**GTW on Aug-22**

**Sub-topic 2-4 : Guidelines for RRM requirements**

**Issue 2-4-1: Guidelines for RRM requirements on MRTD**

* Discuss candidate scenarios on NR-CA.
* Proposals
  + Scenario 1: async NR-CA *[FFS]*
  + Scenario 2: sync NR-CA
* MRTD will be discussed in RRM session based on the scenarios(s) from RAN4#105.

**Discussions:**

Softbank: we are fine with moderator proposal. Supporting both scenarios of async and sync NR-CA are desirable. But we are not sure if for n78/77 async case is valid. But in the future we may need consider async.

NTT DOCOMO: we are fine with the proposal. We need more time to check is all the options should be considered. Intra-band EN-DC type 2 assumes 30us for async. We need more discussion for values.

Skyworks: One of assumption is there is no simultaneous Tx-Rx for overlapped TDD bands. Can we agree with it?

Apple: Echo Skyworks. For TDD bands, the sync operation should be assumed to make deployment simpler.

Ericsson: There will be no simultaneous Tx-Rx. But the deployement can be non-collocated with guard. MRTD can also be 30us.

Samsung: agree MRTD should be discussed in RRM session. Whether sync NR-CA is necessary should be decided in main session. Sync operation is assumed for all the CA. Async is not necessary to be supported for NR CA.

Moderator: for simulatenous Rx-Tx, it is discussed in issue 2-1-1b to preclude Tx-Rx simulatenous operation in the 2nd round.

Huawei: About Tx-Rx simultaneous operation, all the companies agree to prohibit it.

Skyworks: We can discuss it later in other issue. The major aspect architecture assume non-simultaneous operation for CA.

**Agreement:**

* Agree to consider sync NR-CA scenario.
  + No Tx-Rx simultaneous operation is assumed to be supported for sync NR-CA scenario.
* FFS async NR-CA scenario.

**Sub-topic 2-2 : UE RF architecture baseline**

Issue 2-2-1 is split into sub-issues ‘2-2-1 (a)’ and ‘2-2-1 (b)’ as follows.

**Issue 2-2-1 (a): UE RF architecture**

* For further clarification, add the wording “total 4 Rx Chain” to Option 1 of 1st round as follows:
* Proposal
  + Reuse UE RF architecture of inter-band non-contiguous DC\_42\_n77/78 EN-DC Type-2 (i.e. 2 layer/2 Rx Chain per CC, total 4 Rx Chain)

**Discussions:**

Skyworks: agree with proposal as long as 4Rx chain is for RF aspect and there may be more CC in one RF chain.

Samsung: Similar view as Skyworks. 2Rx chain per CC is separate chain. Antenna and RFIC are separate. Not sure if baseband should be separate. We just need to assume that BB is separate.

Vivo: we should clarify RF chain means Antenna. BB can be shared.

Apple: Architecure for EN-DC may be a good start point. But it is not clear from companies’ view which of RF or BB should be separate or shared. We can just use EN-DC architecture as starting point.

ZTE: share the similar view as skyworks. RF chain is only for RF aspect. We need further discuss the meaning of RF chain. We should preclude BB part from RF chain.

Samsung: now it is clear the antenna and RF chain are separated and only whether BB is separate or shared is unclear. RF chain is separated means separate LNA but LNA would share the AGC setting. Should we study one AGC setting for type II?

Skyworks: only four antenna and RF chains is assumed. LNA should be shared as input at least. Whether and how the antenna path can be shared, or BB be shared need further discussions.

Samsung: we agree with Skyworks. The antenna assumption is 4. Not sure if Skyworks is talking about the Type-3.

Skyworks: we can further discuss if LNA output can be shared or separate.

Huawei: it is better not to preclude separate LNA.

Skyworks: how can you have separate LNA going to the same antenna from the input of LNA?

Huawei: we do not say to only apply on separate LNA but just keep the option open.

Samsung: agree with Skyworks. If companies have concern, we can change the total 4Rx.

