

**Agenda Item:** 11  
**Source:** Ericsson  
**Title:** Node B Measurement Concept  
**Document for:**

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## 1 INTRODUCTION

There are several measurements the Node B has to perform and report as input to different radio network functions in the UTRAN. As a standardized Iub interface will make it possible to mix equipment from different manufacturers, there is a need to handle measurements performed in Node B in a general and well-defined way. Naturally, the control and reporting of these measurements have to be standardized within the TSG RAN group.

We propose a general measurement procedure to be applied on the NBAP protocol. This gives the opportunity for a RNC to request and collect information in a specific Node B. The measurements are not tightly coupled to a specific radio network function, but instead classified into different types that are characterized of what the Node B shall measure.

By defining the Node B measurements in this general way, we get a standardized and well defined way to handle different measurements making it possible for operators to mix equipment from different vendors. Also, as the measurement in itself is not tightly connected to a specific function, we get a powerful tool for network optimization and supervision.

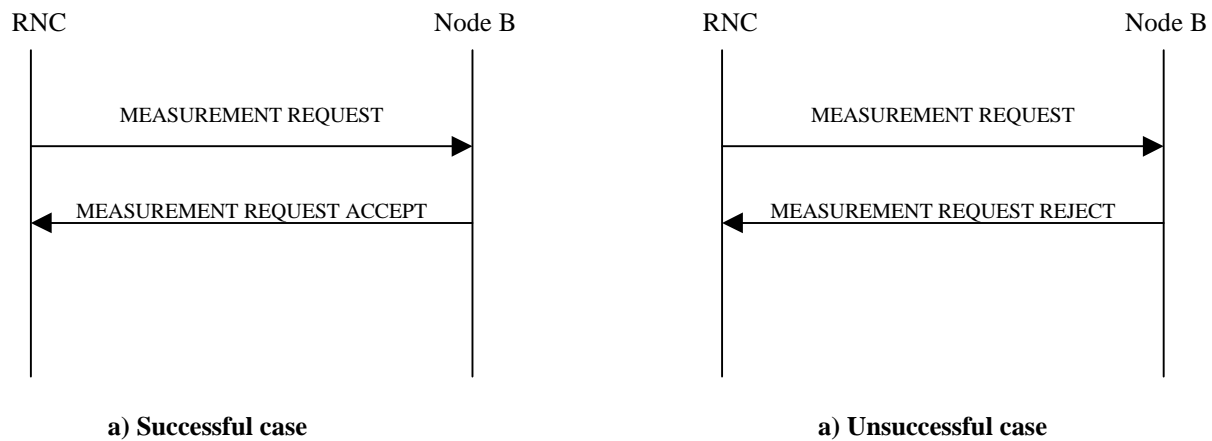
In this contribution we define a measurement concept for Node B. We exemplify this concept by defining the control and report messages for interference and power measurements. **Note that this contribution only proposes a general measurement concept for Node B. Specific measurements with corresponding requirements should be defined in other specifications.**

## 2 MEASUREMENT CONCEPT

To control and steer the measurements we need two procedures, one for requesting measurements and one for termination of a previous request. Also, Node B needs a procedure for reporting measurements to the RNC.

### 2.1 Measurement Request

For requesting measurements, the RNC use the following procedure:



**Figure 1 Measurement Request Procedure**

The MEASUREMENT REQUEST message includes the following information:

- **Measurement Id:** This is a RNC defined identifier that uniquely identifies the measurement.
- **Measurement Object:** This defines on which resource the measurement should be performed. For example might this identifier point out a cell or a carrier within the Node B.
- **Measurement Type:** This defines what measurement that should be performed. This could for example be “interference on the uplink” or “used power on the downlink”.
- **Measurement Characteristics:** This defines how the measurements should be performed. For example measurement frequency, timing information, filtering information. *The exact structure and contents of this parameter is dependent on the Measurement Type and is FFS.*
- **Report Characteristics:** The reporting could be any of the following classes:
  - ◆ **Periodic:** Reports should be delivered in a periodic matter with some frequency. In this case the update frequency have to be specified.
  - ◆ **Event Triggered:** Reports should be delivered upon a specific event in Node B. In this case the event have to be specified.
  - ◆ **Immediate Reporting:** A report should be delivered immediately. Only one measurement report should be sent and after that the measurement is automatically cancelled.

*The possibility to request several measurements for the same event is FFS.*

The MEASUREMENT REQUEST ACCEPT message is used to accept a requested measurement and it includes the following information:

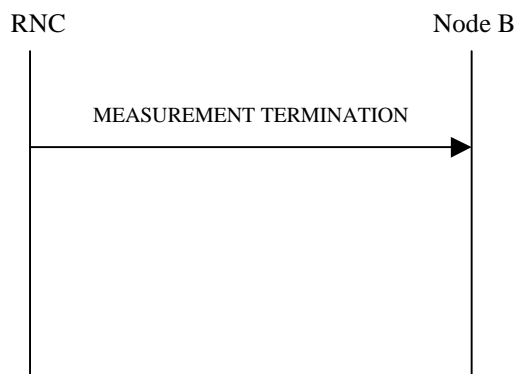
- **Measurement Id:** This is the same Id that was used in the request.

