

Rel-18 NR above 52.6 GHz

Agenda Item:

4.1

Source:

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Discussion

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- WI for enhancement of NR 52.6 ~ 71 GHz
- SI for NR extension up to 114.25 GHz

WI for enhancement of NR 52.6 ~ 71 GHz

Rel-17 NR extension up to 71GHz

- Baseline feature enablement for 60GHz (unlicensed) band
 - Targets general eMBB enhancements, and not optimized for various verticals.
 - Extension of FR2 design to support wider bandwidths and larger subcarrier spacing.
 - Rel-17 design is not complete, so difficult to estimate all the baseline features that will be available at the end of Rel-17.
 - Extremely likely that the following improvements will be not considered (or at the very least not optimized) in Rel-17:
 - Lower process latency (compared to FR2),
 - Lower power consumption and improved energy efficiency,
 - Enhancement to peak data throughput (such as 256QAM, etc)
 - Improved coverage

Rel-18 Focus Areas for Improvement (1/2)

▪ Lower Processing Latency & Higher Peak Data Throughput

- Optimized support for UEs not limited to handheld form factors and handheld device power constraints.
- More advanced UE capability (than what is available in Rel-17)
- Increasing peak throughput by supporting 256 QAM (possibly also 1kQAM).
Investigation on techniques that could lower implementation challenge barrier for even higher order modulation.
 - e.g. non-uniform constellation, etc.

▪ Improved Energy Efficiency & Lower Power Consumption

- Its no surprise power efficiency for devices operating in 60GHz is going to be lower compared to FR1/FR2
- Power saving techniques to further improve power consumption could be an interesting area to pursue.
- New feature support to improve power efficiency could be equally interesting.
 - For example, low PAPR/CM multi-rank transmission (possibly leveraging DFT-s-OFDM)

Rel-18 Focus Areas for Improvement (2/2)

▪ Improved Coverage

- Coverage enhancement explicitly left out from Rel-17 WID
- Potentially supporting of transmission techniques to combat limited EIRP and PSD enforced by regulatory domains.

▪ Leftovers from Rel-17

- Channel access enhancements (possibly including support or enhancements for Rx-assisted LBT)
- Beam management enhancements

Rel-18 Focus Areas for Expansion & Optimization



Positioning

Leveraging extremely wide BW for improved precision and accuracy.

Key feature in supporting various verticals.



Fixed Wireless & IAB

Optimizations to better support fixed wireless communication, and IAB.

Leveraging much higher EIRP regulatory limits (e.g. in UE mobile links are limited to 40dBm EIRP, while fixed wireless have 85dBm EIRP).



V2X & ITS

Harmonized ITS band located at 64 ~ 66 GHz.

Enablement of V2X/ITS operation in 60GHz band

Note: these enhancements could be part of a vertical WI scope (if an enhancements WI for the vertical is approved)

SI for NR extension up to 114.25 GHz

SI for NR extension up to 114.25 GHz

FR1 (0.41 ~ 7.125 GHz)

FR2 (24.25 ~ 52.6 GHz)

E-BAND (60-90 GHz)

W BAND (75-110 GHz)

SI Target

Already Lightly Licensed around the Globe for fixed wireless

Unlicensed 60 GHz band

E-Band & W-Band

- Enabler for ultra-wide band spectrum usages for both licensed & unlicensed

Rel-17 WI

- While 52.6 GHz ~ 71 GHz has been identified a candidate for future licensed operation deployments, currently lack actual approved licensing.
- Primary to support unlicensed operation (in practice)
- Use cases are limited within 52.6 ~ 71 GHz.

Rel-18+ Goals

- Natural extension to investigate licensed bands that are already available in E or W-band.
- Focus on enablement of ultra-wideband spectrum for licensed operation.

SI Scope & Rel-18 Targets

- Likely need to be separate a SI from NR 52.6 ~ 71 GHz enhancement.
- Scope for Rel-18
 - Target study of NR support up to 100GHz (or even up to 114.25 GHz)
 - A general waveform study for 52.6 ~ 100 GHz
 - Investigation into whether existing channel model (TR38.901) that supports up to 100GHz need updates/tweaks.
 - Preparation for potential WI in Rel-19 timeframe.

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