**3GPP TSG-RAN2 Meeting # 130 *draft* R2-2503422**

**St.Julians, Malta, May 19th – 23rd, 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.300** | **CR** | **DraftCR** | **rev** | **-** | **Current version:** | **18.5.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Introduction of SBFD in TS 38300 (Running CR) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_duplex\_evo-Core | | | | |  | ***Date:*** | | | 2025-05-08 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-19 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduction of the SBFD feature in TS38.300 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. In subclause 3.1, introducing the abbreviation of SBFD. 2. Introducing the clauses of SBFD. | | | | | | | | |
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| ***Consequences if not approved:*** | | NG-RAN cannot support SBFD. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3, X(new), X.1(new), X.2(new) | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 38.321 CR ...  TS 38.331 CR ...  TS 38.306 CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Revision of R2-2501851 | | | | | | | | |

# 3 Abbreviations and Definitions

## 3.1 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1], in TS 36.300 [2] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1] and TS 36.300 [2].

5GC 5G Core Network

5GS 5G System

5QI 5G QoS Identifier

A2X Aircraft-to-Everything

A-CSI Aperiodic CSI

AGC Automatic Gain Control

AI Artificial Intelligence

AKA Authentication and Key Agreement

AMBR Aggregate Maximum Bit Rate

AMC Adaptive Modulation and Coding

AMF Access and Mobility Management Function

AR Augmented Reality

ARP Allocation and Retention Priority

ATG Air to Ground

BA Bandwidth Adaptation

BCCH Broadcast Control Channel

BCH Broadcast Channel

BFD Beam Failure Detection

BH Backhaul

BL Bandwidth reduced Low complexity

BPSK Binary Phase Shift Keying

BRID Broadcast Remote Identification

C-RNTI Cell RNTI

CAG Closed Access Group

CAPC Channel Access Priority Class

CBRA Contention Based Random Access

CCE Control Channel Element

CD-SSB Cell Defining SSB

cellDTRX-RNTI Cell Discontinuous Transmission and Reception RNTI

CFR Common Frequency Resource

CFRA Contention Free Random Access

CG Configured Grant

CHO Conditional Handover

CIoT Cellular Internet of Things

CLI Cross Link interference

CMAS Commercial Mobile Alert Service

CORESET Control Resource Set

CP Cyclic Prefix

CPA Conditional PSCell Addition

CPC Conditional PSCell Change

DAA Detect And Avoid

DAG Directed Acyclic Graph

DAPS Dual Active Protocol Stack

DFT Discrete Fourier Transform

DCI Downlink Control Information

DCP DCI with CRC scrambled by PS-RNTI

DCR Direct Communication Request

DL-AoD Downlink Angle-of-Departure

DL-SCH Downlink Shared Channel

DL-TDOA Downlink Time Difference Of Arrival

DMRS Demodulation Reference Signal

DRX Discontinuous Reception

DSR Delay Status Report

DTX Discontinuous Transmission

E-CID Enhanced Cell-ID (positioning method)

