TSG-RAN Working Group 4 (Radio) meeting #3
Tokyo 29 - 31 March 1999

TSGW4#3(99)106

Agenda Item: **7.4**

Source: **CSELT**

Title: **Draft Proposal for the Contents of S4.03 on "RF Parameters in Support of Radio Resource Management"**

Document for: **Discussion**

During the last 3GPP TSG RAN meeting in Fort Lauderdale clarifications occurred about the work organization between WGs in relation to the Radio Resource Management issue. As a result of the discussion (TSGR#2(99) 162, TSGR#2(99) 170, TSGR#2(99) 173):

- WG2 is responsible for defining the RRM strategies which need to be supported by the UTRA protocols;
- WG4 is responsible for:
  - Defining RF Parameters and Requirements for the RRM;
  - Studying RF Scenarios to identify typical scenarios with the associated relevant figures (e.g. number of cells which can/need be monitored, number of radio paths, speed variation of the channel, usefulness of link adaptation, etc.).

As a result a new Title and Scope for WG4 S4.03 document was decided (TSGR#2(99)170):

Title: RF Parameters in Support of Radio Resource Management

Scope: RF Parameters and Requirements for the Radio Resource Management

The new version of the S4.03 has been already updated with the new Title and Scope (Td TSGR/WG4#3(99)105).

This document, starting from these assumptions, proposes a new structure and index for the S4.03 that takes into account the indications and decisions of TSG RAN. In order to facilitate the coordination with WG2, responsible for the RRM strategies, the index proposed is aligned with the issues treated inside the WG2 TR R2.02 on "RRM Strategies", created during the last WG2 meeting in Stockholm according to the decision of TSG RAN.

It must be highlighted that the textual part present in this document is based on the textual part present in the last version of S4.03, discussed in the last WG4 meeting in Turin, reviewed taking into account the RAN decisions.

Contents

1. General Description of Radio resource Management

2. Idle Mode Tasks (FDD)

2.1 Introduction

2.2 RF Cell Selection Scenario

2.2.1 Requirements for Cell Selection

2.2.1.1 Cell Selection Monitoring Requirements

2.2.1.2 Measurement Requirements

2.2.2 RF Parameters used for Cell Selection Criteria

2.3 RF Cell Re-Selection Scenario

2.3.1 Requirements for Cell Re-Selection

2.3.1.1 Cell Re-Selection Monitoring Requirements

2.3.1.2 Measurement Requirements

2.3.2 RF Parameters used for Cell Re-Selection Criteria

2.4 Radio Access Mode Selection and Re-Selection [F.F.S.]

2.5 PLMN Selection and Re-Selection Scenario

2.6 Location Registration Scenario

3. Idle Mode Tasks (TDD)

3.1 Introduction

3.2 RF Cell Selection Scenario

3.2.1 Requirements for Cell Selection

3.2.1.1 Cell Selection Monitoring Requirements

3.2.1.2 Measurement Requirements

3.2.2 RF Parameters used for Cell Selection Criteria

3.3 RF Cell Re-Selection Scenario

3.3.1 Requirements for Cell Re-Selection

3.3.1.1 Cell Re-Selection Monitoring Requirements

3.3.1.2 Measurement Requirements

3.3.2 RF Parameters used for Cell Re-Selection Criteria

3.4 Radio Access Mode Selection and Re-Selection [F.F.S.]

3.5 PLMN Selection and Re-Selection Scenario

3.6 Location Registration Scenario

4. RRC Connection mobility

4.1 Handover

4.1.1 Introduction

The overall handover process shall be implemented in the UE and RNS. Measurement of serving radio connection downlink performance and candidate cells received signal strengths and quality must be made in the UE. These measurements shall be signalled to the RNS for assessment. The RNS measures the uplink performance for the UE being served. The RNC uses measurements in conjunction with defined thresholds and handover strategy to make a handover decision.

4.1.2 Requirements

The reliability of handover in all its different forms is essential to the successful operation of a network. In performing handover preparation and execution the minimum requirements shall be:

- Quick detection of candidate cells
- Quick synchronisation to candidate cells
- Reporting of sufficient number of candidate cells
- Quick detection of degradation of link quality
- Reliable measurement procedures of serving and target cells
- Reliable and quick reporting mechanisms
- Reliable synchronisation mechanism
- Quick and safe release of resource
- Safe guards for failed handoffs
- Minimal disruption to service

- Minimal degradation to link quality
- Minimal degradation to other users
- Full Flexibility and efficiency to seamlessly handle the spectrum in a multi-operator scenario

4.1.3 Handover 3G to 3G

4.1.3.1 FDD Soft/Softer Handover

4.1.3.1.1 Requirements

4.1.3.1.1.1 Handover Preparation Requirements

4.1.3.1.1.2 Measurement Requirements

4.1.3.1.1.3 RF Scenario and RF Parameters Used

4.1.3.2 FDD Inter-Frequency Handover

There will be the need to perform inter-frequency hard handover between two carriers in FDD mode. This is in particularly for the case for networks that support Hierarchical Cell Structures (HCS), i.e., combinations of macro, micro, pico and other specific application cells.

