**3GPP TSG-RAN WG4 Meeting # 98-bis-e R4-210XXXX**

**Electronic Meeting, 12th – 20th April, 2021**

**Agenda item:** 5.6.1,5.6.2

**Source:** Moderator (Intel Corporation)

**Title:** Email discussion summary for [98-bis-e][209]NR\_RRM\_Enh\_1

**Document for:** Information

# Introduction

The email discussion is intended to cover topics related to BWP switching on multiple CCs and UL spatial relation info switching in AI 5.6.1 in RRM enhancement core part and AI 5.6.2.2.4 (BWP switching on multiple CCs) and AI 5.6.2.2.8(UL spatial relation info switching) in RRM performance part..

# Topic #1: BWP Switching on multiple CCs (Core part)

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2104842**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101633.zip) | Apple | ***Observation #4:*** *RRC based BWP switch is applicable to SCell by parameter change, as defined since Rel-15.***Proposal #2: No change is required to requirements for RRC based BWP switch on multiple CCs.** |
| [**R4-2106458**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106458.zip) | Intel | **Observation 1: From the reply LS of RAN2, in Rel-15 or in Rel-16, the BWP switching for SCell using RRC message is not possible.****Observation 2: From the reply LS of RAN2, for the reconfiguration of any parameters (with the exception of *firstActiveDownlinkBWP-Id* or *firstActiveUplinkBWP-Id*), RAN2 has not specified whether this is a BWP switch or not.****Proposal 1: Clarify that requirement for RRC based BWP switching on a single CC apply for SpCell only.****Proposal 2: There is no scenario for RRC based simultaneous BWP switching on multiple CCs. Don’t need to design test case for the scenario.****Proposal 3: For non-simultaneous RRC based multiple BWP switching case, clarify that the requirement apply if there is only one CC in either PCell or PSCell.****Proposal 4:** **Delay time for non-simultaneous RRC based BWP switch on multiple CC will be updated to:**$$\frac{T\_{Waiting}+T\_{RRCprocessingDelay}+T\_{BWPswitchDelayRRC}}{NR slot length}$$ |
| [**R4-2106524**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106524.zip) | OPPO | **Observation 1: It is only feasible to change the active BWP by changing the ID via the RRC reconfiguration for SpCell.****Observation 2: It is also feasible to change the parameters of the active BWP via RRC reconfigurations for either SpCell or active SCell.****Observation 3: Whether it is a BWP switch or not that the reconfiguration of any parameters of an already active BWP of an SPCell or an Scell, which can be further discussed and confirmed by RAN4.****Observation 4: RRC based BWP switch is applicable to SCell, by changing the parameters of its active BWP without changing the ID for an active SCell.** **Proposal 1: The RRM requirements apply for RRC based BWP switch on multiple CCs by changing the parameters of the active BWP of the active SCells/SpCell.** |
| [**R4-2107154**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107154.zip) | Ericsson | * **Observation 1:** RRC based BWP switching can change any BWP parameter including *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id* on the SpCell.
* **Observation 2:** RRC based BWP switching can change any BWP parameter other than the *firstActiveDownlinkBWP-Id* or *firstActiveUplinkBWP-Id* on the SCell.
* **Proposal 1:** RRC based BWP switch delay requirement for single CC in section 8.6.3 is applicable to only SpCell.
* **Proposal 2:** Simultaneous RRC based BWP switch delay requirement for multiple CCs in section 8.6.3A.1 is removed.
* **Proposal 3:** Non-simultaneous RRC based BWP switch delay requirement for multiple CCs in section 8.6.3A.2 is applicable to only PCell and PSCell in NR-DC.
* **Proposal 4:** Define delay requirements for changing any BWP parameter other than the *firstActiveDownlinkBWP-Id* or *firstActiveUplinkBWP-Id* via RRC on SCel.
* **Proposal 5:** The delay requirement in proposal #4 is defined by reusing the delay defined in section 8.3.2, TS 38.133.
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| [**R4-2107221**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107221.zip) | Nokia, Nokia Shanghai Bell | 1. RRC-based simultaneous BWP switch on multiple CCs shall be supported in RAN4.
2. Clarify that RRC-based BWP switch on multiple CCs are appliable for SCells with the paramter change except the modification of parameters *firstActiveDownlinkBWP-Id* and *firstActiveUplinkBWP-Id*
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## Open issues summary and companies view’s collection