EC Energy Cost

EHC Ethernet Header Compression

ePWS enhancements of Public Warning System

ETWS Earthquake and Tsunami Warning System

FS Feature Set

FSA ID Frequency Selection Area Identity

G-CS-RNTI Group Configured Scheduling RNTI

G-RNTI Group RNTI

GFBR Guaranteed Flow Bit Rate

GIN Group ID for Network selection

GNSS Global Navigation Satellite System

GSO Geosynchronous Orbit

H-SFN Hyper System Frame Number

HAPS High Altitude Platform Station

HRNN Human-Readable Network Name

IAB Integrated Access and Backhaul

IFRI Intra Frequency Reselection Indication

I-RNTI Inactive RNTI

INT-RNTI Interruption RNTI

KPAS Korean Public Alarm System

L2 Layer-2

L3 Layer-3

LBT Listen Before Talk

LDPC Low Density Parity Check

LEO Low Earth Orbit

LTM L1/L2 Triggered Mobility

MBS Multicast/Broadcast Services

MCE Measurement Collection Entity

MCCH MBS Control Channel

MDBV Maximum Data Burst Volume

MEO Medium Earth Orbit

MIB Master Information Block

MICO Mobile Initiated Connection Only

MFBR Maximum Flow Bit Rate

ML Machine Learning

MMTEL Multimedia telephony

MNO Mobile Network Operator

MO-SDT Mobile Originated SDT

MP Multi-Path

MPE Maximum Permissible Exposure

MRB MBS Radio Bearer

MT Mobile Termination

MT-SDT Mobile Terminated SDT

MTCH MBS Traffic Channel

MTSI Multimedia Telephony Service for IMS

MU-MIMO Multi User MIMO

Multi-RTT Multi-Round Trip Time

MUSIM Multi-Universal Subscriber Identity Module

N3C Non-3GPP Connection

NB-IoT Narrow Band Internet of Things

NCD-SSB Non Cell Defining SSB

NCGI NR Cell Global Identifier

NCL Neighbour Cell List

NCR Neighbour Cell Relation

NCRT Neighbour Cell Relation Table

NES Network Energy Savings

NGAP NG Application Protocol

NGSO Non-Geosynchronous Orbit

NID Network Identifier

NPN Non-Public Network

NR NR Radio Access

NSAG Network Slice AS Group

NTN Non-Terrestrial Network

P-MPR Power Management Maximum Power Reduction

P-RNTI Paging RNTI

PCH Paging Channel

PCI Physical Cell Identifier

PDB Packet Delay Budget

PDC Propagation Delay Compensation

PDCCH Physical Downlink Control Channel

PDSCH Physical Downlink Shared Channel

PEI Paging Early Indication

PER Packet Error Rate

PH Paging Hyperframe

PLMN Public Land Mobile Network

PNI-NPN Public Network Integrated NPN

PO Paging Occasion

PQI PC5 5QI

PRACH Physical Random Access Channel

PRB Physical Resource Block

PRG Precoding Resource block Group

PRS Positioning Reference Signal

PS-RNTI Power Saving RNTI

PSDB PDU Set Delay Budget

PSER PDU Set Error Rate

PSI PDU Set Importance

PSIHI PDU Set Integrated Handling Information

PSS Primary Synchronisation Signal

PTM Point to Multipoint

PTP Point to Point

PTW Paging Time Window

PUCCH Physical Uplink Control Channel

PUSCH Physical Uplink Shared Channel

PWS Public Warning System

QAM Quadrature Amplitude Modulation

QFI QoS Flow ID

QMC QoE Measurement Collection

QoE Quality of Experience

QPSK Quadrature Phase Shift Keying

RA Random Access

RA-RNTI Random Access RNTI

RACH Random Access Channel

RANAC RAN-based Notification Area Code

REG Resource Element Group

RIM Remote Interference Management

RLM Radio Link Monitoring

RMSI Remaining Minimum SI

RNA RAN-based Notification Area

RNAU RAN-based Notification Area Update

RNTI Radio Network Temporary Identifier

RQA Reflective QoS Attribute

RQoS Reflective Quality of Service

RS Reference Signal

RSRP Reference Signal Received Power

RSRQ Reference Signal Received Quality

RSSI Received Signal Strength Indicator

RSTD Reference Signal Time Difference

RTT Round Trip Time

RVQoE RAN visible QoE

SBFD Sub-Band Full Duplex

SCS SubCarrier Spacing

SD Slice Differentiator

SDAP Service Data Adaptation Protocol

SDT Small Data Transmission

SD-RSRP Sidelink Discovery RSRP

SFI-RNTI Slot Format Indication RNTI

SHR Successful Handover Report

SIB System Information Block

SI-RNTI System Information RNTI

SLA Service Level Agreement

SL-PRS Sidelink Positioning Reference Signal

SL-RSRP Sidelink RSRP

SMC Security Mode Command

SMF Session Management Function

SMTC SS/PBCH block Measurement Timing Configuration

S-NSSAI Single Network Slice Selection Assistance Information

SNPN Stand-alone Non-Public Network

SNPN ID Stand-alone Non-Public Network Identity

SpCell Special Cell

SPR Successful PSCell Addition/Change Report

SPS Semi-Persistent Scheduling

SR Scheduling Request

SRAP Sidelink Relay Adaptation Protocol

SRS Sounding Reference Signal

SRVCC Single Radio Voice Call Continuity

SS Synchronization Signal

SSB SS/PBCH block

SSS Secondary Synchronisation Signal

SSSG Search Space Set Group

SST Slice/Service Type

SU-MIMO Single User MIMO

SUL Supplementary Uplink

TA Timing Advance

TB Transport Block

TCE Trace Collection Entity

TNL Transport Network Layer

TPC Transmit Power Control

TRP Transmit/Receive Point

TRS Tracking Reference Signal

TSS Timing Synchronization Status

U2N UE-to-Network

U2U UE-to-UE

UAV Uncrewed Aerial Vehicle

UCI Uplink Control Information

UDC Uplink Data Compression

UDM Unified Data Management

