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| 3GPP TR38.787 V0.0.1 (2024-04) |
| Technical Report |
| 3rd Generation Partnership Project;Technical Specification Group Radio Access Network;User Equipment (UE) radio transmission and reception forNR Sidelink supporting intra-band CA in ITS band (Release 19) |
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# 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 sidelink evolution services in Rel-18. The purpose is to specify radio solutions that are necessary to support sidelink services working on unlicensed spectrums.

# 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 TR 30.007: "Guideline on WI/SI for new Operating Bands".

[3] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".

# 3 Definitions of terms, symbols and abbreviations

## 3.1 Definitions

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].

Definition format (Normal)

**<defined term>:** <definition>.

**example:** text used to clarify abstract rules by applying them literally.

## 3.2 Symbols

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

Symbol format (EW)

<symbol> <Explanation>

## 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].

ACLR Adjacent Channel Leakage Ratio

ACS Adjacent Channel Selectivity

AGC Automatic Gain Control

A-MPR Additional Maximum Power Reduction

BLER BLock Error Rate

BS Base Station

CBW Channel Bandwidth

CDF Cumulative Distribution Function

CP-OFDM Cyclic Prefix-OFDM

DMRS Demodulation Reference Signal

EIRP Equivalent Isotropically Radiated Power

EVM Error Vector Magnitude

FDD Frequency Division Duplex

FDM Frequency Division Multiplexing

FR1 Frequency Range 1

ITS Intelligent Transportation System

LTE Long Term Evolution

MPR Maximum Power Reduction

NF Noise Figure

NR New Radio

OLPC Open Loop Power Control

PC Power Control

PRB Physical Resource Block

ProSe Proximity-based Services

PSCCH Physical Sidelink Control CHannel

PSSCH Physical Sidelink Shared CHannel

REFSENS Reference Sensitivity

RF Radio Frequency

SCS Sub-Carrier Spacing

SINR Signal to Interference plus Noise Ratio

SL Sidelink

 Sidelink at unlicensed band

SNR Signal-to-Noise Ratio

TDD Time Division Duplex

TDM Time Division Multiplexing

UE User Equipment

UL Uplink

V2V Vehicle to Vehicle

V2X Vehicle to Everything

# 4 Background

In Rel-18, RAN4 specified the following NR sidelink requirements:

(1) NR sidelink CA (n47) with intra-band contiguous CA and power class 3

(2) NR sidelink single carrier in unlicensed spectrum (n46/n96/n102) with power class 5 for 1 Tx and 5 NS values

(3) NR sidelink inter-band con-current operation with power class 3 at NR Uu licensed band + power class 5 at un-licensed band

 sidelink CA, automotive industry shows strong interest towards power class 2/3 in contiguous and non-contiguous intra band SL CA to account for the fragmented utilization of different channels of 10MHz and 20MHz in n47 and to achieve sufficient communication range (5GAA LS in RP-240023)..

# 5 Operating bands and channel arrangement for Sidelink CA

## 5.1 Operating bands

### 5.1.1 Operating band for intra-band contiguous CA

### 5.1.2 Operating band for intra-band non-contiguous CA

## 5.2 Channel bandwidth

### 5.2.1 Channel bandwidth for intra-band contiguous CA

### 5.2.2 Channel bandwidth for intra-band non-contiguous CA

# 6 Transmitter characteristics for NR Sidelink supporting intra-band CA in ITS band

## 6.1 Tx requirements for SL intra-band contiguous CA

### 6.1.1 Maximum output power

### 6.1.2 UE maximum output power reduction

### 6.1.3 UE additional maximum output power reduction

### 6.1.4 Configured transmitted power

## 6.2 Tx requirements for SL intra-band non-contiguous CA

### 6.2.1 Maximum output power

### 6.2.2 UE maximum output power reduction

### 6.2.3 UE additional maximum output power reduction

### 6.2.4 Configured transmitted power

# 7 Receiver characteristics for NR Sidelink supporting intra-band CA in ITS band

## 7.1 Rx requirements for SL intra-band contiguous CA

### 7.1.1 Reference sensitivity

### 7.1.2 Maximum input level

### 7.1.3 Adjacent Channel Selectivity

### 7.1.4 Blocking characteristics

### 7.1.5 Spurious response

### 7.1.6 Intermodulation characteristics

## 7.2 Rx requirements for SL intra-band non-contiguous CA

### 7.2.1 Reference sensitivity

### 7.2.2 Maximum input level

### 7.2.3 Adjacent Channel Selectivity

### 7.2.4 Blocking characteristics

### 7.2.5 Spurious response

### 7.2.6 Intermodulation characteristics

# Annex A: Change history

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| **Change history** |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
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