### Open issues and comments collection

**Issue 1-1-1: Whether requirement for RRC based BWP switch on single CC for Rel-16 is applicable**

* Option 1 (Ericsson, Intel): RRC based BWP switch delay requirement for single CC in section 8.6.3 is applicable to only SpCell.
* Recommended WF:
	+ Further discussion.

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| **Company** | **Comments** |
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**Issue 1-1-2: Whether requirement for RRC based BWP switch on multiple CCs for Rel-16 is applicable**

* Option 1(Apple, OPPO): Yes.
* Option 2(Nokia): Yes, further clarification is needed.
* Clarify that RRC-based BWP switch on multiple CCs are appliable for SCells with the paramter change except the modification of parameters firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id
* Option 3: No.
* Option 3a (Intel):
	+ Proposal 2: There is no scenario for RRC based simultaneous BWP switching on multiple CCs. Don’t need to design test case for the scenario.
	+ Proposal 3: For non-simultaneous RRC based multiple BWP switching case, clarify that the requirement apply if there is only one CC in either PCell or PSCell.
	+ Proposal 4: Delay time for non-simultaneous RRC based BWP switch on multiple CC will be updated to:

$$\frac{T\_{Waiting}+T\_{RRCprocessingDelay}+T\_{BWPswitchDelayRRC}}{NR slot length}$$

* Option 3b (Ericsson):
	+ Proposal 2: Simultaneous RRC based BWP switch delay requirement for multiple CCs in section 8.6.3A.1 is removed.
	+ Proposal 3: Non-simultaneous RRC based BWP switch delay requirement for multiple CCs in section 8.6.3A.2 is applicable to only PCell and PSCell in NR-DC.
	+ Proposal 4: Define delay requirements for changing any BWP parameter other than the firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id via RRC on SCell.
	+ Proposal 5: The delay requirement in proposal #4 is defined by reusing the delay defined in section 8.3.2, TS 38.133.
* Recommended WF:
	+ Further discussion.

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| **Company** | **Comments** |
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### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [**R4-2106460**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106460.zip)Intel |  |
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| [**R4-2106955**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106955.zip)Huawei, HiSilicon |  |
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| [**R4-2106956**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106955.zip)Huawei, HiSilicon |  |
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| [**R4-2107155**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107155.zip)Ericsson |  |
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| [**R4-2107222**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107155.zip)Nokia |  |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary**  |
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*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
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### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

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| **CR/TP number** | **CRs/TPs Status update recommendation**  |
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## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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# Topic #2: UL Spatial Relation Info Switching (Core part)

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2104842**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101633.zip) | Apple | ***Observation #1:*** *Section 8.14 already has known condition and delay requirements for PL-RS specified.****Observation #2:*** *With Option 1a it is unclear what the delay is when PL-RS is unknown and would also need to define PL-RS unknown condition with UL spatial relation switch.* ***Observation #3:*** *Longer delay is expected is acceptable when the delay cannot be quantified in certain conditions. We already have delay requirements for PL-RS switch.* **Proposal #1: Refer to section 8.14 for additional delay due to PL-RS switch in UL spatial relation switch for known PL-RS.** |
| [**R4-2106458**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106458.zip) | Intel | **Proposal 5: For Delay requirements for MAC–CE based UL spatial relation switch for PUCCH, support option 1a.** |

## Open issues summary and companies view’s collection

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Open issues and comments collection

**Issue 2-1-1: Delay requirements for MAC–CE based UL spatial relation switch**

* Option 1 (Apple, Intel): Refer to section 8.14 for additional delay due to PL-RS switch in UL spatial relation switch for known PL-RS.
* Recommended WF:
	+ Further discussion.

