3GPP TSG RAN Meeting #70
Sitges, Spain, Dec. 7 - 10, 2015

RP-152011

Considerations regarding LAA specification in 3GPP RAN

Source: Orange, Telecom Italia

Introduction: Reminder on the inherent difference between LTE operation over exlusively Licensed spectrum and LAA secondary cell operation

- LAA secondary cell operates over unlicensed bands
- Unlicensed spectrum is considered by 3GPP as a tool to augment operators service offering but it can never match the qualities of the licensed regime
- LAA operation requires also specific coexistence and access mechanisms that are not the same for LTE operation over exclusively licensed spectrum
- For that no confusion should be permitted in 3GPP specification between the technologies specified to operate over licensed spectrum and those designed to operate over unlicensed spectrum
- Inaccurate specification would give the impression outside 3GPP that one could revert use of technologies defined for licensed spectrum and unlicensed spectrum. This would have severe consequences on the way the LTE technology and the evolutions we develop are interpreted outside from 3GPP(Performance, value of licensed spectrum, etc)

LAA related agreements in Nov.15 meetings

- RAN1 agreed the following by email, Section 4 of TS36.211 CR [R1-15xxxx]:

”

Downlink, uplink and sidelink transmissions are organized into radio frames with $T_f = 307200 \times T_s = 10\ \mathrm{ms}$ *duration.*

Three radio frame structures are supported:

- *Type 1, only applicable to FDD,*
- *Type 2, only applicable to TDD,*
- *Type 3, only applicable to LAA secondary cell operation* “

1. This statement reads that Type 3 is applicable only to LAA secondary cell operation but as such, does not exclude that other frame structure types cannot be applicable to LAA secondary cell.
2. Type 3 is the only frame structure that was studied and agreed to be specified to operate for LAA secondary cell
3. TDD technology as defined in 3GPP so far using frame structure 2 is not applicable as such to LAA secondary cell operation while guarantying the necessary coexistence with other technologies such as WLAN
4. Our understanding is that TDD and FDD terms in the RAN1 specification refer to the related technologies as specified in 3GPP for LTE under the assumption that they are used over an exclusively licensed spectrum to deliver performances that can be guaranteed only with exclusively licensed spectrum

LAA related agreements in Nov.15 meetings

- RAN4 on the other side had a very tight discussion regarding necessary clarification of the nature of the 5GHz band (Band 46). The following CRs R4-158443 and R4-158444 were agreed to introduce this band respectively in TS 36.101 and TS.36.104

- R4-158443 reads in section 4.2 on **Applicability of minimum requirements:**
- **"…**
- f) The requirements in this specification for TDD operating bands apply for downlink and uplink operations using Frame Structure Type 2 [4] except for Band 46 operating with Frame Structure Type 3."

- This implies that band 46 (5GHz band) which is an unlicensed band is considered as a TDD operating band, which of course put side to side with the RAN1 agreement in TS 36.211that states that "*Type 2,* only applicable to TDD," could be interpreted that some LAA operations can use FS Type 2 for there secondary cell operation.

- This kind of confusing statements should be avoided. Unlicensed bands that would be operated as LAA secondary cells should be explicitly flagged in RAN4 specification as such and referred to differently from normal TDD operation. Indeed, they are not normal TDD bands using TDD technology as defined in 3GPP.

Proposals and way forward

- To avoid any misinterpretation, it is proposed that:

Proposal 1: RAN1 agreement in Section4 of TS36.211 CR is revised with the following note:

" *Three radio frame structures are supported:*

- *Type 1, only applicable to FDD,*
- *Type 2, only applicable to TDD,*
- *Type 3, only applicable to LAA secondary cell operation* (1)

(1) With LTE-LAA operation only Type 3 frame structure is applicable"

Proposal 2 : RAN4 CR in R4-158443 section 4.2 on Applicability of minimum requirements is revised as follows:

"…

f) The requirements in this specification for TDD operating bands apply for downlink and uplink operations using Frame Structure Type 2 [4]

g) Unlicensed bands operated as LAA secondary cells can only use Frame Structure Type 3"

Proposal 3: RAN4 CR in R4-158443 and in R4-15444 should be revised (E-UTRA operating bands tables 5.5-1) so that the duplex mode for unlicensed bands is not TDD but TDD-LAA.. An alternative proposal would be to put unlicensed bands in a separate table that gathers exclusively Unlicensed bands.