The MEASUREMENT REQUEST REJECT message is used to reject a requested measurement and it includes the following information:

- **Measurement Id:** This is the same Id that was used in the request.
- **Cause:** This states the cause for the reject. *The exact content of this parameter is FFS.*

## 2.2 Measurement Termination

For termination of previously requested measurements, the RNC use the following procedure:



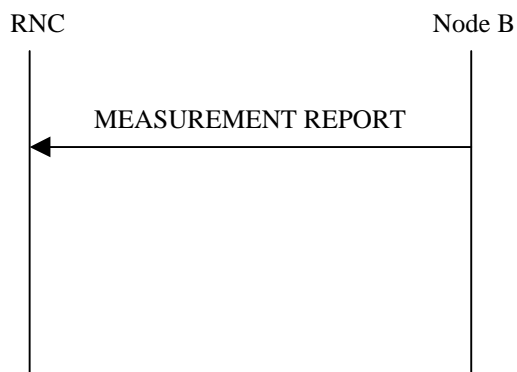
**Figure 2 Measurement Termination Procedure**

The MEASUREMENT TERMINATION message includes the following information:

- **Measurement Id:** This is the same Id that was used in the request.

## 2.3 Measurement Report

To report a previously requested measurement, Node B uses the following procedure:



**Figure 3 : Measurement Report Procedure**

The MEASUREMENT REPORT message includes the following information:

- **Measurement Id:** This is the same id that was used in the request.
- **Time Reference:** This is a time reference showing the time of the measurement. *The accuracy of this is FFS.*
- **Value**

*The possibilities for including several values and/or several measurements in the same report are FFS.*

### 3 EXAMPLE: ADMISSION CONTROL AND CONGESTION CONTROL

In this section we exemplify our general principles with measurements for two radio network functions, Admission Control and Congestion Control. In these examples we use #X to denote any number.

#### 3.1 Admission Control

The admission control function needs to monitor the total traffic load in each cell respectively. For that reason, it asks the Node B to periodically report the interference on the uplink and the used power on the downlink. During startup, the RNC will send the following two measurement requests:

MEASUREMENT REQUEST:

- **Measurement Id:** #A
- **Measurement Object:** Cell Id #M, Carrier Id #N
- **Measurement Type:** Interference UL Measurement
- **Measurement Characteristics:** *FFS*
- **Report Characteristics:** Periodic, with update frequency #X

MEASUREMENT REQUEST:

- **Measurement Id:** #B
- **Measurement Object:** Cell Id #M, Carrier Id #N
- **Measurement Type:** Power DL Measurement
- **Measurement Characteristics:** *FFS*
- **Report Characteristics:** Periodic, with update frequency #X

For each MEASUREMENT REQUEST, Node B will respond with a MEASUREMENT RESPONSE message that acknowledges the measurements.

From now on, the Node B will periodically report the interference on the uplink and the used power on the downlink.

#### 3.2 Congestion Control

The congestion control function also needs to monitor the load in each cell. It might utilize the same measurement reports as Admission Control (this is manufacturer dependent), but in this example we assume that we also want to know when the interference or power reaches above a certain level. The congestion control might then at startup send the following additional measurement request messages:

MEASUREMENT REQUEST:

- **Measurement Id:** #C
- **Measurement Object:** Cell Id #M, Carrier Id #N
- **Measurement Type:** Interference UL Measurement
- **Measurement Characteristics:** *FFS*
- **Report Characteristics:** Event Triggered, report when measurement > #P

MEASUREMENT REQUEST:

- **Measurement Id:** #D
- **Measurement Object:** Cell Id #M, Carrier Id #N
- **Measurement Type:** Power DL Measurement
- **Measurement Characteristics:** *FFS*
- **Report Characteristics:** Event Triggered, report when measurement > #Q

For each MEASUREMENT REQUEST the Node B will respond with a MEASUREMENT RESPONSE message that acknowledge the measurement.

From now on, the Node B will send a report if the interference on the uplink or power on the downlink reach above a certain level.

## 4 SUMMARY

As we do not connect any measurements with any specific radio network function we get a very flexible concept. It will for example allow:

1. Manufacturers can choose which information they want to utilize as input for different radio network functions.
2. Operators will be able to define specific measurements for monitoring the network. This might be especially useful, during a tuning or a troubleshooting phase.
3. Interoperability is secured by specifying the minimum performance requirements for the measurements. This will make it possible to have algorithms from one vendor to make decisions based on measurements in equipment from another vendor.
4. New measurements will easily be incorporated in the standard by a definition of new Node B measurements and messages. The general principles will still apply.

*Whether a similar concept is needed over the Iur interface is FFS.*

## 5 PROPOSED CHANGES

We propose section 8.1.4 Interference Measurements in [1] to be replaced with:

### 8.1.4 Measurement Request

Section 2.1 in this contribution.

### 8.1.5 Measurement Termination

Section 2.2 in this contribution.

### 8.1.6 Measurement Report

Section 2.3 in this contribution.

## 6 REFERENCES

- [1] S3.33 V0.0.2, NBAP Specification