

Critical

**Fault reason**

AC voltage is missing and the battery back-up is in use.

**Description**

Location: Power supply 1/2

**Instructions**

Check the AC voltage. If it is satisfactory, change the power supply.

**Cancelling**

Automatically cancelled when AC voltage is available.

## 3.3 2 Loss of backup power supply

**Severity**

Critical


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**Fault reason**

All output voltages are at an acceptable level, the redundant power supply is causing the alarm.

**Description**

Location: Power supply 1/2

Consequence: Power supply redundancy lost.

**Instructions**

Change the redundant power supply. The redundant power supply is indicating a steady active red LED.

**Cancelling**

Automatically cancelled.

## 3.4 8 Low battery voltage

**Severity**

Critical

**Fault reason**

Power supply unit has performed the battery test and the result is 'Average capacity'.

**Description**

Location: Battery unit

Consequence: Battery back-up capability is not sufficient.

**Instructions**

Battery capacity has decreased. Check that there has not been an AC failure within 24 hours to ensure that the battery has been full before testing.

**Cancelling**

Run the battery test again, or reset the master FXC unit. Resetting the master FXC unit interrupts traffic.


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## 3.5 13 Charger alarm

**Severity**

Major

**Fault reason**

The power supply unit is not capable to charge the battery. As a result, the battery backup power supply is eventually lost.

**Description**

Location: Power supply 1/2

**Instructions**

Change the power supply unit and/or the battery. Check that there is no short circuit connected to the power interface unit's DC output. Check also the cable between the power interface and the battery.

**Cancelling**

Automatically cancelled when charging works normally.

## 3.6 23 Test mode active

**Severity**

Major

**Fault reason**

1. User-activated heating test is ongoing.
2. External alarm connectors test or external control connectors test is ongoing.
3. User-activated fan test is ongoing.
4. User-activated battery test is ongoing.

**Description**

Location:


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1. Power supply 1
2. DIU
3. Fan unit
4. Battery unit

**Instructions**

Wait for the test to be performed.

**Cancelling**

Automatically cancelled, when testing has been completed.

## 3.7 126 Unit function degraded

**Severity**

Major

**Fault reason**

1. DIU heating test has failed.
2. Unit heating test has failed.
3. External alarms test has failed. One or more EACs are not working.
4. External control test has failed. One or more control outputs are not working.
5. Fan performance degraded to 80% of normal.
6. Power supply unit has performed the battery test with the result 'Low capacity'.

**Description**

Location:

1. DIU
2. FXC unit
3. DIU EAC input
4. DIU Control output


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5. Fan unit
6. Battery unit

### Instructions

1. Replace the DIU unit and run the test again.
2. Replace the FXC unit.
3. Replace the DIU unit and run the test again.
4. Replace the DIU unit and run the test again.
5. Replace the fan unit.
6. Replace the battery unit and run the test again. If the alarm is still active, change the power supply and run the test again.

### Cancelling

Cancelled automatically, when the test has been executed successfully.

## 3.8 145 Temperature alarm

### Severity

Major

### Fault reason

1. Alarm of exceeded ambient temperature range: <-42°C or >52°C (<-44°F or >126°F).
2. Unit temperature is <-12°C (<10°F).
3. Power supply unit has overheated and will be shut off within one minute. The power cut lasts 5-15 minutes.

### Description

Location:

1. Node temperature control.
2. FXC unit.
3. Power supply.


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### Cancelling

Automatically cancelled, when the temperature is within the valid range.

## 3.9 150 Fault in unit

### Severity

Critical

### Fault reason

Fault in the fan. The speed of the fan is degraded to < 20%.

### Description

Location: Fan unit

Consequence: Cooling of the node does not work.

### Instructions

Remove the fan and possible obstacles. If not applicable, replace the fan with a new one.

### Cancelling

Automatically cancelled when the fan operates correctly.

## 3.10 168 Equipment door open

### Severity

Minor

### Fault reason

Cabinet cover has not been installed correctly.

### Description

Location: Node


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### Instructions

The cover should be closed whenever the transmission node is in normal operation to ensure air flow and environmental protection. The cover moves the "switch" magnet towards the DIU sensor when the cover is installed normally and in the correct position.

### Cancelling

Automatically cancelled.


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# 4 Common alarms for FXC transmission units

## 4.1 21 Loop to interface

**Severity**

Major

**Fault reason**

1. The Flexbus interface loop is set to active. The whole received Flexbus signal is looped back to the OU (or another IU). The IU - OU communication is cut during the loop.
2. The Flexbus channel loop to interface is set to active. The whole received Flexbus channel signal is looped back to the OU (or another IU).
3. The platform interface loop to interface is set to active. The whole received platform signal is looped back to the OU (or another IU) without regenerating time slot 0.
4. The user has activated an interface loop.

**Description**

Location:

1. FXC RRI Flexbus.
2. FXC RRI Flexbus channel.
3. FXC RRI platform interface.
4. FXC E1/T1 interface.

Consequence:


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1. AIS is connected to all received Flexbus channels.
2. AIS is connected to the receiving direction of the looped channel.
3. AIS is connected to the receiving direction of the looped interface.
4. AIS to Rx direction (towards the cross-connection field).

#### Cancelling

Loopbacks are automatically removed, after the control timeout has expired. A loop can also be removed with the manager by setting the interface, channel or Flexbus back to the normal state.

## 4.2 22 Loop to equipment

#### Severity

Major

#### Fault reason

The user has activated an equipment loop. Tx signal of the interface is looped back to the equipment.

#### Description

Location:

1. FXC RRI Flexbus.
2. FXC RRI platform interface.
3. FXC E1/T1 interface.

Consequence:

1. AIS is connected to all transmitted Flexbus channels in the receiving equipment.
2. AIS to Tx direction.
3. AIS to Tx direction.


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### Cancelling

Loopbacks are automatically removed, after the control timeout has expired. A loop can also be removed with the manager by setting the interface or Flexbus back to the normal state.

## 4.3 25 Test generator on

### Severity

Major

### Fault reason

User-activated signal test generator of the unit is active.

### Description

Location: FXC unit

### Cancelling

The alarm is cancelled when the signal test has been completed.

## 4.4 32 Loss of outgoing signal

### Severity

Critical

### Fault reason

During performing a signal test, the received signal was lost, indicating that some unit is not functioning properly.

### Description

Location: FXC unit

### Instructions

Find the broken unit and replace it. The faulty unit can be different to the unit in which the alarm is active. The alarm is activated in the unit where pattern detection is done. After changing the unit, run the test again.


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### Cancelling

The alarm is cancelled when the signal test has been completed.

## 4.5 50 Loss of incoming 2M signal

### Severity

Critical

### Fault reason

Incoming 2M signal is not received.

### Description

Location:

1. FXC RRI platform interface.
2. FXC E1 interface.

Consequence:

FEA alarm (TS0/B3) is generated to the far-end AIS to Rx direction.

### Instructions

1. Replace the unit.
2. Check the interface settings and cabling at both ends.

### Cancelling

Automatically cancelled when the signal is received.

## 4.6 66 AIS 2M

### Severity

Major


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#### Fault reason

Alarm signal is received, but the received signal has no framing and it is all ones.