UE-Slice-MBR UE Slice Maximum Bit Rate

UL-AoA Uplink Angles of Arrival

UL-RTOA Uplink Relative Time of Arrival

UL-SCH Uplink Shared Channel

UPF User Plane Function

URLLC Ultra-Reliable and Low Latency Communications

VR Virtual Reality

V2X Vehicle-to-Everything

Xn-C Xn-Control plane

Xn-U Xn-User plane

XnAP Xn Application Protocol

XR eXtended Reality

# X SBFD

## X.1 General

Sub-Band Full Duplex (SBFD) operation is supported for a TDD carrier, enabling simultaneous downlink transmission and uplink reception at the gNB on their respective sub-bands. From UE perspective, full duplex is not supported. The configurations of cell-specific SBFD time and frequency resources are provided through SIB1 or dedicated signalling.

Editor Notes: The input from RAN1 on this clause will be merged together. CLI handing and Tx/Rx/Measurement procedures are supposed to be provided by RAN1.

## X.2 SBFD Random Access

Random access procedure in SBFD symbols is supported for all existing RACH trigger events as described in clause 9.2.6, except for the event of request for other SI.

Editor Note: FFS for LTM-related triggers.

Both CBRA and CFRA can be supported on SBFD sub-bands. Only the 4-step RA type using SBFD RACH resources can be supported.

Two RACH configuration options are specified for SBFD RA in TS 38.331 [12]. A cell can configure only one RACH configuration option. This can be either: 1) A single RACH configuration that supports both non-SBFD RA operation and SBFD RA operation, or 2) A dual RACH configuration where a RACH configuration is used for non-SBFD RA operation and an additional RACH configuration is designated for SBFD RA operation, as outlined in TS 38.331 [12]. An SBFD aware UE that supports the RACH configuration option configured in the cell applies the corresponding RACH configuration. Otherwise, the SBFD aware UE applies the non-SBFD RA operation.

Editor Notes: The definition of SBFD aware UE is FFS and will align with RAN1.

# Annex of meeting agreements:

## RAN2 #129bis

Agreements on SBFD RACH aspects

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| * On RO type signaling for CFRA   1. For CFRA triggered by BFR, the RO type is indicated in BeamFailureRecoveryConfig.  2. For CFRA triggered by ReconfigurationwithSync, the RO type is indicated in RACH-ConfigDedicated.   * When both NW indication on RO type and RSRP threshold are absent, it is up to UE implementation to select the RO type. * Random access procedure in SBFD symbols is supported for all the existing RACH trigger events except for SI request. FFS for LTM. |

Additional agreements on SBFD RACH aspects

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| * NW indicate via explicit signaling whether the SBFD RO is selected when SSB RSRP are 'below' or 'above' the configured threshold. * Working assumption: For SBFD-aware UE, the selection of RO type is suggested to be performed before the selection of the set of Random Access resources. * RO-Type change procedure on RO type selection from legacy RO to additional RO in SBFD symbols is supported when the number of PRACH transmission attempts exceed a threshold (we assume it is the same threshold with the fallback from additional RO to legacy RO). If fallback from legacy RO to additional RO occurs, no further fallback to legacy RO is supported. |

Agreements on other SBFD aspects

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| * Send an LS to RAN1 (CC RAN3 and RAN4) on whether SBFD and DC can be configured simultaneously, and whether there is any issue for such configuration. * Working assumption: The configured SP CLI measurement resource sets are initially deactivated upon (re-) configuration by upper layers and after reconfiguration with sync. * SP CLI measurement resource set activation/deactivation MAC CE includes following fields: A/D, Serving Cell ID, BWP ID, CLI measurement resource set ID (for CLI-RSSI or SRS-RSRP measurement), TCI State IDs. |

## RAN2 #129

Agreements on random access in SBFD

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| * When a SBFD aware UE supporting one or both SBFD RACH configuration options accesses a cell, the UE can apply the supported SBFD RACH configuration option in the cell. * When a SBFD aware UE supporting a SBFD RACH configuration option accesses a cell configured with a different SBFD RACH configuration option, the UE applies the legacy RA operation, and does not apply the SBFD RACH configuration. * For initial RA transmission, the network can indicate the RO type (legacy RO or additional RO) to the SBFD-aware UE for the case of CBRA. Detailed signalling is FFS. * If no RO type indication is provided by the NW, a UE selects RO type based on a SSB RSRP threshold. FFS whether NW can further indicate whether to select the additional RO type below or above this SSB RSRP threshold. * FFS whether RO type selection is performed before or after the RA type selection. * FFS if switching from the PRACH resources in non-SBFD symbols to the PRACH resources in SBFD symbols is supported. |

