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| 3GPP TR 38.895 V18.0.0 (2023-12) | |
| Technical Report | |
| 3rd Generation Partnership Project;  Technical Specification Group Radio Access Network;  High power UE (power class 1.5) for NR FR1 TDD single band (Release 18) | |
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Contents

Foreword 4

1 Scope 6

2 References 6

3 Definitions of terms, symbols and abbreviations 6

3.1 Terms 6

3.2 Symbols 6

3.3 Abbreviations 6

4 Background 7

5 High power for FR1 TDD single bands with power class 1.5 UE 7

5.1 NR band n34 7

5.1.1 UE maximum output power 7

5.1.2 UE additional maximum output power reduction 7

5.2 NR band n40 8

5.2.1 UE maximum output power 8

5.2.2 UE additional maximum output power reduction 8

5.3 NR band n39 8

5.3.1 UE maximum output power 8

5.3.2 UE additional maximum output power reduction 8

Annex A (informative): Change history 9

# Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

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

**shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

**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 18 basket WI High power UE (power class 1.5) for NR FR1 TDD single band. The purpose is to gather the relevant background information and studies in order to complete the band specific requirements for the newly requested bands for power class 1.5 UE under TDD mode.

# 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-222351: “New WID on High power for FR1 TDD single bands with power class 1.5 UE”.

[3] 3GPP RP-223499: “Revised WID on High power UE (power class 1.5) for NR FR1 TDD single band”.

# 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].

UE User Equipment

TDD Time Division Duplex

# 4 Background

At 3GPP RAN#97 meeting, a basket Work Item on “High power for FR1 TDD single bands with power class 1.5 UE” [2] was approved for Rel-18. At 3GPP RAN#98 meeting, the WID is revised [3]. The objectives of the core part are as follows:

Develop RF requirements that are applicable to PC1.5 UE mobile device and FWA for NR TDD bands.

- Introduction of high power UE (power class 1.5) operation for NR TDD bands.

- Including bands n34, n39, n40 as in table 1. Other bands based on operators request.

- Specify RF characteristics with dual-PA assumption, including following requirements if needed.

- UE maximum output power

- Tx power tolerance

- A-MPR, if needed

- Reuse existing SAR mechanism.

Table 1: Power class 1.5 NR TDD bands within FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR FDD band | Contact name, company | Contact email | Other supporting companies  (min. 3) | Status  (new, ongoing, completed, stopped) |
| n34 | Chunxia GUO, CMCC | guochunxia@chinamobile.com | CATT, ZTE, Huawei | completed for PC2, new for PC1.5 |
| n39 | Chunxia GUO, CMCC | guochunxia@chinamobile.com | CATT, ZTE, Huawei | completed for PC2, new for PC1.5 |
| n40 | Chunxia GUO, CMCC | guochunxia@chinamobile.com | CATT, ZTE, Huawei | completed for PC2, new for PC1.5 |

The present document is a technical report for this basket Work Item.

# 5 High power for FR1 TDD single bands with power class 1.5 UE

## 5.1 NR band n34

### 5.1.1 UE maximum output power

Table 5.1.1-1: UE Power Class

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n34 |  |  | 295 | +2/-3 | 26 | +2/-3 | 23 | ±2 |
| NOTE: Achieved via dual Tx | | | | | | | | |

### 5.1.2 UE additional maximum output power reduction

Void.

## 5.2 NR band n40

### 5.2.1 UE maximum output power

Table 5.2.1-1: UE Power Class

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n40 |  |  | 295 | +2/-3 | 26 | +2/-3 | 23 | ±2 |
| NOTE: Achieved via dual Tx | | | | | | | | |

### 5.2.2 UE additional maximum output power reduction

Void

## 5.3 NR band n39

### 5.3.1 UE maximum output power

Table 5.3.1-1: UE Power Class

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n39 |  |  | 295,7 | +2/-3 | 26 | +2/-3 | 23 | ±2 |
| Note: PC1.5 considerations for bands n39 35 MHz CBW will be handled in WID “Adding new channel BWs support to existing NR bands [RAN4 WI: NR\_bands\_R18\_BWs-Core]”. | | | | | | | | |

### 5.3.2 UE additional maximum output power reduction

In 3GPP RAN4 #104bis meeting, following agreements is approved to evaluate A-MPR for NS\_50.

- A-MPR including 5MHz and region need to be re-evaluated.

- Evaluate the PC1.5 A-MPR requirements for NS\_50 for band n39, using the Rel-17 RF assumptions for mobile devices.

- The new PC1.5 A-MPR requirements to be defined for NS\_50 are also applicable for FWA devices.

# Annex A (informative): Change history

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| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2022-10 | RAN4 #104-bis-e | R4-2215853 |  |  |  | TR skeleton | 0.0.1 |
| 2023-02 | RAN4 #106 | R4-2301577 |  |  |  | Adding band n34, n40 | 0.1.0 |
| 2023-04 | RAN4 #106-bis-e | R4-2304281 |  |  |  | Add note 7 for PC1. N39 | 0.2.0 |
| 2023-12 | RAN#102 | RP-233521 |  |  |  | Provide endorsed TR to RAN plenary for one step approval | 1.0.0 |

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| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2023-12 | RAN#102 |  |  |  |  | Approved by plenary – Rel-18 spec under change control | 18.0.0 |