#### Description

Location:

1. FXC RRI platform interface.
2. FXC E1 interface.

Consequence: FEA alarm (TS0/B3) generated to the far-end.

#### Instructions

The signal is cut somewhere in the network and AIS replacement has taken place. Follow the 2M signal in the network to find the place where AIS replacement has occurred. The link is usually faulty or it has configuration errors. Other alarms may also cause this alarm, because of AIS switching in the receiving direction, as shown in the consequence field of some alarms.

#### Cancelling

Automatically cancelled when AIS no longer received.

## 4.7 81 Loss of frame alignment

#### Severity

Critical

#### Fault reason

The interface does not detect framing from the received signal.

#### Description

Location:

1. FXC RRI Flexbus.
2. FXC RRI platform interface.
3. FXC E1/T1 interface.


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Consequence:

1. AIS is connected to all received Flexbus channels.
2. AIS is connected to the receiving direction of the platform interface. FEA alarm (TS0/B3) is generated to the far-end.
3. FEA alarm is generated to the far-end AIS to Rx direction.

### Instructions

1. Check in the Configuration window that all installed units are present. A faulty outdoor unit may not be present in the view. Try disconnecting the power feed and then connect it back on. If the outdoor unit does not stay present, replace it.
   - Check that the radios are configured correctly (no configuration error or fault in unit alarms). If the receiving level is sufficient, check the following:
     a. Both ends of the hop are set to the same capacity.
     b. Flexbus interfaces are in use.
     c. The outdoor unit's interleaving settings are the same at both ends of the hop.
   - Check with Flexbus loop to equipment that the indoor unit locks to its own signal. If not, replace it.
2. Check in the Cross-connections window that the right signal is connected to this interface at both ends of the hop.
   - Use a platform interface loop to equipment to check that the platform interface locks to its own transmit signal. If not, replace the unit.
   - Use Flexbus loop to equipment and check that the platform interface locks to its own signal. If not, replace the unit.
3. Check the interface and synchronisation settings at both ends. If the settings are correct, replace the unit. Check the Flexbus cable.

### Cancelling

Automatically cancelled, when the frame is received correctly.


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## 4.8 86 Loss of CRC multiframe alignment

**Severity**

Critical

**Fault reason**

Platform interface has lost CRC frame alignment.

**Description**

Location:

1. FXC RRI platform interface.
2. FXC E1 interface.

Consequence:

- AIS is connected to the receiving direction of the platform interface.
- FEA alarm (TS0/B3) generated to the far-end.

**Instructions**

Check that the other end of the link has CRC in use. Use the same instructions as in the *Loss of frame alignment* alarm to locate the fault.

**Cancelling**

Automatically cancelled.

## 4.9 99 Error rate > 1 E-3

**Severity**

Critical

**Fault reason**

Received signal bit error ratio is worse than $1.0 * 10^{-3}$.

If the location is FXC RRI protected hop, both links in the HSB hop have a bit error ratio worse than $1.0 * 10^{-3}$.


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### Description

The bit error ratio is determined by evaluating the CRC checksum and the frame alignment word. As a result, the exact bit error ratio cannot be measured, but rather an approximate value is obtained.

Location:

1. FXC RRI Flexbus
2. FXC RRI platform interface
3. FXC E1/T1 interface
4. FXC RRI protected hop

Consequence:

1. AIS is connected to all received Flexbus channels.
2. FEA alarm (TS0/B3) generated to far-end AIS to Rx direction.
3. FEA alarm (TS0/B3) generated to far-end AIS to Rx direction.
4. AIS is connected to all received Flexbus channels.

### Instructions

1. 'Alarm signal received' also causes this alarm. The signal may be faded in the radio path or the antenna alignment has changed.
2. If the Flexbus, to which this interface has been connected, has the same alarm, see its instructions. If the Flexbus does not have this alarm, use loop to equipment for both the platform interface and the Flexbus. If either one of the loops gives this alarm, replace the unit.
3. Check the cabling between the units.
4. 'Alarm signal received' also causes this alarm. The signal may be faded in the radio path or the antenna alignment has changed.

### Cancelling

1 - 4. Automatically cancelled when the received signal BER is better than $1.0 * 10^{-3}$. If the radio signal is faded, it is restored when the fading stops. If the antenna alignment has changed, align the antennas according to the instructions in the radio documentation.


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## 4.10 102 Error rate > 1 E-6

**Severity**

Major

**Fault reason**

Received signal bit error ratio is worse than $1.0 * 10^{-6}$.

**Description**

The bit error ratio is determined by evaluating the CRC checksum and the frame alignment word. As a result, the exact bit error ratio cannot be measured, but rather an approximate value is obtained.

Location:

1. FXC RRI platform interface.
2. FXC E1/T1 interface.

**Instructions**

Most commonly caused by radio path fading. If it persists for a long time, use loop to equipment for both the platform interface and Flexbus. If either of the loops gives this alarm, replace the unit.

**Cancelling**

Automatically cancelled, when the received signal is without errors.

## 4.11 137 Fault in oscillator

**Severity**

Major

**Fault reason**

Unit oscillator is not working correctly.

**Description**

Location: FXC unit


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#### Instructions

Replace the unit.

---

Note

The 16 MHz oscillator in the master unit is used as the internal clock of the node. If a slave unit raises the alarm there is no immediate need to replace the unit.

---

#### Cancelling

Reset the unit to cancel the alarm.

## 4.12 148 Equipment reset

#### Severity

Warning

#### Fault reason

The unit has started up after power-on or reset.

#### Description

Location: FXC unit

#### Cancelling

Warnings are not cancelled.

## 4.13 150 Fault in unit

#### Severity

Critical

#### Fault reason

Operating voltages +5 V or -5 V have been detected to be out of range.


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### Description

Location: FXC Unit

### Instructions

There is too much variation in unit operating voltages. Problem is caused by bad input voltage, a broken power supply or broken unit. If input voltage is valid, change the power supply or the unit.

### Cancelling

Reset the unit to cancel the alarm.

## 4.14 179 Far-end alarm

### Severity

Major

### Fault reason

Sent by the equipment in the far-end (TS0/B3); indicates a serious fault in the received signal of the far-end equipment.

### Description

Location:

1. FXC RRI platform interface.
2. FXC E1 interface.

### Instructions

Check the signal flow from the transmit direction of the alarming interface to the far-end.

### Cancelling

Automatically cancelled, when FEA not detected from the far-end any longer.


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# 5 Specific alarms for FXC E1/T1 units

## 5.1 56 Loss of incoming 1.5M signal

**Severity**

Critical

**Fault reason**

Proper 1.5M signal is not received.

**Description**

Location: FXC T1 interface

Consequence: Yellow alarm generated to far-end and AIS to Rx direction

**Instructions**

Check the interface cabling.

**Cancelling**

Automatically cancelled, when the signal is received again.

## 5.2 73 AIS 1.5M

**Severity**

Major

**Fault reason**

Alarm signal is received, but the received signal has no framing and it is all ones.


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### Description

Location: FXC T1 interface

Consequence: Yellow alarm (TS0/B3) generated to the far-end and AIS to Rx direction.