Agreement on other aspects for SBFD

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| * A new SP CLI measurement resource set activation/deactivation MAC CE is introduced to activate/deactivate the SP CLI measurement resource. |

## RAN2 #128

**Agreements on RACH with SBFD**

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| CFRA   * The RO type is indicated by NW for CFRA. FFS on signaling (can FFS for the SI request case if needed).   CBRA   * FFS on the following options   **Option 1**  Upon initiation of RACH procedure for a SBFD-aware UE, network provides the indication on the prioritization of the additional ROs over legacy RO.  **If there is no such indication from the NW, FFS on the following mechanism**   * **UE select legacy RO or SBFD RO based on SSB RSRP, or** * **UE select the legacy RO, or** * **UE select the SBFD RO, or** * **Other metrics than SSB RSRP.**   **Option 2**  **UE select legacy RO or SBFD RO based on SSB RSRP if such condition is configured, and if not configured, then UE can prioritize one type of the ROs, FFS which one.**  RACH configuration   * Only one RACH configuration option (i.e., either RACH configuration Option 1 with Alt 1-1 or RACH configuration Option 2) is supported in a cell. |

**Agreements on other aspects for SBFD**

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| * Prioritization of SBFD cells / frequencies during cell reselection is not considered. * RAN2 wait for input from the other WGs regarding whether for inter-cell CSI-RS measurements, UE needs to be provided with information of the SBFD configuration of neighbouring cells. |

## RAN2 #127bis

**Agreements on RACH with SBFD**

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| * RAN2 understand that if additional RO is selected by SBFD-aware UE, early identification via Msg1 is possible from NW point of view for this UE without specification impact. * From R2 point of view, there is no need to introduce SBFD as a new feature combination in the current PRACH preamble partitioning framework. * Upon initiation of CBRA RACH procedure for a SBFD-aware UE, UE selects one type of ROs between legacy-ROs and additional-ROs based on certain specified/configured conditions/prioritizations, if no additional indication (FFS if there needs to be any) is from network. * For the PRACH transmission re-attempt in one RACH procedure, after certain (configured) number of times of RACH attempt in SBFD RACH occasions, UE is allowed to switch to legacy RACH occasions. FFS about the case when UE select legacy ROs first. * The following two RACH configuration options are considered for SBFD based random access:   + - Option 1: Use one single RACH configuration based on the existing parameters of the single RACH configuration. Can extend the existing parameters if needed.     - Option 2: Use two separate RACH configurations, including one legacy RACH configuration and one additional RACH configuration * For RACH configuration Option 2, RAN2 needs to specify RRC signalling for the new SBFD based RACH configuration with a new set of parameters. * The RACH configuration for SBFD is transmitted via SIB1. * FFS dedicated RRC signalling detail. FFS whether NW can provide both configurations. |

**Agreements on other aspects for SBFD**

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| * For UL resource muting for PUSCH, the configuration of time and frequency location for UL resource muting should be introduced based on R1 agreement. * For L1 based UE-to-UE CLI measurement mechanism, the configuration of periodic, semi-persistent or aperiodic UE-to-UE CLI measurement resource (set) should be introduced based on R1 agreement. * For L1 based UE-to-UE CLI reporting mechanism, the configuration of report quantities should be introduced based on R1 agreement. |

## RAN2 #127

**Agreements on RACH with SBFD**

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| * Working assumption: Random access procedure in SBFD symbols is supported for all the existing RACH trigger events. * RAN2 assume RACH configuration for SBFD via SIB and/or dedicated RRC signalling is supported. Detailed signalling FFS. * RAN2 to strive for a common SBFD CBRA framework independent of RRC state. * FFS whether/how early indication is used during a SBFD RA procedure. * RAN2 focus on 4-step RACH for SBFD RA, FFS on 2-step if needed. |

**Agreements on other aspects for SBFD**

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| * Cell-specific SBFD time/frequency configuration is provided by SIB1 (or via dedicated signalling to covey cell specific configuration). FFS on UE specific dedicated RRC configuration if needed, pending on RAN1 progress. |