Apple: Based on the discussion, there is no consensus whether LNA is shared or separate. Type-2 means two LNA will be used for one CC and two LNA used for other ones. We would like to keep the type-2 as baseline.

Samsung: we cannot see the LNA can be separate. LNA cannot be shared. We do not know whether we need it as the baseline.

Skyworks: the minimum capability can be supported by using this architecture for UE to support collocated scenario. It does not prevent the discussion for other scnearios with more CCs or Rx being supported.

**Agreement:**

* Total four RF antenna is assumed.
* Reuse UE RF architecture of inter-band non-contiguous DC\_42\_n77/78 EN-DC Type-2 (i.e. 2 layer/2 Rx Chain per CC, total 4 Rx Chain) as the baseline.

**Issue 2-2-2: CA bandwidth class**

* Proposal
  + 1 CC on each sub-block. This means to be a total of 2 CC, i.e. n78(2A)/n77(2A) for CA as baseline, but 3 CC, i.e. n77(3A)/n78(3A) is not precluded.

Discussions:

Skyworks: we need sort out the architecture first for the prioritized case. Then we have clear view whether to intra…

Samsung: 1CC on each sub-block and total of 2CC should be prioritized. But we do not preclude 3CC case.

KDDI: two CC is prioritized and currently we do not preclude 3 CC case.

Apple: Similar view. 3CC case should not start before 2 CC.

Huawei: agree with 2CC being prioritized.

Apple: does 3CC means all 3CCs are not collocated? We need further discussion.

Samsung: we means 3CC non-collocated since 3CC collocated is specified.

Skyworks: the assumptions is no matter how many CC two BSs are used. 2CC from one BS and 1CC from another one.

Ericsson: Agree with skyworks. We are talking about two non-collocated sub-blocks.

**Agreement:**

* 1 CC on each sub-block. This means to be a total of 2 CC, i.e. n78(2A)/n77(2A) for CA as baseline
  + 3 CC, i.e. n77(3A)/n78(3A), is not precluded. The work on 3CC should be done after work for 2CC is finalized and it is clear how many non-collocated base stations are assumed.

**Sub-topic 2-3 : RF requirements**

**Issue 2-3-1: Power Imbalance and in-band blocking**

* Proposal
  + 25dB power imbalance, 1dB REFSENS relaxation. RAN4 may revisit if there is technical concern.

Discussions:

Samsung: we have concern on “revisit”. What does “revisit” mean? Does it mean that RAN4 will have multiple requirements for different power imbalance values or to reduce the value. The latter one is not acceptable.

Skyworks: For type-2, there is independent AGC for each CC. For other case, we may need to revist the power imbalance is applicable. For type-2 there is no reason to revisit.

Huawei: In some cases with high densitiy and NLOS, 25dB will shrink the cell. I want to know how operator operate the shrunk cell scenario?

ZTE: the issue needs clarified. Whether it is for type II only or other types need be considered. If it is former one, we agree with Samsung. For other type, the value depends on the UE architecture.

Vivo: We share the similar view as Samsung for RESFEN is discussed for Rel-16. We do not need to revist the requirement of REFSENS.

Apple: Agree that 25dB has been discussed extensively for EN-DC case. It is better to keep discussion being open. We need further check if it is applicable for CA case.

Huawei: if operator said with lower REFENS they can fully operation cell. Then we do not see any issue of reduction for 25dB.

KDDI: from operator point of view, if migrating from EN-DC for CA, 25dB should be kept. If there is different values, then operator will occur problem in migration.

Apple: for EN-DC case, we can assume non-ideal backhaul. But for CA we assume ideal backhaul. We are not sure if the same assumption will be kept.

Samsung: 25dB is reused from EN-DC case which is derived based on RF architecture. If CA share the same architecture, we see no reason.

**Agreement:**

* 25dB power imbalance, 1dB REFSENS relaxation. RAN4 may revisit if there is technical concern.