TSG-RAN Meeting #14 ***RP #14(01)0929***

Kyoto, Japan, Dec. 11th - 14th, 2001

Title : Proposed new SI sheet for SI "Improvement of inter-frequency and inter-system measurement for 1.28 Mcps TDD”

Agenda Item : 9. 9

Source : Samsung

Document for : Approval

This contribution contains the new SI sheet for the study item "Improvement of inter-frequency and inter-system measurement for 1.28 Mcps TDD." In RAN1 #22 meeting, an improved method for measurement of GSM from 1.28 Mcps TDD was discussed and agreed to propose to make the new TR to cover this issue.

The introduction of new TR and the proposed method for measurement of GSM from 1.28Mcps TDD is included in [1]. In the future, this TR may also include the method for measurement of FDD and 3.84Mcps TDD from 1.28Mcps TDD, respectively.

Hence, we proposed the new study item, Improvement of inter-frequency and inter-system measurement for 1.28 Mcps.

REFERENCE

[1] R1-011317, “Introduction of TR 25.xxx on Improvement of Inter-frequency and inter-system measurement”, Samsung

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Study Item Description

Title

Improvement of inter-frequency and inter-system measurements for 1.28 Mcps TDD.

1 3GPP Work Area

X	Radio Access
	Core Network
	Services

2 Linked work items

none

3 Justification

In the case of 1.28Mcps TDD, some idle time slots due to discontinuous transmission can be used for monitoring GSM, FDD and 3.84 Mcps TDD as compressed mode in FDD mode. However, the current Rel-4 specification may not reserve enough time for each inter-system measurement. This may cause the relativey long measurement time and may result in the increase of terminal power consumption or a call drop in case that UE is locatesd at handover region.

A candidate for some improvement can be as follows:

- Enlarging the measurement window for inter-system measurement.
- Chanege the location of measurement window for inter-system measurement.

4 Objective

The purpose of this study item is to provide the enlarged measurement window and the change of the location of measurement window in 1.28 Mcps TDD for improved system performance.

5 Service Aspects

None

6 MMI-Aspects

None

7 Charging Aspects

None

8 Security Aspects

None

9 Impacts

Affects:	USIM	ME	AN	CN	Others
Yes		X	X		
No	X			X	
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for informationat plenary#	Approved at plenary#	Comments
TR 25.XXX		WG1		RAN #15	RAN #15	

Affected existing specifications			
Spec No.	Subject	Approved at plenary#	Comments
25.222	Mulplexing and channel coding(TDD)		
25.224	Physical Layer Procedures (TDD)		
25.331	RRC Protocol Specification		
25.423	UTRAN Iur Interface RNSAP Signalling		
25.433	UTRAN Iub Interface NBAP Signalling		
25.123	Requirements for Support of Radio Mesource Management (TDD)		

11 Study item raporteurs

Li Xiao Qiang, SAMSUNG

12 Study item leadership

TSG-RAN WG1

13 Supporting Companies

CATT, QUALCOMM, SAMSUNG, SIEMENS, SKT

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

(list of Work Items identified as building blocks)

14b The WI is a part of the radio interface improvement features.

14c The WI is a Work Task: parent Building Block

(one Work Item identified as a building block)

3GPP TSG RAN WG1 Meeting #22 ***Tdoc R1- 01- 1317***
Jeju, South Korea, 19th Nov - 23th Nov 2001

Agenda Item:
Source: **Samsung**
Title: **Introduction of TR 25.xxx on Improvement of Inter-frequency and inter-system measurement**
Document for: **Approval**

In WG1 meeting #22, an efficient method for measurement for handover for 1.28Mcps TDD was presented and agreed by TDD Ad Hoc session to propose to make the TR within the existing work item "Improvement of inter-frequency and inter-system measurements" [1]. So TR 25.xxx is introduced. This TR will address the measurement of GSM, FDD, and 3.84 Mcps TDD from 1.28Mcps TDD. The proposed method for measurement of GSM in reference [1] is included in this TR. In the future, this TR will also contain the methods for measurement of FDD and 3.84Mcps TDD.