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| **Company** | **Comments** |
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### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [**R4-2105003**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2105003.zip)Apple |  |
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| [**R4-2106935**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2105003.zip)Huawei, HiSilicon |  |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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*Suggestion on WF/LS assignment*

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|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
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### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

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| **CR/TP number** | **CRs/TPs Status update recommendation**  |
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## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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# Topic #3: BWP Switching on multiple CCs (Performance part)

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2106957**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101634.zip) | Huawei, HiSilicon | **Proposal 1: RAN4 to define test cases for simultaneous RRC based BWP switch on multiple CCs and not to have test cases for partial overlapping cases.****Proposal 2: RAN4 to define following test cases for RRC based BWP switch on multiple CCs.****TC1: RRC based Active BWP Switch on multiple CCs on FR1 in EN-DC (LTE PCell + NR FR1 PSCell + NR FR1 SCell )****TC2: RRC based Active BWP Switch on multiple CCs on FR2 in EN-DC (LTE PCell + NR FR2 PSCell + NR FR2 SCell )****TC3: RRC based Active BWP Switch on multiple CCs on FR1 in SA (NR FR1 PCell + NR FR1 SCell + NR FR1 SCell)****TC4: RRC based Active BWP Switch on multiple CCs on FR2 in SA (NR FR2 PCell + NR FR2 SCell + NR FR2 SCell)** |
| [**R4-2107223**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101634.zip) | Nokia, Nokia Shanghai Bell | 1. RAN4 shall support RRC-based simultaneous BWP switch on multiple CCs.
2. The test case list for RRC based simultaneous BWP switch on multiple CCs shall be:

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|  | **Test cases** |
| RRC based simultaneous BWP switch on multiple CCs | TC1: EN-DC with NR FR1 cell (E-UTRAN PCell + NR FR1 PSCell + NR FR1 SCell)TC2: EN-DC with NR FR2 cell (E-UTRAN PCell + NR FR2 PSCell + NR FR2 SCell)TC3: SA with NR FR1 cell (NR FR1 PCell + NR FR1 SCell + NR FR1 SCell)TC4: SA with NR FR2 cell (NR FR2 PCell + NR FR2 SCell + NR FR2 SCell) |

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## Open issues summary and companies view’s collection

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Open issues and comments collection

**Issue 3-1-1: RAN4 to define test cases for simultaneous RRC based BWP switch on multiple CCs**

* Option 1 (Huawei, Nokia):
* TC1: EN-DC with NR FR1 cell (E-UTRAN PCell + NR FR1 PSCell + NR FR1 SCell)
* TC2: EN-DC with NR FR2 cell (E-UTRAN PCell + NR FR2 PSCell + NR FR2 SCell)
* TC3: SA with NR FR1 cell (NR FR1 PCell + NR FR1 SCell + NR FR1 SCell)
* TC4: SA with NR FR2 cell (NR FR2 PCell + NR FR2 SCell + NR FR2 SCell)
* Recommended WF:
	+ Depending on conclusion of Issue 1-1-2. Further discussion.

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| **Company** | **Comments** |
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### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [**R4-2106958**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101635.zip)Huawei, HiSilicon |  |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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*Suggestion on WF/LS assignment*

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|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
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### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

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| **CR/TP number** | **CRs/TPs Status update recommendation**  |
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## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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|  | **Status summary**  |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
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# Topic #4: UL Spatial Relation Info Switching (Performance part)

## Companies’ contributions summary

NA.

## Open issues summary and companies view’s collection

NA.

### Open issues and comments collection

NA.

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

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| **CR/TP number** | **Comments collection** |
| [**R4-2104901**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104901.zip)Qualcomm, Inc. |  |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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*Suggestion on WF/LS assignment*

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|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
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### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

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| **CR/TP number** | **CRs/TPs Status update recommendation**  |
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## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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|  | **Status summary**  |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
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# Recommendations for Tdocs

## 1st round

**New tdocs**

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| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
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**Existing tdocs**

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| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
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Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

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| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
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Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents