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Contents

Foreword

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

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y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

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The present document is part 3 of a multi-part Technical Specification (TS) covering the New Radio (NR) User Equipment (UE) conformance specification, which is divided in the following parts:

FFS

1 Scope

The present document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain RF characteristics for carrier aggregation between Range 1 and Range 2 and additional requirements due to NR non-standalone (NSA) operation mode with E-UTRA.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the "*definition and applicability*" part of the test.

For example only Release 15 and later UE declared to support 5G-NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

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.
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- 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*.

Editor's note: intended to capture more references

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

[2] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone"

[3] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone"

[4] 3GPP TS 38.101-3: "NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios"

[5] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception"

[6] 3GPP TS 38.508-1: "5GS; User Equipment (UE) conformance specification; Part 1: Common test environment"

[7] 3GPP TR 38.905: "NR; Derivation of test points for radio transmission and reception conformance test cases"

[8] 3GPP TS 38.521-1:" User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 Standalone

[9] 3GPP TS 38.521-2:" NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Range 2 Standalone"

[10] 3GPP TS 36.521-1:" Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing"

[11] 3GPP TS 36.508:" Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing"

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 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 TR 21.905 [1].

Editor's note: intended to capture definitions

3.2 Symbols

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

$\Delta R_{IB,c}$	Allowed reference sensitivity relaxation due to support for CA or DC operation, for serving cell *c*.
$\Delta T_{IB,c}$	Allowed maximum configured output power relaxation due to support for CA or DC operation, for serving cell *c*
$BW_{LTE\_Channel}$	Channel bandwidth of E-UTRA carrier
$BW_{LTE\_Channel\_CA}$	Channel bandwidth of E-UTRA sub-block which is composed of intra-band contiguous CA E-UTRA carriers
$BW_{NR\_Channel}$	Channel bandwidth of NR carrier
$BW_{NR\_Channel\_CA}$	Channel bandwidth of NR sub-block which is composed of intra-band contiguous CA NR carriers
Ceil(x)	Rounding upwards; ceil(x) is the smallest integer such that ceil(x) $\geq$ x
EN-DC_{ACLR}	The ratio of the filtered mean power centred on the aggregated sub-block bandwidth ENBW to the filtered mean power centred on an adjacent bandwidth of the same size ENBW
E-$UTRA_{ACLR}$	E-UTRA ACLR
F_C	*RF reference frequency* for the carrier centre on the channel raster
F_{DL_low}	The lowest frequency of the downlink *operating band*
F_{DL_high}	The highest frequency of the downlink *operating band*
F_{UL_low}	The lowest frequency of the uplink *operating band*
F_{UL_high}	The highest frequency of the uplink *operating band*
F_{OOB}	The boundary between the NR out of band emission and spurious emission domains
L_{CRB}	Transmission bandwidth which represents the length of a contiguous resource block allocation expressed in units of resources blocks
Max()	The largest of given numbers
Min()	The smallest of given numbers
NR_{ACLR}	NR ACLR
N_{RB}	Transmission bandwidth configuration, expressed in units of resource blocks
P_{CMAX}	The configured maximum UE output power
RB_{start}	Indicates the lowest RB index of transmitted resource blocks
W_{gap}	The sub-block gap between the two sub-blocks

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 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 TR 21.905 [1].

ACLR	Adjacent Channel Leakage Ratio
ACS	Adjacent Channel Selectivity
A-MPR	Additional Maximum Power Reduction
BCS	Bandwidth Combination Set
CA	Carrier Aggregation
CC	Component carrier
DC	Dual Connectivity
EN-DC	E-UTRA/NR DC
EVM	Error Vector Magnitude
FR	Frequency Range
ENBW	The aggregated bandwidth of an E-UTRA sub-block and an adjacent NR sub-block
ITU-R	Radiocommunication Sector of the International Telecommunication Union
MBW	Measurement bandwidth defined for the protected band

MPR	Allowed maximum power reduction
MSD	Maximum Sensitivity Degradation
MCG	Master Cell Group
NR	New Radio
NS	Network Signalling
NSA	Non-Standalone, a mode of operation where operation of another radio is assisted with another radio
OOB	Out-of-band
OOBE	Out-of-band emission
OTA	Over The Air
PRB	Physical Resource Block
RE	Resource Element
REFSENS	Reference Sensitivity
RF	Radio Frequency
Rx	Receiver
SCG	Secondary Cell Group
SCS	Subcarrier spacing
SEM	Spectrum Emission Mask
SUL	Supplementary uplink
TDM	Time Division Multiplex
Tx	Transmitter
UE	User Equipment

k Multiple Antenna transmissionULSUP Uplink sharing from UE perspective

4 General

4.1 Relationship between minimum requirements and test requirements

The present document is interwork specification for NR UE, covering RF characteristics and minimum performance requirements. Conformance to the present specification is demonstrated by fulfilling the test requirements specified in the conformance specification 3GPP TS 38.521-3 [5].

The Minimum Requirements given in this specification make no allowance for measurement uncertainty. The test specification TS 38.521-3 [5] defines test tolerances. These test tolerances are individually calculated for each test. The test tolerances are used to relax the minimum requirements in this specification to create test requirements. For some requirements, including regulatory requirements, the test tolerance is set to zero.

The measurement results returned by the test system are compared - without any modification - against the test requirements as defined by the shared risk principle.

The shared risk principle is defined in Recommendation ITU-R M.1545 [6].

4.2 Applicability of minimum requirements

a) In this specification the Minimum Requirements are specified as general requirements and additional requirements. Where the Requirement is specified as a general requirement, the requirement is mandated to be met in all scenarios

b) For specific scenarios for which an additional requirement is specified, in addition to meeting the general requirement, the UE is mandated to meet the additional requirements.

c) The spurious emissions power requirements are for the long-term average of the power. For the purpose of reducing measurement uncertainty it is acceptable to average the measured power over a period of time sufficient to reduce the uncertainty due to the statistical nature of the signal

4.3 Specification suffix information

Unless stated otherwise the following suffixes are used for indicating at 2nd level sub-clause, shown in Table 4.3-1.