Reference

[1] R1-01-1289, "Improvement of inter-system handover measurement for 1.28Mcps TDD", Samsung

3G TR 25.xxx V0.0.1 (2001-11)

Technical Report

3rd Generation Partnership Project;
Technical Specification Group Radio Access Network;
Improvement of inter-frequency and inter-system Measurement

(Release 5)

Reference

<Workitem>
(<Shortfilename>.PDF)

Keywords

<keyword[, keyword]>

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Contents

Intellectual Property Rights

Foreword

This Technical Report(TR) has been produced by the 3rd Generation Partnership Project (3GPP), Technical Specification Group RAN.

The contents of this TR are subject to continuing work within the 3GPP TSG and may change following formal TSG approval. Should the TSG modify the contents of this TR, it will be re-released with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1. Scope

The purpose of this document is to help the TSG RAN WG1 group to specify the changes to current specifications, which is needed for the introduction of the “improvement of inter-frequency and inter-system measurement” option for Release 5.

“Improvement of inter-frequency and inter-system measurement” is proposed to specify the enhanced handover measurement. This work item is composed of possible 3 work tasks (WT).

1) Measurement of GSM from 1.28Mcps TDD
2) Measurement of FDD from 1.28Mcps TDD
3) Measurement of 3.84Mcps TDD from 1.28Mcps TDD

The different WTs will be described in subsequent chapters. It is intended to gather all information in order to trace the history and the status of the WTs in RAN WG1. It is not intended to replace contributions and Change Requests, but only to list conclusions and make references to agreed contributions and CRs. When solutions are sufficiently stable, the CRs can be issued.

It describes agreed requirements related to the WTs.

It identifies the affected specifications with related Change Requests.

It also describes the schedule of the WTs.

2. References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.
References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

For a specific reference, subsequent revisions do not apply.

For a non-specific reference, the latest version applies.

3. Definitions, symbols and abbreviations

3.1. Definitions

For the purposes of the present document, the following terms and definitions apply.

3.2. Symbols

3.3. Abbreviations

4. Requirements

- Backward compatibility with the previous release should be kept.

5 Measurement Improvement

5.1. Measurement of GSM from 1.28Mcps TDD

5.1.1 Introduction

In FDD mode, compressed mode is used for inter-frequency and inter-system measurements, since the transmission in the physical channels in FDD are continuous. But for 1.28Mcps TDD, the transmissions are discontinuous, so some time slots which have no traffic can be used for monitoring GSM.

A channel swapping procedure is proposed before starting monitoring GSM during inter-system measurement in order to acquire more enough consecutive idle time to monitor GSM. Channel swapping method means that traffic time slots assigned for uplink and downlink can be reallocated before monitoring GSM.

Simulation results of average synchronisation time, maximum synchronisation time, and minimum synchronisation time for monitoring GSM are provided under the condition of symmetric channel structure and asymmetric channel structure with 0.5ms and 0.8ms synthesizer switching time. The simulation results show a clear benefit of using a channel swapping method compared to the conventional one.

5.1.2 Methodology

5.1.2.1 Proposed channel swapping method

Channel swapping method is proposed to achieve more consecutive time slots to do inter-system measurement before the starting time of monitoring GSM.

It is assumed that channel swapping procedure in every subframe is the same. For low data rate traffic with only 1 uplink channel and 1 downlink channel, a channel swapping method doing like this: uplink traffic channel for UE swaps to be assigned in the uplink timeslot just before the second switching point, and downlink traffic channel for UE swaps to be assigned in the downlink timeslot just after the second switching point. Hence, all the idle time slots from the end of the timeslot just after the second switching point in sub-frame # i to the beginning of the timeslot just before the second switching point in sub-frame # i+1 can be utilized for tracking FCCH burst or FCCH and SCH bursts of GSM frame concurrently. Note that the second switching point in every sub-frame does not need to be fixed. In Fig. 1, yellow colored time slots means a traffic channel after channel swapping, and green colored timeslots means the measurement period for monitoring GSM. It is observed that the sum of 5 time slots and DwPTS+GP+UpPTS can be used for monitoring GSM.

