



**5G;
High power UE (power class 1.5 or 2) for NR Intra-band Carrier
Aggregation (CA) with high power on FDD or TDD band
(3GPP TR 38.794 version 19.0.0 Release 19)**



Reference

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Foreword

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Version x.y.z

where:

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 - 1 presented to TSG for information;
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 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

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should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document is a technical report for release 19 High power UE (power class 1.5 or 2) for NR intra-band Carrier Aggregation (CA) or NR inter-band CA/Dual connectivity (DC) band combinations with/without NR SUL (supplementary uplink).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP RP-241679, "Rel-19 High power UE (power class 1.5 or 2) for NR intra-band Carrier Aggregation (CA) or NR inter-band CA/Dual connectivity (DC) band combinations with/without NR SUL (supplementary uplink)".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

3.2 Symbols

For the purposes of the present document, the following symbols apply:

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

<ABBREVIATION>	<Expansion>
TDD	Time Division Duplex
UE	User Equipment

4 Background

At 3GPP RAN#104, a basket Work Item on "High power UE (power class 1.5 or 2) for NR intra-band Carrier Aggregation (CA) or NR inter-band CA/Dual connectivity (DC) band combinations with/without NR SUL (supplementary uplink)" [2] was approved for Rel-19, which includes several objectives as illustrated in the following table, with each objective associated with a technical report.

Rel-19 High power UE (power class 1,5 and 2) for NR CA/DC combinations with/without NR SUL		
Obj.	Band combination list	Power class cases for uplink
1	High power UE (power class 1.5 or 2) for NR Intra-band Carrier Aggregation (CA) with high power on FDD or TDD band	1UL(FDD): PC2 on FDD band 1UL(TDD): PC1.5 or PC2 on TDD band Note: single UL carrier for FDD, Single UL carrier or intra-band UL CA for TDD
2	High power UE (power class 1.5 or 2) for NR Inter-band Carrier Aggregation (CA)/Dual connectivity (DC) with/without SUL (supplementary uplink) with high power on TDD band(s) Note: Including PC3 FDD/TDD+ PC3 TDD case	PC2 inter-band CA/DC: 1UL(TDD): PC2 on TDD band 2UL (TDD+TDD): PC3 or PC2 on TDD band 2UL (FDD+TDD): PC3 on FDD band, PC3 or PC2 on TDD band
		PC1.5 inter-band CA/DC: 1UL(TDD): PC 1.5 on TDD band 2UL (TDD+TDD): PC3, PC2 or PC1.5 on TDD band 2UL (FDD+TDD): PC3 on FDD band, PC1.5 on TDD band
2		PC2 SUL band combinations with or without CA: SUL: PC3 or PC2 on SUL band NUL(TDD): PC2 on TDD band PC1.5 SUL band combinations with or without CA: SUL: PC3 or PC2 on SUL band NUL(TDD): PC1.5 on TDD band NUL = Normal Uplink in contrast to SUL.
3	High power UE (power class 2) for NR Inter-band Carrier Aggregation (CA)/Dual connectivity (DC) with high power on FDD band(s) Note: Including PC3 FDD+ PC3 FDD	1UL(FDD): PC2 on FDD band 2UL (FDD+FDD): PC3 on FDD band
4	High power UE (power class 1.5) for NR Inter-band Carrier Aggregation (CA)/Dual connectivity (DC) with high power on both FDD and TDD bands	2UL (FDD+TDD): PC2 on FDD band, PC2 or PC1.5 on TDD band

The objective #1 of the core part for this basket Work Item is as follows:

- For Objective 1:
 - For NR intra-band downlink CA with PC2 or 1.5 TDD band or PC2 FDD band, introduce band combinations to the CA configuration tables and specify maximum output power.
 - For NR intra-band uplink CA with PC2 or 1.5 FR1 TDD band, introduce band combinations to the CA configuration tables and specify requirements for intra-band UL CA with or without UL MIMO/TxD.

The present document is a technical report for the above objective on NR intra-band CA in this basket Work Item.

5 High power for NR TDD or FDD intra-band downlink CA with single UL carrier

5.1 CA_n25(3A) with UL n25

5.1.1 Configurations

The configuration is specified as Table 5.5A.2-1 of TS 38.101-1.

5.1.2 UE maximum output power

The PC2 requirements in clause 6.2.1 of TS 38.101-1 apply for UE maximum output power of the uplink carrier under this configuration.

5.1.3 UE additional maximum output power reduction

There is no additional maximum output power reduction issue.

5.1.4 ΔR_{IBNC}

This configuration is already specified in TS 38.101-1, however, the ΔR_{IBNC} values are missing from the latest specifications.

Similar to the way for power class 3, the same the ΔR_{IBNC} values apply to all secondary component carriers for operation with three or more non-contiguous component carriers.

For PC2 CA_n25(3A) with UL n25, ΔR_{IBNC} values are proposed to the same as CA_n25(2A) as illustrated in the following table:

CA configuration	SCS (kHz)	Aggregated channel bandwidth (PCC+SCC)	W_{gap} / [MHz]	UL PCC allocation	SCC ΔR_{IBNC}^1 (dB)	SCC ΔR_{IBNC}^2 (dB)	Duplex mode
CA_n25(2A) ⁹ CA_n25(3A) ⁹	15/15	5MHz + 5MHz NOTE 1	$W_{\text{gap}} = 55.0$	10^5	7.3^8	10.0^8	FDD
			$W_{\text{gap}} = 30.0$	25	0.0^8	0.0^8	
NOTE 1: For operation with three or more non-contiguous component carriers, all combinations of channel bandwidths defined in Table 5.5A.2-1.							
NOTE 8: For operation with three or more non-contiguous component carriers, ΔR_{IBNC} applies to all secondary component carriers.							
NOTE 9: Bandwidth Combination Set 0							

6 High power for NR FR1 TDD intra-band uplink CA with or without UL MIMO/TxD

6.1 CA_n79C with UL MIMO

6.1.1 Configurations

The configuration is specified as Table 5.5A.1-1 of TS 38.101-1.

6.1.2 UE maximum output power

For intra-band UL contiguous CA and UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the maximum output power is defined as the sum of the maximum output power from both UE antenna connectors and all UL CCs. The period of measurement shall be at least one sub frame (1 ms), as specified in Table 6.1.2-1.

Table 6.1.2-1: UE Power Class for intra-band UL contiguous CA with UL MIMO in closed loop spatial multiplexing scheme

NR CA Configuration	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
CA_n79C			26	+2/-3	23	+2/-3		
NOTE: $P_{\text{PowerClass}}$ is the maximum UE power specified without taking into account the tolerance.								

6.1.3 UE additional maximum output power reduction

There is no A-MPR issue for this CA configuration.

Annex A (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2024-08	RAN4 #112	R4-2411107				TR skeleton	0.0.1
2025-08	RAN4#116	R4-2511831				Adding CA_n25(3A) with UL n25	0.0.2
2025-08	RAN4#116	R4-259376				Adding PC2 CA_n79C with UL MIMO	0.0.2
2025-09	RAN#109	RP-252725				Submission to RAN plenary for information	1.0.0
2025-10	RAN4#116bis	R4-2513245				Editorial changes	1.0.1
2025-12	RAN#110	RP-253501				Submission to RAN plenary for approval	2.0.0

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2025-12	RAN#110					Approved by plenary – Rel-19 spec under change control	19.0.0

History

Version	Date	Status
V19.0.0	February 2026	Publication