Table 4.3-1: Definition of suffixes

Clause suffix	Variant
None	Single Carrier
A	Carrier Aggregation (CA)
B	Dual-Connectivity (DC)
C	Supplement Uplink (SUL)
D	UL MIMO

4.4 Test points analysis

The information on test point analysis and test point selection including number of test points for each test case is shown in TR 38.905 [7] clause 4.3.

5 Operating bands and Channel arrangement

5.1 General

The channel arrangements presented in this clause are based on the operating bands and channel bandwidths defined in the present release of specifications.

NOTE: Other operating bands and channel bandwidths may be considered in future releases.

Requirements throughout the RF specifications are in many cases defined separately for different frequency ranges (FR). The frequency ranges in which NR can operate according to this version of the specifications are identified as described in Table 5.1-1.

Table 5.1-1: Definition of frequency ranges

Frequency range designation	Corresponding frequency range
FR1	450 MHz – 6000 MHz
FR2	24250 MHz – 52600 MHz

The present specification covers band combinations including

- at least one FR1 operating band and one FR2 operating band for carrier aggregation and dual connectivity operations;
- at least one E-UTRA operating band for dual connectivity operations.

5.2 Operating bands

NR is designed to operate in FR1 operating bands defined in TS 38.101-1 [2] and FR2 operating bands defined in TS 38.101-2 [3]. E-UTRA is designed to operate in operating bands defined in TS 36.101 [4].

Editor's note: The lists of specific NR operating bands and band combinations is maintained in TR 38.817-01 and will be merged into TS 38.101-3 [4] in a future version.

5.2A Operating bands for CA

5.2A.1 Inter-band CA between FR1 and FR2

NR carrier aggregation is designed to operate in the operating bands defined in Table 5.2A.1-1. The band combinations include at least one FR1 operating band and one FR2 operating band.

Table 5.2A.1-1: Band combinations for NR CA

NR CA Band	NR Band
CA_n71A_n257A	n71, n257
CA_n77A-n257A	n77, n257
CA_n78A-n257A	n78, n257
CA_n79A-n257A	n79, n257

5.2B Operating bands for DC

5.2B.1 General

The operating bands are specified for operation with EN-DC or NGEN-DC configured. The band combinations include at least one E-UTRA operating band.

For EN-DC configurations indicated by column “Single Uplink allowed” (e.g., problematic band combinations as defined in TS38.306) in tables in this section the UE may indicate capability of not supporting simultaneous dual uplink operation due to possible intermodulation interference to its own downlink band if the intermodulation order is 2 or if the intermodulation order is 3 for the combinations when both operating bands are below 1 GHz or between 1695 MHz – 2690 MHz. In case for the EN-DC configurations listed in tables in this section the intermodulation products caused by the dual uplink operation do not interfere with the own downlink transmission as defined in Annex-A the UE is mandated to operate in dual and triple uplink mode. Single Uplink is also allowed for certain band combinations where intermodulation or reverse intermodulations product could create difficulty for meeting emission requirements.

5.2B.2 Intra-band contiguous EN-DC

Editor’s note: conducted requirements

5.2B.2.1 EN-DC (two bands)

Table 5.2B.2.1-1: Band combinations for EN-DC (two bands)

EN-DC band	E-UTRA Band	NR Band	Single UL allowed
DC_(n)71	71	n71	No[3]
DC_(n)41	41	n41	Yes[1]
NOTE 1: Single UL allowed due to potential emission issues, not self-interference. NOTE 2: The minimum requirements apply for 15 kHz subcarrier spacing on the SCG. NOTE 3: For UE(s) supporting dynamic power sharing it is mandatory to do dual simultaneous UL. For UE(s) not supporting dynamic power sharing single UL is allowed.			

5.2B.3 Intra-band non-contiguous EN-DC

Editor’s note: conducted requirements

5.2B.3.1 EN-DC (two bands)

Table 5.2B.3.1-1: Band combinations EN-DC (two bands)

EN-DC Band Uplink Combination	E-UTRA Band	NR Band	Single UL allowed
DC_3_n3	3	n3	Yes[1]
DC_41_n41	41	n41	Yes
NOTE 1: Only single switched UL is supported in Rel.15			

5.2B.3.2 EN-DC (three bands)

Table 5.2B.3.2-1: Band combinations EN-DC (three bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_41-41-n41	CA-41-41	n41	No

5.2B.4 Inter-band EN-DC within FR1

Editor's note: conducted requirements

5.2B.4.1 EN-DC (two bands)

Table 5.2B.4.1-1: Band combinations for EN-DC (two bands)

EN-DC band	E-UTRA Band	NR Band	Single UL allowed
DC_1_n28	1	n28	No
DC_1_n40	1	n40	No
DC_1_n51	1	n51	No
DC_1_n77[3]	1	n77	DC_1_n77
DC_1_n78[3]	1	n78	No
DC_1_n79[3]	1	n79	No
DC_2_n5	2	n5	No
DC_2_n66	2	n66	No
DC_2_n71	2	n71	No
DC_2_n78	2	n78	No
DC_3_n7	3	n7	No
DC_3_n28	3	n28	No
DC_3_n40	3	n40	No
DC_3_n51	3	n51	No
DC_3_n77[3]	3	n77	DC_3_n77
DC_3_n78[3]	3	n78	DC_3_n78
DC_3_n79[3]	3	n79	No
DC_5_n40	5	n40	No
DC_5_n66	5	n66	No
DC_5_n78[3]	5	n78	No
DC_7_n28	7	n28	No
DC_7_n51	7	n51	No
DC_7_n78[3]	7	n78	No
DC_8_n40	8	n40	No
DC_8_n77[3]	8	n77	No
DC_8_n78[3]	8	n78	No
DC_8_n79[3]	8	n79	No
DC_11_n77[3]	11	n77	No
DC_11_n78[3]	11	n78	No
DC_11_n79[3]	11	n79	No
DC_12_n5	12	n5	No
DC_12_n66	12	n66	No
DC_18_n77[3]	18	n77	No
DC_18_n78[3]	18	n78	No
DC_18_n79[3]	18	n79	No
DC_19_n77[3]	19	n77	No
DC_19_n78[3]	19	n78	No
DC_19_n79[3]	19	n79	No
DC_20_n8	20	n8	No
DC_20_n28[4]	20	n28	No
DC_20_n51	20	n51	No
DC_20_n77	20	n77	No
DC_20_n78[3]	20	n78	No
DC_21_n77[3]	21	n77	No
DC_21_n78[3]	21	n78	No
DC_21_n79[3]	21	n79	No

EN-DC band	E-UTRA Band	NR Band	Single UL allowed
DC_25_n41	25	n41	No
DC_26_n41[3]	26	n41	No
DC_26_n77[3]	26	n77	No
DC_26_n78[3]	26	n78	No
DC_26_n79[3]	26	n79	No
DC_28_n51	28	n51	No
DC_28_n77[3]	28	n77	No
DC_28_n78[3]	28	n78	No
DC_28_n79[3]	28	n79	No
DC_30_n5	30	n5	No
DC_30_n66	30	n66	No
DC_38_n78	38	n78	No
DC_39_n78[1,3]	39	n78	No
DC_39_n79[3]	39	n79	No
DC_40_n77	40	n77	No
DC_41_n77	41	n77	No
DC_41_n78	41	n78	No
DC_41_n79[2]	41	n79	No
DC_42_n51	42	n51	No
DC_42_n77	42	n77	No
DC_42_n78	42	n78	No
DC_42_n79	42	n79	No
DC_66_n71	66	n71	No
DC_66_n5	66	n5	No
DC_66_n78	66	n78	No

NOTE 1: The frequency range above 3600MHz for Band n78 is not used in this combination.
NOTE 2: The frequency range below 2545MHz for Band 41 is not used in this combination.
NOTE 3: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability.
NOTE 4: The frequency range in band 28 is restricted for this band combination to 703-733 MHz for the UL and 758-788 MHz for the DL.

5.2B.4.2 EN-DC (three bands)

Table 5.2B.4.2-1: Band combinations EN-DC (three bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3_n28	CA_1-3	n28	No
DC_1-3_n77[2]	CA_1-3	n77	DC_1_n77, DC_3_n77
DC_1-3_n78[2]	CA_1-3	n78	DC_3_n78
DC_1-3_n79[2]	CA_1-3	n79	No
DC_1-5_n78[2]	CA_1-5	n78	No
DC_1-5_n78[2]	CA_1-5	n78	No
DC_1-7_n28[2]	CA_1-7	n28	No
DC_1-7_n78 [2]	CA_1-7	n78	No
DC_1-7-7_n78[2]	CA_1-7-7	n78	No
DC_1-8_n78[2]	CA_1-8	n78	No
DC_1-18_n77[2]	CA_1-18	n77	No
DC_1-18_n78[2]	CA_1-18	n78	No
DC_1-18_n79	CA_1-18	n79	No
DC_1-19_n77[2]	CA_1-19	n77	DC_1_n77
DC_1-19_n78[2]	CA_1-19	n78	No
DC_1-19_n79[2]	CA_1-19	n79	No
DC_1-20_n28[3]	CA_1-20	n28	No
DC_1-20_n78[2]	CA_1-20	n78	No
DC_1-21_n77[2]	CA_1-21	n77	DC_1_n77
DC_1-21_n78[2]	CA_1-21	n78	No
DC_1-21_n79[2]	CA_1-21	n79	No
DC_1-28_n77[2]	CA_1-28	n77	No
DC_1-28_n78[2]	CA_1-28	n78	No
DC_1-28_n79	CA_1-28	n79	No
DC_1_n28-n78[2]	1	CA_n28-n78	No
DC_1_n77-n79	1	CA_n77-n79	No
DC_1_n78-n79	1	CA_n78-n79	No
DC_1-41_n77	CA_1-41	n77	No
DC_1-41_n78	CA_1-41	n78	No
DC_1-41_n79	CA_1-41	n79	No
DC_1-42_n77	CA_1-42	n77	DC_1_n77
DC_1-42_n78	CA_1-42	n78	No
DC_1-42_n79	CA_1-42	n79	No
DC_1_SUL_n78-n84[2]	1	SUL_n78-n84	No
DC_2-5_n66	CA_2-5	n66	No
DC_2-12_n66	CA_2-12	n66	No
DC_2-30_n66	CA_2-30	n66	No
DC_2-(n)71	CA_2-71	n71	No
DC_2-66_n71	CA_2-66	n71	No
DC_3_n3-n77	3	CA_n3-n77	DC_3_n3
DC_3_n3-n78	3	CA_n3-n78	DC_3_n3
DC_1-28_n77	CA_1-28	n77	No
DC_3-5_n78[2]	CA_3-5	n78	DC_3_n78
DC_3-7_n28	CA_3-7	n28	No
DC_3-7_n78[2]	CA_3-7	n78	DC_3_n78
DC_3-7-7_n78[2]	CA_3-7-7	n78	DC_3_n78

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_3-19_n77[2]	CA_3-19	n77	No
DC_3-19_n78[2]	CA_3-19	n78	No
DC_3-19_n79[2]	CA_3-19	n79	No
DC_3-20_n28[2,3]	CA_3-20	n28	No
DC_3-20_n78[2]	CA_3-20	n78	No
DC_3-21_n77[2]	CA_3-21	n77	No
DC_3-21_n78[2]	CA_3-21	n78	No
DC_3-21_n79[2]	CA_3-21	n79	No
DC_3-28_n78[2]	CA_3-28	n78	No
DC_3_n28-n78[2]	3	CA_n28-n78	DC_3_n78
DC_3-38_n78	CA_3-38	n78	DC_3_n78
DC_3-41_n78	CA_3-41	n78	DC_3_n78
DC_3-42_n77	CA_3-42	n77	DC_3_n77
DC_3-42_n78	CA_3-42	n78	DC_3_n78
DC_3-42_n79	CA_3-42	n79	No
DC_3_n77-n79	3	CA_n77-n79	No
DC_3_n78-n79	3	CA_n78-n79	No
DC_3_SUL_n78-n80[2]	3	SUL_n78-n80	DC_3_n78
DC_3_SUL_n78-n82[2]	3	SUL_n78-n82[1]	DC_3_n78
DC_3_SUL_n79-n80[2]	3	SUL_n79-n80	No
DC_5-7-7_n78	CA_5-7-7	n78	No
DC_5-7_n78	CA_5-7	n78	No
DC_5-30_n66	CA_5-30	n66	No
DC_7-7_n78	CA_7-7	n78	No
DC_7-20_n28[3]	CA_7-20	n28	No
DC_7-20_n78[2]	CA_7-20	n78	No
DC_7-28_n78[2]	CA_7-28	n78	No
DC_7_n28-n78[2]	7	CA_n28-n78	No
DC_7_n78[2]	CA_7	n78	No
DC_7-46_n78	CA_7-46	n78	No
DC_8_SUL_n78-n81[2]	8	SUL_n78-n81	No
DC_8_SUL_n79-n81[2]	8	SUL_n79-n81	No
DC_12-30_n66	CA_12-30	n66	No
DC_18-28_n77[2]	CA_18-28	n77	No
DC_18-28_n78[2]	CA_18-28	n78	No
DC_18-28_n79[2]	CA_18-28	n79	No
DC_19-21_n77[2]	CA_19-21	n77	No
DC_19-21_n78[2]	CA_19-21	n78	No
DC_19-21_n79[2]	CA_19-21	n79	No
DC_19-42_n77	CA_19-42	n77	No
DC_19-42_n78	CA_19-42	n78	No
DC_19-42_n79	CA_19-42	n79	No
DC_19_n77-n79	19	CA_n77-n79	No
DC_19_n78-n79	19	CA_n78-n79	No
DC_20_n8-n75	20	CA_n8-n75	DC_20_n8
DC_20_n28-n75[3]	20	CA_n28-n75	No

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_20_n28-n78[2,3]	20	CA_n28-n78	No
DC_20_n75-n78[2]	20	CA_n75-n78	No
DC_20_n76-n78[2]	20	CA_n76-n78	No
DC_20_SUL_n78-n82[2]	20	SUL_n78-n82	No
DC_20_SUL_n78-n83[2]	20	SUL_n78-n83[1]	No
DC_21-42_n77	CA_21-42	n77	No
DC_21-42_n78	CA_21-42	n78	No
DC_21-42_n79	CA_21-42	n79	No
DC_21_n77-n79	21	CA_n77-n79	No
DC_21_n78-n79	21	CA_n78-n79	No
DC_28-42_n77	CA_28-42	n77	No
DC_28-42_n78	CA_28-42	n78	No
DC_28-42_n79	CA_28-42	n79	No
DC_41-42_n77	CA_41-42	n77	No
DC_41-42_n78	CA_41-42	n78	No
DC_41-42_n79	CA_41-42	n79	No
DC_41_n77	CA_41	n77	No
DC_41_n78	CA_41	n78	No
DC_41_n79	CA_41	n79	No
DC_42_n77	CA_42	n77	No
DC_28_SUL_n78-n83[2]	20	SUL_n78-n83	No
DC_42_n77	CA_42	n77	No
DC_42_n78	CA_42	n78	No
DC_42_n79	CA_42	n79	No
DC_66_(n)71	CA_66-71	n71	No
DC_66_SUL_n78-n86[2]	20	SUL_n78-n86	DC_66_n78

NOTE 1: If a UE is configured with both NR UL and NR SUL carriers in a cell, the switching time between NR UL carrier and NR SUL carrier can be up to 140us.
NOTE 2: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability
NOTE 3: The frequency range in band 28 is restricted for this band combination to 703-733 MHz for the UL and 758-788 MHz for the DL.

5.2B.4.3 EN-DC (four bands)

Table 5.2B.4.3-1: Band combinations EN-DC (four bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3-5_n78[1]	CA_1-3-5	n78	DC_3_n78
DC_1-3-7_n28	CA_1-3-7	n28	No
DC_1-3-7-7_n78[1]	CA_1-3-7-7	n78	DC_3_n78
DC_1-3-7_n78[1]	CA_1-3-7	n78	DC_3_n78
DC_1-3-8_n78[1]	CA_1-3-8	n78	No
DC_1-3-28_n77[1]	CA_1-3-28	n77	No
DC_1-3-28_n78[1]	CA_1-3-28	n78	No
DC_1-3_n28-n78[1]	CA_1-3	CA_n28-n78	DC_3_n78
DC_1-3-28_n79[1]	CA_1-3-28	n79	No
DC_1-3-19_n77[1]	CA_1-3-19	n77	DC_1_n77, DC_3_n77
DC_1-3-19_n78[1]	CA_1-3-19	n78	DC_3_n78
DC_1-3-19_n79[1]	CA_1-3-19	n79	No
DC_1-3-20_n28[2]	CA_1-3-20	n28	No
DC_1-3-20_n78[1]	CA_1-3-20	n78	DC_3_n78
DC_1-3-21_n77[1]	CA_1-3-21	n77	DC_1_n77, DC_3_n77
DC_1-3-21_n78[1]	CA_1-3-21	n78	DC_3_n78
DC_1-3-21_n79[1]	CA_1-3-21	n79	No
DC_1-3-42_n77	CA_1-3-42	n77	DC_1_n77
DC_1-3-42_n78	CA_1-3-42	n78	No
DC_1-3-42_n79	CA_1-3-42	n79	No
DC_1-5-7_n78	CA_1-5-7	n78	No
DC_1-5-7-7_n78	CA_1-5-7-7	n78	No
DC_1-7-20_n28[2]	CA_1-7-20	n28	No
DC_1-7-20_n78[1]	CA_1-7-20	n78	No
DC_1-7_n28-n78[1]	CA_1-7	CA_n28-n78	No
DC_1-18-28_n77	CA_1-18-28	n77	No
DC_1-18-28_n78	CA_1-18-28	n78	No
DC_1-18-28_n79[1]	CA_1-18-28	n79	No
DC_1-19-42_n77	CA_1-19-42	n77	DC_1_n77
DC_1-19-42_n78	CA_1-19-42	n78	No
DC_1-19-42_n79	CA_1-19-42	n79	No
DC_1-20_n28-n78[1,2]	CA_1-20	CA_n28-n78	No
DC_1-21-28_n77[1]	CA_1-21-28	n77	No
DC_1-21-28_n78[1]	CA_1-21-28	n78	No
DC_1-21-28_n79[1]	CA_1-21-28	n79	No
DC_1-21-42_n77	CA_1-21-42	n77	DC_1_n77
DC_1-21-42_n78	CA_1-21-42	n78	No
DC_1-21-42_n79	CA_1-21-42	n79	No
DC_1-28-42_n77	CA_1-28-42	n77	No
DC_1-28-42_n78	CA_1-28-42	n78	No
DC_1-28-42_n79	CA_1-28-42	n79	No
DC_1-41-42_n77	CA_1-41-42	n77	No
DC_1-41-42_n78	CA_1-41-42	n78	No
DC_1-41-42-n79	CA_1-41-42	n79	No
DC_2-66-(n)71	CA_2-66-71	n71	
DC_3-5-7-7_n78	CA_3-5-7-7	n78	DC_3_n78

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_3-7_n28-n78[1]	CA_3-7	CA_n28-n78	DC_3_n78
DC_3-20_n28-n78[1,2]	CA_3-20	CA_n28-n78	DC_3_n78
DC_3-21-42_n77	DC_3-21-42	n77	DC_3_n77
DC_3-21-42_n78	DC_3-21-42	n78	DC_3_n78
DC_3-21-42_n79	DC_3-21-42	n79	No
DC_19-21-42_n77	CA_19-21-42	n77	No
DC_19-21-42_n78	CA_19-21-42	n78	No
DC_19-21-42_n79	CA_19-21-42	n79	No
DC_3-5-7_n78	CA_3-5-7	n78	DC_3_n78
DC_3-7-20_n28[2]	CA_3-7-20	n28	No
DC_3-7-28_n78[1]	CA_3-7-28	n78	No
DC_3-7-20_n78[1]	CA_3-7-20	n78	DC_3_n78
DC_3-19-21_n77[1]	CA_3-19-21	n77	DC_3_n77
DC_3-19-21_n78[1]	CA_3-19-21	n78	DC_3_n78
DC_3-19-21_n79[1]	CA_3-19-21	n79	No
DC_3-19-42_n77	CA_3-19-42	n77	No
DC_3-19-42_n78	CA_3-19-42	n78	No
DC_3-19-42_n79[1]	CA_3-19-42	n79	No
DC_3-28-42_n77	CA_3-28-42	n77	No
DC_3-28-42_n78	CA_3-28-42	n78	No
DC_3-28-42_n79	CA_3-28-42	n79	No
DC_7-20_n28-n78[1,2]	CA_7-20	CA_n28-n78	No
DC_21-28-42_n77	CA_21-28-42	n77	No
DC_21-28-42_n78	CA_21-28-42	n78	No
DC_21-28-42_n79	CA_21-28-42	n79	No

NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability

NOTE 2: The frequency range in band 28 is restricted for this band combination to 703-733 MHz for the UL and 758-788 MHz for the DL.

5.2B.4.4 EN-DC (five bands)

Table 5.2B.4.4-1: Band combinations EN-DC (five bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3-5-7_n78	CA_1-3-5-7	n78	DC_3_n78
DC_1-3-5-7-7_n78	CA_1-3-5-7-7	n78	DC_3_n78
DC_1-3-7-20_n28[2]	CA_1-3-7-20	n28	No
DC_1-3-7-20_n78[1]	CA_1-3-7-20	n78	DC_3_n78
DC_1-3-7_n28-n78[1]	CA_1-3-7	CA_n28-n78	DC_3_n78
DC_1-3-19-21_n77[1]	CA_1-3-19-21	n77	DC_1_n77, DC_3_n77
DC_1-3-19-21_n78[1]	CA_1-3-19-21	n78	DC_3_n78
DC_1-3-19-21_n79[1]	CA_1-3-19-21	n79	No
DC_1-3-19-42_n77	CA_1-3-19-42	n77	DC_1_n77, DC_3_n77
DC_1-3-19-42_n78	CA_1-3-19-42	n78	DC_3_n78
DC_1-3-19-42_n79	CA_1-3-19-42	n79	No
DC_1-3-20_n28-n78[1,2]	CA_1-3-20	CA_n28-n78	DC_3_n78
DC_1-3-21-42_n77	CA_1-3-21-42	n77	DC_1_n77, DC_3_n77
DC_1-3-21-42_n78	CA_1-3-21-42	n78	DC_3_n78
DC_1-3-21-42_n79	CA_1-3-21-42	n79	No
DC_1-7-20_n28-n78[1,2]	CA_1-7-20	CA_n28-n78	No
DC_1-19-21-42_n77	DC_1-19-21-42	n77	DC_1_n77
DC_1-19-21-42_n78	DC_1-19-21-42	n78	No
DC_1-19-21-42_n79	DC_1-19-21-42	n79	No
DC_3-7-20_n28-n78[1,2]	CA_3-7-20	CA_n28-n78	DC_3_n78
DC_1-3-5-7_n78	CA_1-3-5-7	n78	DC_3_n78
DC_1-3-7-20_n28	CA_1-3-7-20	n28	No
DC_1-3-28-42_n77	CA_1-3-28-42	n77	DC_1_n77, DC_3_n77
DC_1-3-28-42_n78	CA_1-3-28-42	n78	DC_3_n78
DC_1-3-28-42_n79	CA_1-3-28-42	n79	No
DC_1-21-28-42_n77	CA_1-21-28-42	n77	DC_1_n77
DC_1-21-28-42_n78	CA_1-21-28-42	n78	No
DC_1-21-28-42_n79	CA_1-21-28-42	n79	No
NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability NOTE 2: The frequency range in band 28 is restricted for this band combination to 703-733 MHz for the UL and 758-788 MHz for the DL			

5.2B.4.5 EN-DC (six bands)

Table 5.2B.4.5-1: Band combinations EN-DC (six bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3-7-20_n28-n78[1,2]	CA_1-3-7-20	CA_n28-n78	DC_3_n78
NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability NOTE 2: The frequency range in band 28 is restricted for this band combination to 703-733 MHz for the UL and 758-788 MHz for the DL			

5.2B.5 Inter-band EN-DC including FR2

Editor's note: OTA requirements

5.2B.5.1 EN-DC (two bands)

Table 5.2B.5.1-1: Band combinations for EN-DC (two bands)

EN-DC band	E-UTRA Band	NR Band	Single UL allowed
DC_1_n257	1	n257	No
DC_2-2_n257	CA_2-2	n257	No
DC_2_n257	CA_2	n257	No
DC_2_n260	2	n260	No
DC_2_n260	CA_2	n260	No
DC_2-2_n260	CA_2-2	n260	No
DC_3_n257	3	n257	No
DC_3_n258	3	n258	No
DC_5-5_n257	CA_5-5	n257	No
DC_5-5_n260	CA_5-5	n260	No
DC_5_n257	5	n257	No
DC_5_n260	5	n260	No
DC_5_n261	5	n261	No
DC_7-7_n257	CA_7-7	n257	No
DC_7_n257	7	n257	No
DC_7_n258	7	n258	No
DC_8_n257	8	n257	No
DC_8_n258	8	n258	No
DC_11_n257	11	n257	No
DC_12_n260	12	n260	No
DC_18_n257	18	n257	No
DC_19_n257	19	n257	No
DC_20_n258	20	n258	No
DC_21_n257	21	n257	No
DC_26_n257	26	n257	No
DC_28_n257	28	n257	No
DC_28_n258	28	n258	No
DC_30_n260	30	n260	No
DC_39_n258	39	n258	No
DC_41_n257	41	n257	No
DC_41_n258	41	n258	No
DC_42_n257	42	n257	No
DC_48-48_n257	CA_48-48	n257	No
DC_48_n257	CA_48	n257	No
DC_48-48_n260	C_48-48	n260	No
DC_48_n260	CA_48	n260	No
DC_66-66_n257	CA_66-66	n257	No
DC_66_n257	66	n257	No
DC_66-66_n260	C_66-66	n260	No
DC_66_n260	66	n260	No
DC_66_n261	66	n261	No
NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability for all of the above combinations			

5.2B.5.2 EN-DC (three bands)

Table 5.2B.5.2-1: Band combinations EN-DC (three bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3_n257[1]	CA_1-3	n257	No
DC_1-3_n257[1]	CA_1-3	n257	No
DC_1-5_n257[1]	CA_1-5	n257	No
DC_1-7_n257[1]	CA_1-7	n257	No
DC_1-7-7_n257[1]	CA_1-7-7	n257	No
DC_1-8_n257	CA_1-8	n257	No
DC_1-18_n257[1]	CA_1-18	n257	No
DC_1-19_n257[1]	CA_1-19	n257	No
DC_1-21_n257[1]	CA_1-21	n257	No
DC_1-28_n257[1]	CA_1-28	n257	No
DC_1-41_n257	CA_1-41	n257	No
DC_1-42_n257	CA_1-42	n257	No
DC_2-5_n257[1]	CA_2-5	n257	No
DC_2-5_n260	CA_2-5	n260	No
DC_2-12_n260	CA_2-12	n260	No
DC_2-13_n257[1]	CA_2-13	n257	No
DC_2-30_n260	CA_2-30	n260	No
DC_2-66_n257[1]	CA_2-66	n257	No
DC_2-66_n260	CA_2-66	n260	No
DC_2-13_n260[1]	CA_2-13	n260	No
DC_3-5_n257[1]	CA_3-5	n257	No
DC_3-7_n257[1]	CA_3-7	n257	No
DC_3-7-7_n257[1]	CA_3-7-7	n257	No
DC_3-19_n257[1]	CA_3-19	n257	No
DC_3-21_n257[1]	CA_3-21	n257	No
DC_3-28_n257[1]	CA_3-28	n257	No
DC_3-41_n257	CA_3-41	n257	No
DC_3-42_n257[1]	CA_3-42	n257	No
DC_5-7-7_n257[1]	CA_5-7-7	n257	No
DC_5-7_n257[1]	CA_5-7	n257	No
DC_5-30_n260	CA_5-30	n260	No
DC_5-66_n260	CA_5-66	n260	No
DC_12-30_n260	CA_12-30	n260	No
DC_12-66_n260	CA_12-66	n260	No
DC_13-66_n257[1]	CA_13-66	n257	No
DC_13-66_n260[1]	CA_13-66	n260	No
DC_18-28_n257[1]	CA_18-28	n257	No
DC_19-21_n257[1]	CA_19-21	n257	No
DC_19-42_n257[1]	CA_19-42	n257	No
DC_21-42_n257[1]	CA_21-42	n257	No
DC_21-28_n257[1]	CA_21-28	n257	No
DC_28-42_n257[1]	CA_28-42	n257	No
DC_30-66_n260	CA_30-66	n260	No
DC_41-42_n257	CA_41-42	n257	No
NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability			