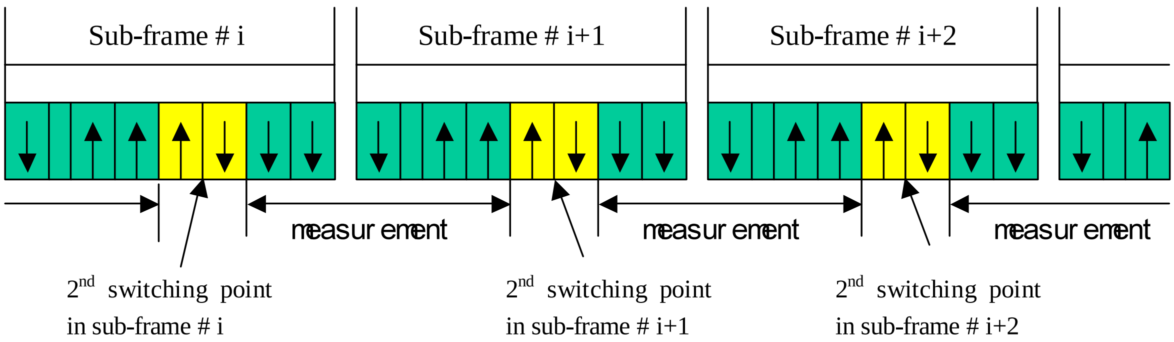

Figure 1. Measurement time by using proposed channel swapping method during inter-system measurement

5.1.2.2 Simulation results Comparison

Comparison Scheme1: Simulation results comparison in case of symmetric frame structure. The second switching point is between TS3 and TS4. See Figure 2

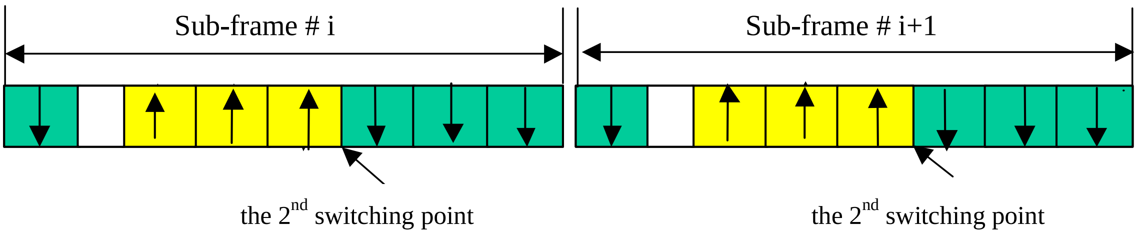

Figure2: Symmetric frame structure with 3 uplink timeslots and 3 downlink timeslots from TS1 to TS6

By using channel swapping method, TS1 is assumed to be used for uplink traffic channel, and downlink traffic channel may be allocated in TS0, TS4, TS5, TS6. It is assumed that downlink traffic channel can be allocated at TS0, TS4, TS5, and TS6 with equal possibility. Hence, average value of synchronisation time in the four cases of downlink traffic channel being assigned in TS0, TS4, TS5, TS6, is used respectively..

1) Monitoring only FCCH burst with 0.5ms switching time

Average synchronisation time with 0.5ms switching time:

Using channel swapping method: 75.6ms

Conventional method: (83.9+185.0+288.3+111.4)/4 = 167.2ms

See Figure 3.

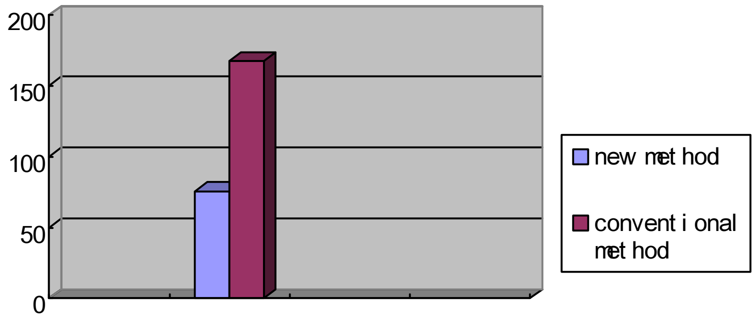

Figure 3. average synchronisation time of monitoring only FCCH in Symmetric frame structure

Maximum synchronisation time with 0.5 ms switching time:

Using channel swapping method: 187.2ms

Conventional method: 656.5ms

See Figure 4.

