

On NR-LTE V2X Co- Channel Coexistence

Perspectives for Release 18

ITS Competitive Landscape

3GPP

- LTE V2X: basic use cases (safety)
- NR V2X: advanced use cases
- These two technologies have not been designed to coexist in the same channel
 - This was discussed in the Rel-16 scoping phase, eg see RP-181063 “*Phase II of [NR_V2X] Study Item email discussion*”, Objective 6
 - The approved Rel-16 Study Item on NR V2X (RP-181480) stated
 - *Advanced V2X services provided by NR sidelink coexisting with V2X service provided by LTE sidelink in different channels (i.e., **not co-channel**). Not co-channel could include both adjacent channel and channels that are sufficiently far apart.*
 - *NOTE: It is assumed that any coexistence requirements and mechanisms of NR sidelink with non-3GPP technologies will not be defined by 3GPP.*

IEEE

- IEEE 802.11p
- New version in development called IEEE 802.11bd
- Even though this would cause some constraints in terms of performance, 802.11bd adds functionalities that enable it to nominally operate co-channel with 802.11p

Benefits of LTE/NR V2X Co-Channel Coexistence

- Enables 'tiered-down' services while ITS spectrum allocations are being decided.
 - New services can take advantage of NR V2X's high spectral efficiency and HARQ feedback
 - A LTE/NR "Dynamic Spectrum Sharing"-like solution can be designed to protect LTE- V2X in a controlled manner
 - We believe NR V2X can share the same channel with LTE V2X better than LTE V2X can coexist with itself
- Maximizes deployment flexibility and enables new technology migration paths.
 - In co-channel deployments, the new services availability over a localized area will be tiered & dynamic and will be based on LTE V2X penetration & vehicle density
 - Allows for eventual transition from LTE-V2X to NR-V2X
- Creates feature parity with 802.11p/bd

Additional considerations



- There should be no changes to LTE V2X only devices
- R18 NR/LTE coexistence design should not be deployed on NR V2X only clean channels
 - R14 and R16/17 are not designed to dynamically coexist on the same channel (only static partition)
 - Improvements are not required for NR-only V2X channels
- Strive for no hardware changes to NR V2X Rel-16/17

Proposal

- **Proposal: study the following in Rel-18**
 - Co-channel coexistence between NR V2X & LTE V2X, including necessary modifications to NR V2X
 - Draft study item in RP-21xxxx



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