5.2B.5.3 EN-DC (four bands)

Table 5.2B.5.3-1: Band combinations EN-DC (four bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3-5_n257[1]	CA_1-3-5	n257	No
DC_1-3-7_n257[1]	CA_1-3-7	n257	No
DC_1-3-7-7_n257	CA_1-3-7-7	n257	No
DC_1-3-19_n257[1]	CA_1-3-19	n257	No
DC_1-3-21_n257[1]	CA_1-3-21	n257	No
DC_1-3-28_n257[1]	CA_1-3-28	n257	No
DC_1-3-42_n257	CA_1-3-42	n257	No
DC_1-5-7_n257[1]	CA_1-5-7	n257	No
DC_1-5-7-7_n257	CA_1-5-7-7	n257	No
DC_1-18-28_n257[1]	CA_1-18-28	n257	No
DC_1-19-42_n257	CA_1-19-42	n257	No
DC_1-21-28_n257[1]	CA_1-21-28	n257	No
DC_1-21-42_n257	CA_1-21-42	n257	No
DC_1-28-42_n257	CA_1-28-42	n257	No
DC_1-41-42_n257	CA_1-41-42	n257	No
DC_3-5-7-7_n257	CA_3-5-7-7	n257	No
DC_3-5-7_n257[1]	CA_3-5-7	n257	No
DC_3-19-21_n257[1]	CA_3-19-21	n257	No
DC_3-19-42_n257	CA_3-19-42	n257	No
DC_3-21-42_n257	DC_3-21-42	n257	No
DC_3-28-42_n257	CA_3-28-42	n257	No
DC_19-21-42_n257[1]	CA_19-21-42	n257	No
DC_21-28-42_n257[1]	CA_21-28-42	n257	No
NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability			

5.2B.5.4 EN-DC (five bands)

Table 5.2B.5.4-1: Band combinations EN-DC (five bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3-5-7_n257[1]	CA_1-3-5-7	n257	No
DC_1-3-5-7-7_n257[1]	CA_1-3-5-7-7	n257	No
DC_1-3-19-21_n257[1]	CA_1-3-19-21	n257	No
DC_1-3-19-42_n257	CA_1-3-19-42	n257	No
DC_1-3-21-42_n257	CA_1-3-21-42	n257	No
DC_1-3-28-42_n257	CA_1-3-28-42	n257	No
DC_1-19-21-42_n257	DC_1-19-21-42	n257	No
DC_1-21-28-42_n257	DC_1-21-28-42	n257	No
DC_3-5-7-7_n257	CA_3-5-7-7	n257	No
DC_1-3-28-42_n257	CA_1-3-28-42	n257	No
DC_1-21-28-42_n257	CA_1-21-28-42	n257	No
NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability			

5.2B.6 Inter-band EN-DC including both FR1 and FR2

Editor's note: OTA requirements

5.2B.6.1 EN-DC (two bands)

This section is N/A

5.2B.6.2 EN-DC (three bands)

Table 5.2B.6.2-1: Band combinations EN-DC (three bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1_n77-n257	1	CA_n77-n257	No
DC_1_n78-n257	1	CA_n78-n257	No
DC_1_n79-n257	1	CA_n79-n257	No
DC_3_n77-n257	3	CA_n77-n257	No
DC_3_n78-n257	3	CA_n78-n257	No
DC_3_n79-n257	3	CA_n79-n257	No
DC_5_n78-n257[1]	5	CA_n78-n257	No
DC_7-7_n78-n257	CA_7-7	CA_n78-n257	No
DC_7_n78-n257	7	CA_n78-n257	No
DC_19_n77-n257	19	CA_n77-n257	No
DC_19_n78-n257	19	CA_n78-n257	No
DC_19_n79-n257	19	CA_n79-n257	No
DC_21_n77-n257	21	CA_n77-n257	No
DC_21_n78-n257	21	CA_n78-n257	No
DC_21_n79-n257	21	CA_n79-n257	No
NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability			

5.2B.6.3 EN-DC (four bands)

Table 5.2B.6.3-1: Band combinations EN-DC (four bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3_n78-n257	CA_1-3	CA_n78-n257	No
DC_1-5_n78-n257	CA_1-5	CA_n78-n257	No
DC_1-7-7_n78-n257	CA_1-7-7	CA_n78-n257	No
DC_1-7_n78-n257	CA_1-7	CA_n78-n257	No
DC_3-5_n78-n257	CA_3-5	CA_n78-n257	No
DC_3-7-7_n78-n257	CA_3-7-7	CA_n78-n257	No
DC_3-7_n78-n257	CA_3-7	CA_n78-n257	No
DC_5-7-7_n78-n257	CA_5-7-7	CA_n78-n257	No
DC_5-7_n78-n257	CA_5-7	CA_n78-n257	No

5.2B.6.4 EN-DC (five bands)

Table 5.2B.6.4-1: Band combinations EN-DC (five bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3-5_n78-n257	CA_1-3-5	CA_n78-n257	No
DC_1-3-7-7_n78-n257	CA_1-3-7-7	CA_n78-n257	No
DC_1-3-7_n78-n257	CA_1-3-7	CA_n78-n257	No
DC_1-5-7-7_n78-n257	CA_1-5-7-7	CA_n78-n257	No
DC_1-5-7_n78-n257	CA_1-5-7	CA_n78-n257	No
DC_3-5-7-7_n78-n257	CA_3-5-7-7	CA_n78-n257	No
DC_3-5-7_n78-n257	CA_3-5-7	CA_n78-n257	No