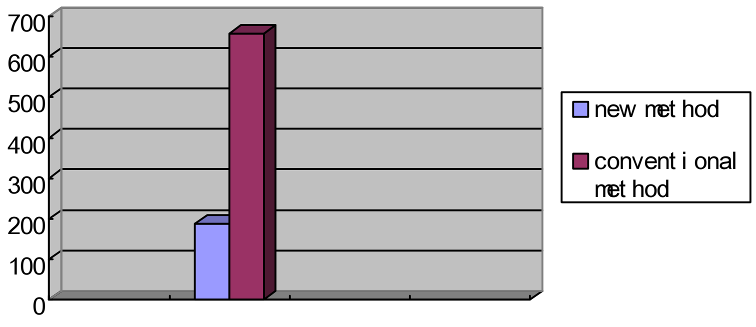

Figure 4 maximum synchronisation time of monitoring only FCCH in Symmetric frame

structure

2) Monitoring both FCCH burst and SCH burst with 0.5ms switching time

Average synchronisation time with 0.5ms switching time:

Using channel swapping method: 92.5ms

Conventional method: (102.0+336.2+511.7+140.4)/4 = 272.6ms

See Figure 5.

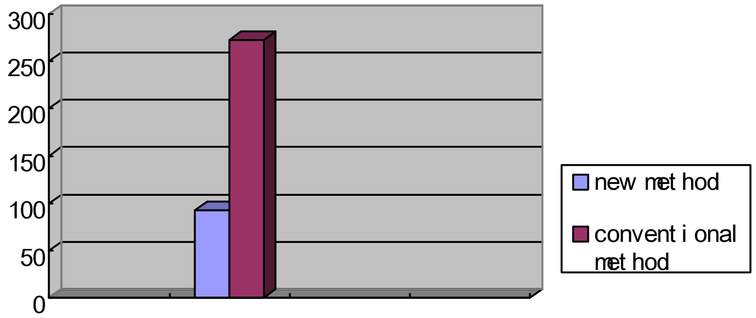

Figure 5 average synchronisation time of monitoring both FCCH and SCH in Symmetric frame structure

Maximum synchronisation time with 0.5ms switching time:

Using channel swapping method: 237.2ms

Conventional method: 896.5ms

See Figure 6.

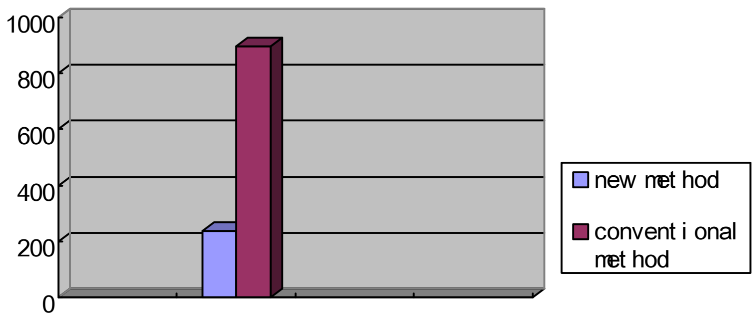

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Figure 6. maximum synchronisation time of monitoring both FCCH and SCH in Symmetric frame structure

Comparison Scheme2: Simulation results comparison in case of asymmetric frame structure with 2 uplink timeslots and 4 downlink timeslots from TS1 to TS6. The second switching point is between TS2 and TS3. See Figure 7.

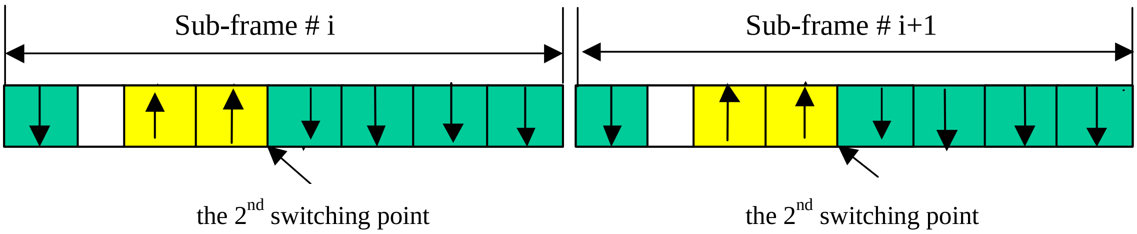

Figure 7: Asymmetric frame structure with 2 uplink timeslots and 4 downlink timeslots from TS1 to TS6

1) Monitoring only FCCH burst with 0.5ms switching time

Average synchronisation time with 0.5ms switching time:

Using channel swapping method: 75.6ms

Conventional method: (83.9+97.6+185.0+288.3+111.4)/5 = 153.2ms

See Figure 8.

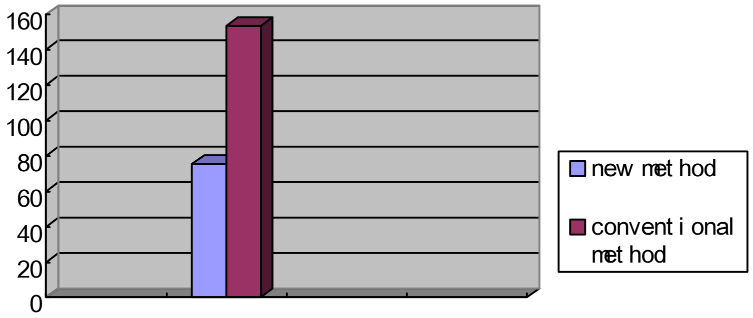

Figure 8. average synchronisation time of monitoring only FCCH in Asymmetric frame structure

Maximum synchronisation time with 0.5ms switching time:

Using channel swapping: 187.2ms

Conventional method: 656.5ms

See Figure 9.

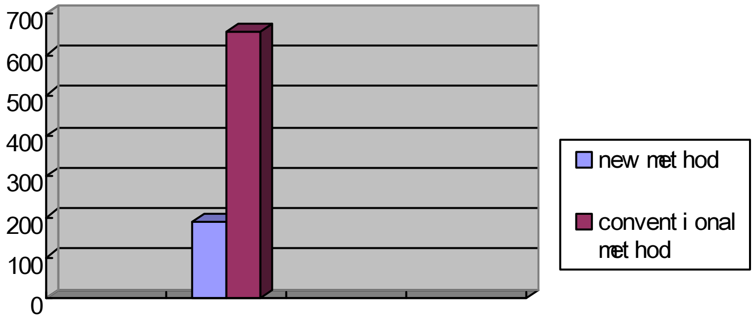

Figure 9 maximum synchronisation time of monitoring only FCCH in Asymmetric frame structure

2) Monitoring both FCCH burst and SCH burst with 0.5ms switching time

Average synchronisation time with 0.5ms switching time:

Using channel swapping method: 92.5ms

Conventional method: (102.0+116.7+336.2+511.7+140.4)/5 = 241.4ms

See Figure 10.

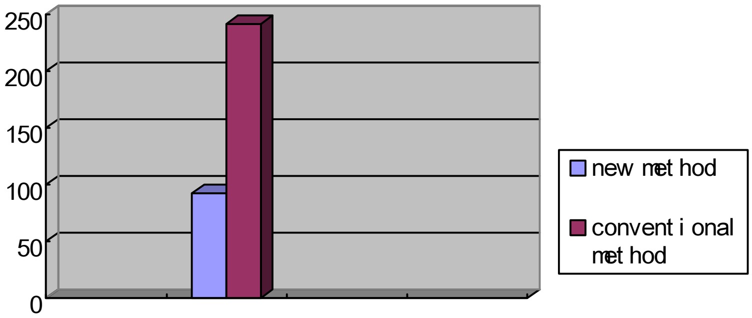

Figure 10 average sync time of monitoring both FCCH and SCH in Asymmetric frame structure

Maximum synchronisation time with 0.5ms switching time:

Using channel swapping method: 237.2ms

Conventional method: 896.5ms

See Figure 11.