### Instructions

The signal is cut somewhere in the network and AIS replacement has taken place. Follow the 1.5M signal in the network to find out the place where AIS replacement has occurred. The link is usually faulty or it has configuration errors. Other alarms may cause this alarm because of AIS switching in the receiving direction as shown in the consequence field of some alarms.

### Cancelling

Automatically cancelled, when the signal is acceptable.

## 5.3 172 Yellow alarm

### Severity

Major

### Fault reason

The yellow alarm is sent by the equipment in the far-end, it indicates a serious fault in the received signal of the far-end equipment.

### Description

Location: FXC T1 interface

### Instructions

Check interface and synchronisation settings at both ends.

### Cancelling

Automatically cancelled.


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# 6 Specific alarms for FXC RRI units

## 6.1 64 Alarm signal received

**Severity**

Major

**Fault reason**

An outdoor unit has lost frame lock and it has replaced the frame with a pseudo-frame to ensure communication between the indoor and outdoor units.

**Description**

Location: FXC RRI Flexbus

Consequence: AIS is connected to all received Flexbus channels. This causes an AIS 2 Mbit/s alarm to all used platform interfaces that are connected to the Flexbus interface, which is causing the alarm.

**Instructions**

The signal may be faded in the radio path. The alarm *No incoming radio signal* is activated in the oudoor unit. If this alarm is not active in the outdoor unit, check the radios at both ends of the hop. They must have the right configuration (frequency, interleaving and Tx power on). Check also that the same capacity has been selected for both ends of the hop.

**Cancelling**

If the radio signal is faded, it recovers when the fading stops. If the oudoor unit is Nokia FlexiHopper (Plus), check the maximum Tx power setting. If a stronger Tx power is allowed, it withstands fading better.


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## 6.2 128 Fault in equipment

### Severity

Major

### Fault reason

Protection is lost and a redundant signal path is in use. Reasons:

1. OU1 transmitter error. Outdoor unit in Flexbus 1 is faulty or not present.
2. OU2 transmitter error. Outdoor unit in Flexbus 2 is faulty or not present.
3. OU1 receiver error. Outdoor unit in Flexbus 1 is not locked to the Rx signal, or it is faulty or not present.
4. OU2 receiver error. Outdoor unit in Flexbus 2 is not locked to the Rx signal, or it is faulty or not present.

### Description

Location: FXC RRI protection lost.

### Instructions

Check the outdoor unit installation. If the configuration is correct and the signal is valid, change the faulty outdoor unit.

### Cancelling

Automatically cancelled, when the protection is in order.

## 6.3 141 Forced control on

### Severity

Critical


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**Fault reason**

1. The user has started Automatic Fading Margin Measurement (AFMM), and AFMM forced control is on. Protection is disabled until AFMM is completed.
2. Forced controls on OU Tx. The user has selected the active transmitter using forced control.
3. Forced controls on OU Rx. The user has selected the active receiver using forced control.

**Description**

Location: FXC RRI operation mode

**Cancelling**

Automatically cancelled, when the measurement has finished.

## 6.4 143 Fault in changeover function

**Severity**

Critical

**Fault reason**

1. OU configuration is incompatible with the protection mode.
2. OU configuration checksum is missing, or incompatible with the OU software. The outdoor unit SW is incompatible with the protection mode or the outdoor unit is faulty.

**Description**

Location: FXC RRI operation mode

**Instructions**

1. Check Tx frequency and interleaving settings.
2. Update the outdoor unit software.

**Cancelling**

Automatically cancelled, when the problem has been corrected.


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# 7 Specific alarms for FXC STM transmission units

## 7.1 124 Synchronisation fault in clock recovery

**Severity**

Major

**Fault reason**

1. A missing synchronisation input clock signal with a priority is present on the synchronisation list.
2. Missing or degraded signals.

**Description**

Location: Synchronisation database

**Instructions**

1. Check the settings of interface 1 and/or 2 under SDH priorities in the Synchronisation dialogue box.
2. Check the signal quality statistics.

**Cancelling**

Not applicable.

## 7.2 125 Loss of synchronization signal(s)

**Severity**

Critical


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#### Fault reason

1. The transmission node is not receiving synchronisation from the interfaces (SNC protection).
2. Missing or degraded signals.

#### Description

Location: Synchronisation database

Consequence: 2M-AIS upstream

#### Instructions

1. Check the settings in the synchronisation dialogue box, or the settings at the other side of the link.
2. Check the signal quality statistics.

#### Cancelling

Not applicable.

## 7.3 126 Unit function degraded

#### Severity

Major

#### Fault reason

A defect in the synchronisation HW has been detected. Synchronisation of the node might be lost or degraded.

#### Description

Location: Synchronisation database

#### Instructions

Replace the unit.

#### Cancelling

Not applicable.


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## 7.4 139 Subrack is missing units

**Severity**

Critical

**Fault reason**

The FXC Bridge is logically installed, but it has been either removed physically or it is broken.

**Description**

Location: Node

**Instructions**

Uninstall the removed unit, plug the removed unit back or replace the broken unit.

**Cancelling**

Not applicable.

## 7.5 140 Subrack has excessive units

**Severity**

Major

**Fault reason**

There are two FXC Bridge or FXC STM-1 units installed.

**Description**

Location: Node

**Instructions**

Remove the extra unit. (Only one FXC Bridge or STM-1 unit can be installed in the same cabinet).

**Cancelling**

Not applicable.


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## 7.6 141 Forced control on

**Severity**

Critical

**Fault reason**

STM interface 1 or 2 was forced to be used as the synchronisation source.

An SNC protection group status is forced to either the protecting or protected path.

**Description**

Location:

Synchronisation database

CC database

**Instructions**

Configure synchronisation to the use priorities mode.

Configure the SNC protection group to the automatic protection switch mode.

**Cancelling**

Not applicable.

## 7.7 152 Fault in block

**Severity**

Critical

**Fault reason**

Fault in the FXC STM-1 unit oscillator, which causes also the *Fault in unit* alarm.

**Description**

Location: Synchronisation database


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#### Instructions

Replace the FXC STM-1 unit.

#### Cancelling

Not applicable.

## 7.8 162 Database full

#### Severity

Warning

#### Fault reason

Fault management event history database is full. New events are not recorded in the database. This happens when the poller (NMS/BSC) is unable to poll the unit and thus clears the alarm history.

#### Instructions

Make sure that polling is working.

#### Cancelling

Warnings are not cancelled.

## 7.9 165 Real time lost fault

#### Severity

Major

#### Fault reason

Real time clock is not set.

#### Description

Location: Node


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#### Instructions

Not applicable, see Cancelling.

#### Cancelling

This alarm is cancelled automatically within 24 hours because the FXC STM node gets an RTC update periodically.

---

Note

Automatic cancelling only occurs if FXC STM is connected to the NMS.

---

## 7.10 184 Real time updated

#### Severity

Warning

#### Fault reason

Real time clock (RTC) time difference between the node (internal) and poller (network). The difference was over 1 s and the RTC has been automatically updated.

#### Description

Location: Node

#### Instructions

Not applicable.

