

Top 3 things that happened on 6G waveform, channel coding and modulation at RAN1 #126

THE VERDICT

1. RAN1 concluded there is no consensus to support any constellation shaping scheme for either DL or UL; some proponents of some schemes stated they would agree to withdraw them. The RAN#112 conclusion reproduced in the chair notes says the shaping study stops if there is no consensus in Q3/26 (RAN1 did not itself declare the study stopped); whether RAN plenary acted on this after the meeting was not checked. (R1-2606762)
2. On higher-order modulation, RAN1 observed that DL 4K QAM and UL 1K QAM, if supported, are restricted to fixed wireless access and not eMBB, and gave four options instead of one recommendation: three recommend adopting UL 1K QAM and differ on DL 4K QAM, and the fourth records no consensus to recommend anything. Whether RAN plenary acted on this after the meeting was not checked. (R1-2606762)
3. For the new LDPC base graph BG3, RAN1 supported the lower-triangular sub-matrix E (Option E2) and excluded the identity matrix. Answering a RAN plenary task, it agreed that BG3 in UL is mandatory with capability signaling, except that it is optional for UEs with up to 20 MHz maximum UL channel bandwidth in any band supported by the UE; RAN plenary may add exceptions. (R1-2606761)

WHO PUSHED WHAT

OPEN QUESTION	COMPANY	WHAT THEY PUSH	TDOC
Which, if any, constellation shaping approach should 6GR support?	NTT DOCOMO	NTT DOCOMO proposes 1D-NUC, potentially for modulation order Qm at least 6.	R1-2606495 not treated
	Tejas Networks	Tejas Networks proposes probabilistic shaping.	R1-2606777 not treated
	Samsung	Samsung proposes ending the shaping study and using uniform QAM alone if no single scheme gains consensus.	R1-2606785 not treated
Which uplink waveform enhancements warrant further work?	Qualcomm	Qualcomm proposes DFT-s-OFDM with pi/2 BPSK and frequency-domain truncation.	R1-2606370 not treated
	CATT	CATT proposes supporting symmetric and asymmetric FDSS spectrum extension.	R1-2605713 not treated
	LG Electronics	LG Electronics proposes relaxing the DFT-size restriction.	R1-2605504 not treated
How should the new LDPC base graph be constructed?	Tejas Networks	Tejas Networks proposes 44 information columns and maximum lifting size 192 for further study.	R1-2605655 not treated
	CATT	CATT proposes row splitting, no inherent double edges and a lower-triangular extension sub-matrix.	R1-2605714 not treated

KEY OUTCOMES

- **Constellation shaping (a conclusion, not an agreement).** No consensus on any shaping scheme for DL or UL. The chair notes reproduce the RAN#112 condition that the study stops without consensus in Q3/26. (R1-2606762)
- **Higher-order modulation (observations and options for RAN plenary).** RAN1 observes that, if supported, DL 4K QAM and UL 1K QAM are restricted to fixed wireless access, to be enforced in the specification; how is FFS. RAN1 listed four options, one of which records no consensus to recommend anything. (R1-2606762)
- **BG3 in uplink.** BG3 in UL is mandatory with capability signaling, and optional for UEs with up to 20 MHz maximum UL channel bandwidth in any band supported by the UE. Further exceptions are for RAN plenary. (R1-2606761)
- **Uplink PAPR reduction shortlist.** RAN1 completed a list of three techniques for further down-selection: FDSS with no spectrum extension or truncation, FDSS with spectrum extension, and FDSS with spectrum truncation, each with candidate modulations listed. RAN1 targets a down-selection of transparent or non-transparent FDSS and of the modulation (at least for 16QAM) at RAN1 #126bis; the applicable spectral-efficiency range is FFS. (R1-2606760)

Full brief with every quote, source and caveat: [HTML](#) · [PDF](#)

Coverage: RAN1 #126 (Maastricht, 2026-08-24 to 2026-08-28), topic agenda items only. Scout read 61 recorded decisions and 167 company positions or passages; the full brief cites 12 TDocs and shows each verbatim quote, matched against the TDoc text. Summaries are Scout's reading. Register status not treated means the meeting recorded no decision on the document, not that it was rejected. Not covered: plenary decisions after the meeting, email discussions.

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