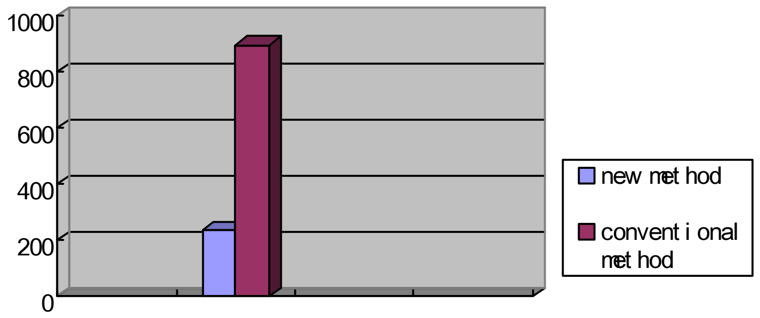

Figure11 maximum synchronisation time of monitoring both FCCH and SCH in Asymmetric frame structure

Monitoring FCCH only or FCCH+SCH with 0.8ms switching time

When monitoring FCCH or FCCH +SCH with 0.8ms switching time, there is the special case in conventional method without channel swapping that can never acquire FCCH or FCCH+SCH, which is that TS5 for downlink traffic and TS1 for uplink traffic because of the large synthesizer switching time and short measurement window.

But in swapping method, because of long search window, FCCH or FCCH+SCH can always be acquired. The maximum synchronisation time of detecting FCCH+SCH burst will not exceed 237.5ms.

5.1.2.3 Conclusion

Channel swapping method for improvement of inter-system handover measurement is introduced in order to increase the measurement time for monitoring GSM and compared with conventional method. The simulation results for measurement time in each cases is summarized in Table 1.

Table 1. Comparison of simulation results by using our proposed method and conventional one with 2 traffic timeslots per subframe and with 0.5ms and 0.8ms switching time under symmetric frame structure

	0.5ms switching time		0.8ms switching time	
	Proposed method	Conventional method	Proposed method	Conventional method
Average synchronisation time for monitoring both FCCH and SCH (ms)	92.5	272.6	114.2	Can't be evaluated because of long switching time. Referring Table4, 5.
Average synchronisation time for monitoring only FCCH (ms)	75.6	167.2	95.1	Can't be evaluated because of long switching time. Referring Table4, 5.

Maximum synchronisation time for monitoring both FCCH and SCH (ms)	237.2	896.5	237.5	These bursts can never be acquired
Maximum synchronisation time for monitoring only FCCH (ms)	187.2	656.5	232.5	SCH burst can never be acquired
Minimum synchronisation time for monitoring both FCCH and SCH (ms)	6.1	6.1	6.3	6.4
Minimum synchronisation time for monitoring only FCCH (ms)	1.1	1.1	1.4	1.4

The simulation results show a great benefit of using channel swapping method during inter-system measurement in 1.28Mcps TDD.

5.1.3 Investigation on impacts to other functions

As to swapping method for measurement, impact on Radio Resource Management, Dynamic Channel Allocation and high layer signaling needs to be further investigated.

5.1.4 Specification Impact and associated Change Request

5.1.4.1 WG1

5.1.4.2 WG2

5.1.4.3 WG3

5.1.4.3 WG4

5.1.5 Backward Compatibility

5.2. Measurement of FDD from 1.28Mcps TDD

5.3. Measurement of 3.84Mcps TDD from 1.28Mcps TDD

6. Study Areas

7. Agreements and associated contributions

8. Backward Compatibility

9. Project Plan

9.1 Schedule

Date	Meeting	Scope	[expected] Input	[expected]Output

9.2 Work Task Status

	Planned Date	Milestone	Status

10 History

Document history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2001.11	RAN 1 #22	R1-01-1317					0.0.1
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This document is written in Microsoft Word version 2000							