#### Cancelling

Warnings are not cancelled.


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## 7.11 207 Calibration expired

**Severity**

Warning

**Fault reason**

The SDH node clock was last calibrated one year ago.

**Instructions**

Recalibrate the SDH node clock in the synchronisation window. Check the current synchronisation status before calibration to avoid calibration to a low quality synchronisation source.

**Cancelling**

Warnings are not cancelled.

## 7.12 221 Version mismatch

**Severity**

Critical

**Fault reason**

At least one unit in the subrack is not compatible with the FXC STM-1 unit.

**Description**

Location: Node

**Instructions**

Check the SW versions of the units and upgrade them to the wanted level, starting first with the PDH DNCU and the PDH DNAU units and then continue with FXC STM-1 and the FXC Bridge SDH SW.

**Cancelling**

Automatically cancelled when all units are compatible with the master unit.


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## 7.13 223 Protection switch

### Severity

Warning

### Fault reason

Protection switch of the STM interfaces (SNC-protection) caused by:

1. the connector, the cable, or the link.
2. a fault somewhere in the network (only some of the VC-12s are cut).

### Description

Location: CC database

### Instructions

1. Check the connector, the fibre, and the link.
2. Check the signal quality statistics.

### Cancelling

Warnings are not cancelled.


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# 8 Specific alarms for FXC STM-1

## 8.1 148 Equipment reset

**Severity**

Warning

**Fault reason**

The unit is starting up again after a power-on or reset.

**Description**

Location: unit

**Instructions**

The unit restarts automatically after power-on or reset.

**Cancelling**

Not applicable.

## 8.2 149 Forced indication

**Severity**

Warning

**Fault reason**

LED is forced on or off.


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**Description**

Location: LED

**Instructions**

Set the LED to normal state in the FXC STM-1 Manager's Forced indications dialogue box.

**Cancelling**

The forced state is automatically cancelled, after control timeout.

## 8.3 150 Fault in unit

**Severity**

Critical

**Fault reason**

Frame alignment hardware fault detected in the unit.

**Description**

Location: Unit

**Instructions**

Remove the unit and replace it with new one.

**Cancelling**

Not applicable.

## 8.4 162 Database full

**Severity**

Warning


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### Fault reason

Fault management event history database is full. New events are not recorded in the database. This happens when the poller (NMS/BSC) is unable to poll the unit and clears the alarm history.

### Description

Location: Event history

### Instructions

Check that polling is working.

### Cancelling

Not applicable.


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# 9 Specific alarms for FXC STM-1 Interface x

## 9.1 23 Test mode active

**Severity**

Major

**Fault reason**

Laser control state is changed to test shutdown for the period of the control timeout.

**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: OS

Consequence: Transmit laser is off.

**Instructions**

The laser switches back on automatically after a control timeout.

**Cancelling**

Not applicable.


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## 9.2 48 Loss of incoming signal

**Severity**

Critical

**Fault reason**

Optical input power level is too low.

**Description**

Location: OS

Consequence: MS-RDI upstream

TU AIS for pass through TU12s and 2M AIS for dropped TU12s downstream.

**Instructions**

- Check if the fibre is connected to the optical connector of the FXC STM unit.
- Check if there is a cut or physical damage on the fibre at some point of the fibre link.
- Check that the far-end of the fibre is connected and the far-end device is operational and sending a signal.
- Check if the attenuation of the fibre is too high. High attenuation is caused by long distances (>40 km), splices, or fibre adapters.

**Cancelling**

This alarm is cancelled when a signal is received again (input power level above minimum receive sensitivity of -34 dBm).

## 9.3 57 Loss of pointer

**Severity**

Critical

**Fault reason**

The AU-4 pointer was not found.


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### Description

Location: MS/S4

Consequence: S4-RDI upstream

TU AIS for pass through TU12s and 2M AIS for dropped TU12s downstream.

### Instructions

Check for the correct synchronisation of the signal.

### Cancelling

This alarm is cancelled as soon as a valid pointer is detected.

## 9.4 59 Incoming signal level incorrect

### Severity

Critical

### Fault reason

The received power level has dropped to –30dB or below.

### Description

Location: OS

### Instructions

Check if it is expected that the receive level is –30dB or low. Loss of signal occurs at about –35dB. If the low signal level is as planned and expected, this alarm should be inhibited. If the low receive level is unexpected, check whether the attenuation of the fibre is too high. High attenuation is caused by long distances (>40 km), splices, or fibre adapters.

Check whether there is dirt or damage on one of the fibre connector tips. Check the correct fit of the fibre connectors.

### Cancelling

The alarm is cancelled if the receive level is –29dB or higher.


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# 9.5 64 Alarm signal is received

**Severity**

Major

**Fault reason**

1. MS-AIS inserted.
2. AU-AIS inserted.

**Description**

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location:

1. MS
2. MS/S4

Consequence:

1. MS-RDI upstream
2. S4-RDI upstream

TU AIS for pass through TU12s and 2M AIS for dropped TU12s downstream.

**Instructions**

Check the whole MS signal path to find the reason behind the alarm.

**Cancelling**

Not applicable.


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## 9.6 81 Loss of frame alignment

**Severity**

Critical

**Fault reason**

Frame alignment word of STM signal not found.

**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: OS/RS

Consequence: MS-RDI upstream

TU AIS for pass through TU12s and 2M AIS for dropped TU12s downstream.

**Instructions**

This alarm is either caused by bad quality of the STM signal, or due to the fact that the device at the far-end is not sending an STM-1 signal at all.

- Check for correct synchronisation of the signal.
- Check if the wrong type of fibre is in use (FXC STM L.1.1 laser is defined for type G.652 fibre).
- Check if the far-end device is not sending an STM-1 frame at all.
- Check if there is dirt or damage on one of the fibre connector tips.
- Check if the attenuation of the fibre is too high. High attenuation is caused by long distances (>40 km), splices, or fibre adapters.

**Cancelling**

The alarm is cancelled when the frame alignment of the STM signal is detected again.


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## 9.7 141 Forced control on

**Severity**

Critical

**Fault reason**

1. The laser is forced on.

**Description**

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: OS

Consequence: Transmit laser is on, even under ALS or Transmitter Fail (TF) conditions.

**Instructions**

Set the laser control state back to on.

**Cancelling**

Not applicable.

## 9.8 153 Fault in transmitter

**Severity**

Critical

**Fault reason**

Monitored transmit power is lower than -7 dBm or higher than +3 dBm from the Begin of Life value.


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**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: OS

Consequence: Corresponding optical transmitter is switched off.

**Instructions**

Replace the unit.

**Cancelling**

Not applicable.

## 9.9 156 Laser power out of range

**Severity**

Critical

**Fault reason**

Monitored transmit power is lower than -3 dBm or higher than +3 dBm from Begin of Life value.

**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: OS


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#### Instructions

The lifetime of the laser is nearing its end or the power has dropped due to a laser failure. Replace the unit when performing the next maintenance activities. The laser will not be shut down.

---

Note

The current estimated lifetime of the laser transceiver is about 300 years. In normal operation this alarm only occurs due to a faulty laser.

---

#### Cancelling

Not applicable.

## 9.10 158 Forced laser cut off

#### Severity

Critical

#### Fault reason

The user has changed the laser control state to Forced off.

#### Description

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: OS

Consequence: Transmit laser is off.

#### Instructions

Set the laser control state back to on.


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#### Cancelling

Not applicable.

## 9.11 162 Database full

#### Severity

Warning

#### Fault reason

Fault management event history database is full. New events are not recorded in the database. This happens when the poller (NMS/BSC) is unable to poll the unit and clears the alarm history.

#### Description

Location: Event history

#### Instructions

Make sure that polling is working.

#### Cancelling

Not applicable.

## 9.12 213 Remote Defect Indication (RDI)

#### Severity

Major

#### Fault reason

The far-end device generating the MS overhead has detected a defect on the received signal from FXC STM direction (such as loss of signal or loss of frame alignment) and it has inserted MS-RDI bit in direction to FXC STM.

#### Description

Location: MS


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### Instructions

Check for open alarms at the far-end device and remove the cause of the alarms.

### Cancelling

MS-RDI is cancelled at the far-end device, which is generating the MS overhead.

## 9.13 214 Signal degraded

### Severity

Major

### Fault reason

The threshold for signal degraded was crossed based on BIP-24 in MSOH B2 bytes.

### Description

Location: MS

### Instructions

This alarm is caused by bad quality of the STM signal.

- Check if a wrong type of fibre is in use (FXC STM L.1.1 laser is defined for type G.652 fibre).
- Check if there is dirt or damage on one of the fibre connector tips.
- Check if the attenuation of the fibre is too high. High attenuation is caused by long distances (>40 km), splices, or fibre adapters.

### Cancelling

The alarm is cancelled when the number of bit errors falls below the threshold specified in ETSI/ITU standard for the signal degraded alarm.


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## 9.14 215 Trace identifier mismatch

**Severity**

Critical

**Fault reason**

Received RS-TTI and Expected RS-TTI do not match. (Mismatch monitoring for RS needs to be activated to receive this alarm.)

**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: RS

Consequence: MS-RDI upstream

TU AIS for pass through TU12s and 2M AIS for dropped TU12s downstream.

**Instructions**

- Check if the correct device is connected at the far-end of the fibre.
- Check if the device at the far-end of the fibre link inserts the transmitted TTI as expected by FXC STM.
- Check if the expected TTI string is configured correctly to the FXC STM device.

**Cancelling**

The alarm is cancelled when the expected TTI matches the received TTI, or when mismatch monitoring is disabled.


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# 10 Specific alarms for FXC STM-1 Interface S4 x

## 10.1 47 Payload mismatch

**Severity**

Critical

**Fault reason**

Received and expected VC-4 path labels do not match (0x02 TUG structure).

**Description**

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: S4/TUG

Consequence: TUG-AIS downstream.

**Instructions**

Check if the correct signal structure is inserted at the far-end of the VC-4 path. FXC STM supports only TUG structure.

**Cancelling**

The alarm is cancelled when TUG structure is received as the path label.


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## 10.2 57 Loss of pointer

**Severity**

Critical

**Fault reason**

TU-Pointer is not found.

**Description**

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: TU12_K.L.M

K.L.M specifies one of the 63 TU-12s within the STM-1 signal according to EN 300 417-1-1 (for example, TU12_3.7.3).

Consequence: TU12-AIS downstream.

**Instructions**

Check the synchronisation of FXC STM and the SDH network. Check if VC-4 contains TUG structure.

**Cancelling**

The alarm is cancelled when the pointer is detected again.

## 10.3 64 Alarm signal is received

**Severity**

Major

**Fault reason**

TU-AIS is inserted.


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**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: TU12_K.L.M

K.L.M specifies one of the 63 TU-12s within the STM-1 signal according to EN 300 417-1-1 (for example, TU12_3.7.3).

**Instructions**

TU-AIS was received as a consequent action of a defect in the TU-12 path. Check TU-12 path for defects.

**Cancelling**

The alarm is cancelled when the reason behind TU-AIS insertion at the far-end is removed.

## 10.4 82 Loss of multiframe alignment

**Severity**

Critical

**Fault reason**

TU-Multiframe in H4 byte is not found.

**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: S4/TUG


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Consequence: TU AIS for pass through TU12s and 2M AIS for dropped TU12s downstream.

#### Instructions

Check if the VC-4 contains TUG structure.

#### Cancelling

Not applicable.

## 10.5 162 Database full

#### Severity

Warning

#### Fault reason

Fault management event history database is full. New events are not recorded in the database. This happens when the poller (NMS/BSC) is unable to poll the unit and clears the alarm history.

#### Description

Location: Event history

#### Instructions

Make sure that polling is working.

#### Cancelling

Not applicable.

## 10.6 213 Remote Defect Indication (RDI)

#### Severity

Major

#### Fault reason

S4-RDI bit is set.


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**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: S4

**Instructions**

The far-end device generating the VC-4 has detected a defect on the received signal from FXC STM direction and it has inserted S4-RDI in direction to FXC STM. Check for open alarms at the far-end device and remove the reason behind the alarms.

**Cancelling**

The alarm is cancelled when the RDI bit is no longer received from the far-end.

## 10.7 214 Signal degraded

**Severity**

Major

**Fault reason**

The number of block errors indicated by the B3 byte has crossed the threshold for the signal degraded alarm.

**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location: S4


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### Instructions

Check the quality of the whole VC-4 path to determine the source of the bit errors and remove the source of the errors.

### Cancelling

The alarm is cancelled when the number of block errors falls below the threshold specified in ETSI/ITU standard for the signal degraded alarm.

## 10.8 215 Trace identifier mismatch

### Severity

Critical

### Fault reason

Received VC-4 path label is 0x00 (C2 byte).

### Description

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: S4

Consequence: S4-RDI upstream.

TU AIS for pass through TU12s and 2M AIS for dropped TU12s downstream.

### Instructions

The source of the VC-4 path signal is out of service, or the VC-4 was not cross-connected correctly in an intermediate node along the VC-4 path. Check the far-end device, which should generate the VC-4 and intermediate nodes for correct cross-connection settings.


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### Cancelling

The alarm is cancelled when the expected TTI matches the received TTI or when mismatch monitoring is disabled.

## 10.9 216 Unequipped signal

### Severity

Critical

### Fault reason

Received VC-4 path label is 0x00.

### Description

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: S4

### Instructions

The source of the VC-4 path signals are out of service. There is no content inserted to the VC-4 at the far-end VC-4 path.

### Cancelling

The alarm is cancelled when the content is inserted into the VC-4 path at the far-end.


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# 11 Specific alarms for FXC Bridge PDH

## 11.1 22 Loop to equipment

**Severity**

Major

**Fault reason**

2M signal coming back from the backplane bus (D-bus or cross-connection bus), it is looped back to the backplane.

**Description**

Location: FXC Bridge; C12/D-bus.

**Instructions**

The loop is disabled after the control timeout period expires.

**Cancelling**

Not applicable.

## 11.2 32 Loss of outgoing signal

**Severity**

Critical

**Fault reason**

The test signal used during a cross-connection test has been lost.


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**Description**

Location: FXC Bridge Unit

**Instructions**

Alarm is active as long as the test is ongoing.

**Cancelling**

The alarm is automatically cancelled after the test has been completed.

## 11.3 126 Unit function degraded

**Severity**

Major

**Fault reason**

The heating test of the unit failed.

**Description**

Location: FXC Bridge Unit

**Instructions**

See cancelling.

**Cancelling**

The alarm is automatically cancelled, after the test has been completed.

## 11.4 139 Subrack is missing a unit

**Severity**

Critical

**Fault reason**

The FXC STM-1 unit is not present, it might be broken or not logically installed.


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#### Description

Location: FXC Bridge; SPI link

#### Instructions

Check if an FXC STM-1 unit is present in one of the transmission slots of the subrack. Check that the unit is logically installed. Replace the unit if it is broken.

#### Cancelling

Not applicable.

## 11.5 145 Temperature error

#### Severity

Major

#### Fault reason

The temperature measured directly at the unit (within the mechanical housing) is below -12°C (10°F).

#### Description

Location: FXC Bridge unit.

#### Instructions

Check if the temperature outdoors is below -40°C (-40°F). Performing a heating test to check if the heating layer on the FXC Bridge unit is working correctly.

#### Cancelling

The alarm is cancelled when the temperature measured at the FXC Bridge unit is above -12°C (10°F).

## 11.6 221 Version mismatch

#### Severity

Critical


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### Fault reason

The node contains units that are not compatible. This is generated when there are FXC E1 T1 or RRI units in the node that are not compatible with STM units.

### Description

Location: Unit

### Instructions

Check the SW versions of the units and upgrade them to the wanted level, starting first with the PDH DNCU and the PDH DNAU units and then continue with FXC STM-1 and the FXC Bridge SDH SW.

### Cancelling

Automatically cancelled when all units are compatible with the master unit.


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# 12 Specific alarms for FXC Bridge SDH

## 12.1 22 Loop to equipment

**Severity**

Major

**Fault reason**

2M signal coming from SDH is looped back to SDH.

**Description**

Location: PDH channel y

Consequence: 2M-AIS downstream

**Instructions**

The loop is disabled after the control timeout period expires.

**Cancelling**

Not applicable.

## 12.2 47 Payload mismatch

**Severity**

Critical

**Fault reason**

Received VC-12 path label and expected VC-12 path label do not match.


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### Description

Location: SDH channel y

Consequence: S12-RDI upstream and 2M-AIS downstream.

### Instructions

Check if the correct signal structure is mapped at the far-end of the VC-12 path. FXC STM supports both byte synchronous (2048 kbit/s) and asynchronous mapping.

### Cancelling

The alarm is cancelled when a supported signal structure is mapped at the far-end of the VC-12 path.

## 12.3 64 Alarm signal is received

### Severity

Major

### Fault reason

2M AIS is received.

### Description

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: PDH channel y

Consequence: A bit stream upstream and 2M-AIS downstream.

### Instructions

2M AIS was received as a consequent action of a defect at the far-end of the 2M signal. Check the source of the 2M signal for defects.


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#### Cancelling

The alarm is cancelled when the reason behind 2M AIS insertion at the far-end is removed.

## 12.4 81 Loss of frame alignment

#### Severity

Critical

#### Fault reason

Frame alignment is missing.

#### Description

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: PDH channel y

Consequence: A-Bit set upstream and 2M-AIS downstream.

#### Instructions

FXC STM could not detect the frame alignment of the 2M signal. Check if the device generating the 2M signal generates the same frame format as FXC STM. This can be either double frame without CRC-4 or multiframe with CRC-4.

#### Cancelling

The alarm is cancelled when the frame alignment is detected again.

## 12.5 96 Excessive error rate

#### Severity

Critical


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**Fault reason**

Frame alignment word error rate is high.

**Description**

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: PDH channel y

Consequence: A-Bit set upstream and 2M-AIS downstream.

**Instructions**

The number of errored basic frame alignment words has crossed the threshold for this alarm. Check the quality of the whole path of the 2M signal to find the source of the bit errors and remove it.

**Cancelling**

The alarm is cancelled when the number of errored frame alignment words falls below the threshold of this alarm.

## 12.6 148 Equipment reset

**Severity**

Warning

**Fault reason**

The unit is starting up again after a power-on or reset.

**Description**

Location: Unit

**Instructions**

The unit restarts automatically after power-on or reset.


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#### Cancelling

Warnings are not cancelled.

## 12.7 162 Database full

#### Severity

Warning

#### Fault reason

Fault management event history database is full. New events are not recorded into the database. This happens when the poller (NMS/BSC) is unable to poll the unit and clears the alarm history.

#### Description

Location: Event history

#### Instructions

Make sure that polling is working.

#### Cancelling

Not applicable.

## 12.8 213 Remote defect indication (RDI)

#### Severity

Major

#### Fault reason

1. S12 RDI bit is set.
2. A-Bit is set.

#### Description

Note


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This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location:

1. SDH channel y.
2. PDH channel y.

**Instructions**

The far-end device generating the VC-12 has detected a defect on the receive signal from FXC STM direction and it has inserted S12-RDI in direction to FXC STM. Check for open alarms at the far-end device and remove the cause of the alarms.

**Cancelling**

The alarm is cancelled when the RDI bit is no longer received from the far-end.

## 12.9 214 Signal degraded

**Severity**

Major

**Fault reason**

The number of block errors indicated by the V5 byte has crossed the threshold for the signal degraded alarm.

**Description**

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

Location:


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1. SDH channel y.
2. PDH channel y.

**Instructions**

Check the quality of the whole VC-12 path to find the source of the bit errors and remove the source of the errors.

**Cancelling**

The alarm is cancelled when the number of bit errors falls below the alarm threshold.

## 12.10 215 Trace identifier mismatch

**Severity**

Critical

**Fault reason**

The expected SDH-PDH channel TTI and the received TTI do not match. Mismatch monitoring for the channel needs to be activated to receive this alarm.

**Description**

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: SDH channel y

Consequence: S12-RDI upstream and TU12-AIS downstream.

**Instructions**

Not applicable.

**Cancelling**

Not applicable.


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## 12.11 216 Unequipped signal

### Severity

Critical

### Fault reason

Received VC-12 path label is 0x00.

### Description

---

Note

This alarm is masked if alarm monitoring for the STM-1 interface x is off.

---

Location: SDH channel y.

Consequence: S12-RDI upstream and TU12-AIS downstream.

### Instructions

The source of the VC-12 path signals is out of service, or the VC-12 was not cross-connected correctly in an intermediate node along the VC-12 path. Check if the VC-12 at the far-end is cross-connected to the correct VC-4 and check the location at the far-end.

### Cancelling

The alarm is cancelled when the VC-12 path is taken into service at the far-end again.


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# 13 Common alarms for Nokia Hopper family products

## 13.1 128 Fault in equipment

**Severity**

Major

**Fault reason**

File system error

**Description**

Location: SW setup

**Instructions**

Replace the unit.

**Cancelling**

Not applicable.

## 13.2 142 Fault in installation of equipment

**Severity**

Critical

**Fault reason**

Compatibility problem with a fixed hardware module.


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1. MetroHopper RADIO product code or version
2. FlexiHopper PSU product code or version
3. FlexiHopper MODEM product code or version
4. FlexiHopper IFU product code or version

**Description**

Location: HW setup

**Instructions**

Fill in the correct information. Contact your local Nokia help desk.

**Cancelling**

Not applicable.

## 13.3 148 Equipment reset

**Severity**

Warning

**Fault reason**

Unit is starting up after power-on or reset.

**Description**

Location: HW setup

**Cancelling**

Warnings are not cancelled.

## 13.4 162 Database full

**Severity**

Warning


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**Fault reason**

Overflow in event history

**Description**

Location: FM event history

**Instructions**

The polling element automatically resets the alarm history in the units when it is full.

**Cancelling**

Warnings are not cancelled.

## 13.5 165 Real time lost fault

**Severity**

Major

**Fault reason**

Real time clock not set after reset

**Description**

Location: Real time clock (RTC)

**Instructions**

The polling device sets the real time clock automatically, when it is available.

**Cancelling**

Cancelled when RTC is set.

## 13.6 184 Real time updated

**Severity**

Warning


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**Fault reason**

Real time clock time difference has been over 5 seconds and it has been automatically updated.

**Description**

Location: Real time clock (RTC)

**Cancelling**

Warnings are not cancelled.

## 13.7 185 Connection or settings have changed

**Severity**

Warning

**Fault reason**

The user has changed the unit alarm settings or Q1 identifications.

**Description**

Location:

1. FM setup
2. Identifications

**Cancelling**

Warnings are not cancelled.

## 13.8 186 Configuration error

**Severity**

Minor

**Fault reason**

One or more of the following identifications are missing:


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1. FE type string
2. FE product code string
3. FE product version string
4. FE serial number string
5. FE user's manual product code string
6. FE user's manual product version string

**Description**

Location:

1. Identifications
2. SW setup

**Instructions**

Fill in the missing information. Contact your local Nokia help desk.

**Cancelling**

Block the alarm manually.


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# 14 Specific alarms for Nokia FlexiHopper (Plus) outdoor units

## 14.1 0 Fault in power supply

**Severity**

Critical

**Fault reason**

1. +3.3 V supply voltage is out of range
2. +5.25 V supply voltage is out of range
3. +27.5 V supply voltage is out of range
4. +6.5 V supply voltage is out of range
5. -5.0 V supply voltage is out of range

**Description**

Location: Radio interface

**Instructions**

The outdoor unit is faulty. Replace the faulty outdoor unit and send it to the manufacturer.

**Cancelling**

Not applicable.


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## 14.2 21 Loop to interface

**Severity**

Major

**Fault reason**

Far-end loopback is on.

**Description**

Location: Radio interface

**Instructions**

Wait for the control timeout to expire or restart the outdoor unit. The control timeout can be defined by the user.

**Cancelling**

Cancelled when the loop is removed.

## 14.3 22 Loop to equipment

**Severity**

Major

**Fault reason**

Near-end loopback is active.

**Description**

Location: Radio interface

**Instructions**

Cancel the loopback.

**Cancelling**

Cancelled when the loop is removed.


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## 14.4 23 Test mode active

**Severity**

Major

**Fault reason**

Location: SW setup

**Description**

Fault code: 23

Alarm explanation: The unit is operating in the factory test mode. This mode should not be visible to customers.

**Instructions**

N/A

**Cancelling**

N/A

## 14.5 45 No outgoing radio signal

**Severity**

Critical

**Fault reason**

1. Transmit power has been set off.
2. Transmit frequency setting is missing.
3. Transmitter framelock is lost.
4. MW phaselock is lost.

**Description**

Location: Radio interface


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### Instructions

1. Set the TX power on.
2. Set the TX frequency.
3. In normal operation this alarm is activated when changing the capacity. It is automatically cancelled when the capacity has been successfully changed. If the alarm persists, the connection to the outdoor unit has been lost (the outdoor unit is faulty). Replace the faulty outdoor unit and send it to the manufacturer.
4. Set the TX frequency. If this does not help, the outdoor unit is faulty. Replace the faulty outdoor unit and send it to the manufacturer.

### Cancelling

Not applicable.

## 14.6 59 Incoming signal level incorrect

### Severity

Critical

### Fault reason

Received signal level is below the alarm limit. Check the following:

1. Tx power level at the far-end.
2. Antenna misalignment at the near-end or far-end.
3. Hop distance is too long or line-of-sight has been obstructed.
4. Weather conditions, such as heavy rain.

### Description

Location: Radio interface

### Instructions

Check the far-end settings. Check the installation and the alignment.


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### Cancelling

This alarm can be cancelled manually after commissioning or after FMM (Fading Margin Measurement).

## 14.7 60 No incoming radio signal

### Severity

Critical

### Fault reason

1. Rx framelock is lost
2. MW phaselock is lost
3. IF phaselock is lost.

### Description

Location: Radio interface

### Instructions

1. If the signal level is sufficient, check that the capacity and Tx frequency are correct.
2. Set the Tx frequency. If this does not help, the outdoor unit is faulty. Replace the faulty outdoor unit and send it to the manufacturer.
3. The outdoor unit is faulty. Replace the faulty outdoor unit and send it to the manufacturer.

### Cancelling

Not applicable.

## 14.8 96 Excessive error rate

### Severity

Critical


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#### Fault reason

Bit error rate is higher than the limit defined by the user. The default value for the limit is BER $=10^{-6}$.

#### Description

Location: Radio interface

#### Instructions

1. Change the alarm limit.
2. Check that the interleaving setting is the same as in the far-end radio.
3. Check that the Rx signal level is sufficient.

#### Cancelling

Not applicable.

## 14.9 141 Forced control on

#### Severity

Critical

#### Fault reason

1. Fading margin measurement is ongoing.
2. Transmit power has been set off.

#### Description

Location: Radio interface

#### Instructions

1. Wait until the fading margin measurement has finished.
2. Set the Tx power on.

#### Cancelling

Not applicable.


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## 14.10 150 Fault in unit

**Severity**

Critical

**Fault reason**

1. Temperature is out of range
2. MWU power amplifier voltage is out of range
3. MWU medium power amplifier voltage is out of range
4. IF-PLL database is missing
5. Subband conflict between modem and MWU
6. Intermediate frequency conflict between IFU and MWU
7. Incorrect duplex frequency for subband
8. Band database is missing
9. Band database line is missing.

**Description**

Location: Radio interface

**Instructions**

1. Verify that the outside temperature is within the range defined in the technical specifications.

2 - 9. The outdoor unit is faulty. Replace the faulty oudoor unit and send it to the manufacturer.

**Cancelling**

Not applicable.

## 14.11 179 Far-end alarm

**Severity**

Major


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#### Fault reason

1. Loop to equipment loopback is set in the far-end outdoor unit.
2. Loop to interface loopback is set in the far-end outdoor unit.