It is known that the service provided by a specific layer will not be continuous. This means that there are trans-layer handovers where the UE will be handed over to a macro layer, before returning again to the micro layer.

This necessitates good performance and also introduces the fact that during soft handoff within one layer, the UE shall be able to monitor other FDD carriers for the purpose of inter-frequency handover.

From the system perspective, the inter-frequency hard handover must have comparable performance to that of soft handover.

4.1.3.2.1 Requirements

4.1.3.2.1.1 Handover Preparation Requirements

4.1.3.2.1.2 Measurement Requirements

4.1.3.2.1.3 RF Scenario and RF Parameters Used

4.1.3.3 FDD/TDD Handover

4.1.3.3.1 Requirements

4.1.3.3.1.1 Handover Preparation Requirements

4.1.3.3.1.2 Measurement Requirements

4.1.3.3.1.3 RF Scenario and RF Parameters Used

4.1.3.4 TDD/TDD Handover

4.1.3.4.1 Requirements

4.1.3.4.1.1 Handover Preparation Requirements

4.1.3.4.1.2 Measurement Requirements

4.1.3.4.1.3 RF Scenario and RF Parameters Used

4.1.4 Handover 3G to 2G

In the early days of UMTS deployment it can be anticipated that the service area will not be as contiguous and extensive as existing second generation systems. It is also anticipated that UMTS network will be an overlay on the 2nd generation network and utilise the latter, in the minimum case, as a fall back to ensure continuity of service and maintain a good QoS as perceived by the user.

4.1.4.1 Handover to GSM

This section presents some of the important aspects of GSM handover required to be performed by the UE. For the full specifications reference should be made the GSM recommendations.

The underlying requirement is to ensure continuity of service to the UMTS user. The handover requirements for 3G to GSM should be comparable to GSM to GSM handover requirements.

The MS (GSM terminology) shall be able to monitor up to 32 carriers.

The MS shall be able synchronize to 6 carriers

The MS shall be able to report back to the network on the 6 strongest cells with correctly identified BSIC.

The MS shall be able to perform this task at levels down to the reference sensitivity level or reference interference levels as specified in GSM 05.05.

The MS shall demodulate the SCH on the BCCH carrier of each surrounding cell and decode the BSIC as often as possible, and as a minimum at least once every [10 seconds].

4.1.4.1.1 Requirements

4.1.4.1.1.1 Handover Preparation Requirements

4.1.4.1.1.2 Measurement Requirements

4.1.4.1.1.3 RF Scenario and RF Parameters Used

4.2 Radio Link Management

4.2.1 Link adaptation

4.3 Cell Update

4.4 URA Update

5. Admission control (FDD)

6. Admission control (TDD)

7. Radio access bearer control (FDD)

8. Radio access bearer control (TDD)

9. Dynamic Channel Allocation (FDD)

10. Dynamic Channel allocation (TDD)

11. Power Management (FDD)

11.1 Open Loop Power Control

11.1.1 Introduction

11.1.2 UE Implementation Requirements

11.1.3 UE Power Control Range Requirements

11.1.4 BS Implementation Requirements

11.1.5 BS Power Control Range Requirements

12. Power Management (TDD)

12.1 Open Loop Power Control

12.1.1 Introduction

12.1.2 UE Implementation Requirements

12.1.3 UE Power Control Range Requirements

12.1.4 BS Implementation Requirements

12.1.5 BS Power Control Range Requirements

13. Radio Link Surveillance (FDD)

13.1 Radio Link Measurement Requirements

13.1.1 Signal Strength

13.1.1.1 General

13.1.1.2 Physical Parameters

13.1.1.3 Statistical Parameters

13.1.1.4 Range of Parameters

13.1.2 Signal Quality

13.1.2.1 General

13.1.2.2 Physical Parameters

13.1.2.3 Statistical Parameters

13.1.2.4 Range of Parameters

13.1.3 Measurement Reporting

13.1.4 Abosolute UE-BS Distance

13.2 Radio Link Failure Requirements

14. Radio Link Surveillance (TDD)

14.1 Radio Link Measurement Requirements

14.1.1 Signal Strength

14.1.1.1 General

14.1.1.2 Physical Parameters

14.1.1.3 Statistical Parameters

14.1.1.4 Range of Parameters

14.1.2 Signal Quality

14.1.2.1 General

14.1.2.2 Physical Parameters

14.1.2.3 Statistical Parameters

14.1.2.4 Range of Parameters

14.1.3 Measurement Reporting

14.1.4 Abosolute UE-BS Distance

14.2 Radio Link Failure Requirements

15. Annex A RF Power Management Scenario

16. Annex B RF Handover Scenario