

Agenda Item:

Source: Ericsson

Title: Required UTRAN measurements in UTRA/FDD

Document for: Approval

1 Introduction

To support the radio network function in UTRAN different radio related quantities have to be measured both in the UE and UTRAN. At the RAN WG2#4 meeting several measurement quantities were incorporated into TS 25.302. Most of the incorporated measurements are marked FFS. Among the in TS 25.302 incorporated UTRAN measurement quantities are DL TX power and UL load. In this document some UTRAN measurements are discussed and defined.

2 Measurements

2.1 Definitions

The terminology for different measurement quantities differs between the different WG's. To get a joint view it is here proposed that we use the following definitions:

RSCP, Received Signal Code Power, is the received power on one code after despreading, defined on the pilot symbols.

ISCP, Interference on Signal Code Power, is the interference on the mentioned received signal after despreading. Thereby only the non-orthogonal part of the interference is included in this measurement.

SIR, Signal to Interference Ratio, is the RSCP divided by the ISCP, i.e. SIR is the signal to interference ratio after despreading.

RSSI, Received Signal Strength Indicator, the wideband received power within the channel bandwidth.

In TR 25.990 the term radio link (RL) is defined as below.

RL, Radio Link, is a logical association between a single User Equipment and a single UTRAN access point. It's physical realization comprises one or more radio bearer transmissions.

2.2 RSSI, Uplink Load

The RSSI is wide-band received signal power on one carrier. Measuring the RSSI on the uplink will give a measure of the total uplink interference (load) at the UTRAN access point. The uplink RSSI measurement can be used for load control and for initial power setting of uplink physical channels.

2.3 SIR, Uplink Combined SIR Measurement

The combined SIR measurement is defined as the ratio of the RSCP and the ISCP measurements after radio link combination in Node B. The combined SIR takes orthogonality into account and gives therefore a very good indication of the total performance of the radio links between the UE and a certain Node B, i.e. the radio links that are in softer handover in a certain Node B.

Note that for asynchronous uplink transmission where the UE's in the same cell are not using the same uplink scrambling code, there will be no orthogonality between the codes and therefore measuring the uplink ISCP will be almost the same as measuring the RSSI-RSCP.

The measurement of the combined SIR shall be made on the DPCCH/DPDCH.

The combined SIR measurement can be used in the power control and macro diversity evaluation

2.4 UTRAN Total Transmitted Power Measurement

The total transmitted power on one carrier from one UTRAN access point. The total transmitted power can be used for load control, i.e. it is possible to monitor how close to the maximum transmitted output power a certain cell is.

2.5 UTRAN Transmitted Code Power Measurement

The transmitted power on one carrier and one channelisation code for one RL from a UTRAN access point. The measured transmitted code power can be used for doing power balancing between different radio links.

3 Proposal

It is proposed that UTRAN layer 1 shall be able to measure and report the following quantities:

1. RSSI (uplink load),
2. Combined SIR,
3. Total transmitted power,
4. Transmitted code power,

to higher layers.

Text proposals for the UTRAN layer 1 measurements are found in section 4. **Note** that the proposed text in section 4 shall replace the current contents in all the sections.

4 Text Proposal for 25.231, Measurements

7.1.4 Measurement for the Handover preparation in FDD at the UTRAN side

UTRAN layer 1 shall support measuring and reporting to higher layers of:

1. Uplink RSSI,
2. Total transmitted power,

for an UTRAN access point.

UTRAN layer 1 shall support measuring and reporting to higher layers of the transmitted code power for any RL transmitted from an UTRAN access point.

For the radio links that are in softer handover, UTRAN layer 1 shall support measuring and reporting to higher layers of the combined SIR. If only one RL exists, i.e. not in softer handover, -the SIR for that RL shall be reported.

See section 8 for the definition of the quantities.

8 Radio link measurements

<Note: Several of the measurement quantities listed in this section are the same as in the text proposal in the Ericsson WG1 contribution “R1-99850, Required UE measurements in UTRA/FDD”. The measurement quantities that are added in this contribution are “Total Transmitted Power” and “Transmitted Code Power”>

RSCP:

Definition:

Received Signal Code Power, is the received power on one code after de-spreading, defined on the pilot symbols. UE measurements shall be possible on the CPICH, PCCPCH, SCCPCH for each RL and on DPCH for each RL and after RL combination. UTRAN measurements shall be possible on PRACH for each RL and on DPCH for each RL and after RL combination.

Purpose:

Handover evaluation, DL open loop power control, calculation of SIR and pathloss.

ISCP

Definition:

Interference on Signal Code Power, is the interference on the received signal after de-spreading. Thereby only the non-orthogonal part of the interference is included in this measurement. UE measurements shall be possible on the CPICH, PCCPCH, SCCPCH for each RL and on DPCH for each RL and after RL combination. UTRAN measurements shall be possible on the PRACH for each RL and on DPCH for each RL and after RL combination.

Purpose:

This quantity is used for calculating SIR.

SIR

Definition:

Signal to Interference Ratio, is defined as the RSCP divided by the ISCP. The measuring of SIR shall be possible both for the UE and UTRAN according to the measurement of RSCP and ISCP.

Purpose:

UL/DL inner/outer loop power control, UL/DL open loop power control, handover evaluation, initial power setting.

RSSI

Definition: (note that the RSSI is not a radio link measurement, but it is defined in this section anyway)

Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. UE measurements shall be possible for the relevant UTRAN DL channel bandwidth and for the other systems supported according to the applicable system DL bandwidth and channel structure. UTRAN measurements shall be possible for the relevant UTRAN UL channel bandwidth.

Purpose:

Inter system (GSM/PDC) handover evaluation.

Ec/No*Definition:*

The received signal code power divided by the total received power in the channel bandwidth and is defined as RSCP/RSSI. The measuring of Ec/No shall be possible both for the UE and UTRAN according to the measurement of RSCP.

Purpose:

Handover evaluation.

Total Transmitted Power

Definition: (note that this is not a radio link measurement, but it is defined in this section anyway)

Total Transmitted Power, is the total transmitted power on one carrier. The measurement shall be possible for an UTRAN access point.

Purpose:

Load control.

Transmitted Code Power*Definition:*

Transmitted Code Power, is the transmitted power on one carrier and one channelisation code. The measurement shall be possible for each RL transmitted from an UTRAN access point.

Purpose:

Power balancing between different radio links.