#### Description

Location: Radio interface

#### Instructions

1. Cancel the loopback at the far-end.
2. Wait for the control timeout to expire at the far-end or restart the far-end outdoor unit. The far-end control timeout can be defined by the user.

#### Cancelling

Not applicable.

## 14.12 267 Licence expired

#### Severity

Critical

#### Fault reason

*SB:* SW setup

#### Description

*Fault code:* 267

*Alarm explanation:* The feature's short-term licence has expired.

#### Instructions

Obtain a new licence file for this feature or turn off the feature.

#### Cancelling

The alarm is cancelled when a new licence has been installed or the feature is no longer in use.


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## 14.13 268 Licence will expire in near future

**Severity**

Major

**Fault reason**

*SB:* SW setup

**Description**

*Fault code:* 268

*Alarm explanation:* The time limited licence for the feature will expire in the near future.

**Instructions**

Obtain a new licence file for this feature or turn off the feature before the expiry time.

**Cancelling**

The alarm is cancelled when a new licence has been installed or the feature is no longer in use.

## 14.14 269 Licence for feature is not available

**Severity**

Critical

**Fault reason**

*SB:* SW setup

**Description**

*Fault code:* 269

*Alarm explanation:* A license for the enabled feature is not available. The feature was most likely activated from a configuration backup during a unit replacement and the replacement unit does not contain a licence.


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### Instructions

Obtain a new licence file for this feature or turn off the feature.

### Cancelling

The alarm is cancelled when a new licence has been installed or the feature is no longer in use.


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# 15 Specific alarms for Nokia MetroHopper outdoor units

## 15.1 0 Fault in power supply

**Severity**

Critical

**Fault reason**

One (or more) of the supply voltages is low (difference between nominal and real voltage is bigger than 10%).

**Description**

Location: Radio interface

**Instructions**

Replace the unit and return the faulty unit to the manufacturer.

**Cancelling**

Not applicable.

## 15.2 21 Loop to interface

**Severity**

Major

**Fault reason**

Cable interface loopback is on.


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**Description**

Location: Radio interface

**Instructions**

Wait for the control timeout to expire or restart the outdoor unit. The control timeout can be defined by the user.

**Cancelling**

Cancelled when the loop is removed.

## 15.3 22 Loop to equipment

**Severity**

Major

**Fault reason**

Burst loopback is on.

**Description**

Location: Radio interface

**Cancelling**

Cancelled when the loop is removed.

## 15.4 45 No outgoing radio signal

**Severity**

Critical

**Fault reason**

No outgoing radio signal because:


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1. RX only mode is activated.
2. The radio link has not been commissioned.
3. Commission failed because there was no free channel available.

**Description**

Location: Radio interface

**Cancelling**

Not applicable.

## 15.5 59 Incoming signal level incorrect

**Severity**

Critical

**Fault reason**

The received signal level is below limit (-75 dBm). Possible reasons:

1. Far-end transmitter off
2. Misalignment
3. Hop distance too long or line-of-sight obstructed
4. Heavy rain

**Description**

Location: Radio interface

**Instructions**

Check the far-end settings. Check the installation and alignment.

**Cancelling**

Not applicable.


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## 15.6 60 Loss of incoming radio signal

**Severity**

Critical

**Fault reason**

Frame alignment word lock lost. Signal level too low or no far-end radio present. Possible hardware fault in the near-end radio

**Description**

Location: Radio interface

**Instructions**

Check the far-end radio, alignment and/or the radio path. Return faulty units to the manufacturer.

**Cancelling**

Not applicable.

## 15.7 145 Temperature alarm

**Severity**

Major

**Fault reason**

Location: Radio Interface

**Description**

Fault code: 145

Alarm explanation: Operating temperature below –45 °C or above +80 °C.

**Instructions**

MetroHopper may not be within guaranteed performance values.


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#### Cancelling

The alarm is cancelled when operating temperature is between –45 °C – +80 °C.

## 15.8 150 Fault in unit

#### Severity

Critical

#### Fault reason

1. Initialisation fault: data is missing in the EEPROM or in the file system.
2. The EEPROM is not readable due to a hardware fault or the EEPROM is not initialised properly.

#### Description

Location: Radio interface

#### Instructions

Fill in the missing information. Contact your local Nokia help desk.

#### Cancelling

Not applicable.

## 15.9 179 Far-end alarm

#### Severity

Major

#### Fault reason

1. Loop to equipment loopback is set in the far-end outdoor unit.
2. Loop to interface loopback is set in the far-end outdoor unit.

#### Description

Location: Radio interface


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### Instructions

1. Cancel the loopback at the far-end.
2. Wait for the control timeout to expire at the far-end. The far-end control timeout can be defined by the user.

### Cancelling

Not applicable.

## 15.10 222 Corrupt data

### Severity

Critical

### Fault reason

Microwave unit type initialisation failure.

### Description

Location: Radio interface

### Instructions

Replace the unit and return the faulty unit to the manufacturer.

### Cancelling

Not applicable.


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# 16 LEDs for Nokia MetroHub

## 16.1 Overview of LEDs for Nokia MetroHub

In addition to the alarms that a network element can produce, most units also have a three-colour LED indicator. These indicators display the current state of the equipment as a quick on-site reference.

For more information on LEDs, see the following:

- *Power supply unit LED*
- *Fan unit LED*
- *Interface unit (DIUx) LED*
- *Transmission unit LEDs*
- *Flexbus DC LEDs on FXC RRI*

## 16.2 Power supply unit LEDs for Nokia MetroHub

| LED | Situation |
|---|---|
| Steady GREEN | In service, output voltages are acceptable. |
| Flashing YELLOW | ON/standby switch in stand-by position, input voltage is acceptable. |
| Steady YELLOW | MetroHub in cold start state, only heating/over-heat case/remote shut-down. |
| Steady RED | Fault, output voltage(s) is not acceptable. |


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## 16.3 Fan unit LEDs for Nokia MetroHub

| LED | Situation |
|---|---|
| Steady GREEN | In service |
| Steady YELLOW | No control from management bus |
| Steady RED | Fault |
| Flashing RED | Unit operation degraded |

## 16.4 Interface unit (DIUx) LEDs for Nokia MetroHub

| LED | Situation |
|---|---|
| Steady GREEN | In service |
| Steady YELLOW | External alarm on or cabinet cover open |
| Steady RED | Fault |

## 16.5 Transmission unit LEDs

| Indicator | Static | Slow flashing | Fast flashing |
|---|---|---|---|
| GREEN | Power is on and the operation is error free. | Upon master's command[1]; no alarms active. | Software is downloading to the unit. |
| YELLOW | A major or minor alarm is active. | Upon master's command; major or minor alarm(s) active. | Software is downloading to the unit. |
| RED | A critical alarm is active. | Upon master's command; critical alarms active. | Software is downloading to the unit. |

[1]When the Q1 master unit sends the functional entity indication command.


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## 16.6 Flexbus DC LEDs on the FXC RRI transmission unit

| LED | Situation |
|---|---|
| No light | No power feed or Tx signal. |
| Flashing GREEN | DC power feed to the outdoor unit is active, Tx signal is not active. |
| Steady GREEN | DC power feed to the outdoor unit and Tx signal is active. |


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