5.2B.6.5 EN-DC (six bands)

Table 5.2B.6.5-1: Band combinations EN-DC (six bands)

EN-DC Band	E-UTRA Band	NR Band	Single UL allowed
DC_1-3-5-7_n78-n257	CA_1-3-5-7	CA_n78-n257	No
NOTE 1: Applicable for UE supporting inter-band carrier aggregation with mandatory simultaneous Rx/Tx capability			

5.3 Channel bandwidth

5.3A UE Channel bandwidth for CA

5.3A.1 Inter-band CA between FR1 and FR2

5.3B UE Channel bandwidth for EN-DC

For intra-band contiguous EN-DC, the aggregated channel bandwidth is sum of the individual NR and E-UTRA channel bandwidths assuming nominal EN-DC channel with 0 kHz offset spacing as specified in sub-clause 5.4.

$$ENBW = BW_{NR\_Channel} + BW_{E\text{-}UTRA\ Channel}$$

In the case where the NR sub-block and/or the E-UTRA sub-block itself is composed of intra-band contiguous CA carriers, the EN-DC aggregated channel bandwidth is the sum of the aggregated channel bandwidths of the NR and E-UTRA sub-blocks assuming nominal EN-DC channel spacing between the NR sub-block and E-UTRA sub-block.

$$ENBW = BW_{NR\_Channel\_CA} + BW_{E\text{-}UTRA\ Channel\_CA}$$

5.3B.1 Intra-band EN-DC in FR1

5.3B.1.1 General

The requirements for intra-band EN-DC in this specification are defined for EN-DC configurations with associated bandwidth combination sets.

For each EN-DC configuration, requirements are specified for all bandwidth combinations contained in a *bandwidth combination set*, which is indicated per supported band combination in the UE radio access capability. A UE can indicate support of several bandwidth combination sets per band combination.

The DL component carrier combinations for a given EN-DC configuration shall be symmetrical in relation to channel centre unless stated otherwise in Table 5.3B.1-1.

5.3B.1.2 BCS for Intra-band contiguous EN-DC

For intra-band contiguous EN-DC, an EN-DC configuration is a single operating band supporting a carrier aggregation bandwidth class.

Requirements for intra-band contiguous carrier aggregation are defined for the EN-DC configurations and bandwidth combination sets specified in Table 5.3B.1.2-1.

Table 5.3B.1.2-1: EN-DC configurations and bandwidth combination sets defined for intra-band contiguous EN-DC

		E-UTRA – NR configuration / Bandwidth combination set				
Downlink EN-DC configuration	Uplink EN-DC configurations	Component carriers in order of increasing carrier frequency			Maximum aggregated bandwidth (MHz)	Bandwidth combination set
		Channel bandwidths for LTE carrier (MHz)	Channel bandwidths NR for carrier (MHz)	Channel bandwidths for LTE carrier (MHz)		
DC_(n)41AA	DC_(n)41AA	20	40, 60, 80,100		120	0
			40, 60, 80,100	20		
DC_(n)41CA	DC_(n)41AA[1], DC_41A_n41A[2]	20+20	40, 60, 80,100		140	0
			40, 60, 80,100	20+20		
DC_(n)41DA	DC_(n)41AA[1], DC_41A_n41A[2]	20+20+20	40, 60, 80,100		160	0
			40, 60, 80,100	20+20+20		
DC_(n)71B	DC_(n)71B	15	5		20	0
		10	5, 10			
		5	5, 10, 15			
			5	15		
			5, 10	10		
			5, 10, 15	5		
NOTE 1: Contiguous intra-band EN-DC uplink requirements shall apply. NOTE 2: LTE and NR ACLR requirements and non-contiguous intra-band EN-DC uplink requirements shall apply.						

5.3B.1.3 BCS for Intra-band non-contiguous EN-DC

For intra-band non-contiguous EN-DC, an EN-DC configuration is a single operating band supporting an EN-DC bandwidth class.

Requirements for intra-band non-contiguous EN-DC are defined for the EN-DC configurations and bandwidth combination sets specified in Table 5.3B.1.3-1.

Table 5.3B.1.3-1: EN-DC configurations and bandwidth combination sets defined for intra-band non-contiguous EN-DC

		E-UTRA – NR configuration / Bandwidth combination set				
Downlink EN-DC configuration	Uplink EN-DC configurations	Component carriers in order of increasing carrier frequency			Maximum aggregated bandwidth (MHz)	Bandwidth combination set
		Channel bandwidths for LTE carrier (MHz)	Channel bandwidths NR for carrier (MHz)	Channel bandwidths for LTE carrier (MHz)		
DC_3A_n3A	DC_3A_n3A(1)		5, 10, 15, 20, 25, 30	5, 10, 15, 20	50	0
DC_41A_n41A	DC_41A_n41A	20	40, 60, 80,100		120	0
			40, 60, 80,100	20		
DC_41C_n41A	DC_41A_n41A	20+20	40, 60, 80,100		140	0
			40, 60, 80,100	20+20		
DC_41D_n41A	DC_41A_n41A	20+20+20	40, 60, 80,100		160	0
			40, 60, 80,100	20+20+20		
NOTE 1: Only single switched UL is supported in Rel.15						

5.4 Channel arrangement

5.4A Channel arrangement for CA

The channel arrangement for CA operations in FR1 and FR2 as specified in 38.101-1 and 38.101-2, respectively.

5.4B Channel arrangement for DC

The channel arrangement for intra-band EN-DC operations in FR1 is specified in sub-clause 5.4B.1 of TS 38.101-1.

5.4B.1 Channel spacing for intra-band EN-DC carriers

The spacing between carriers will depend on the deployment scenario, the size of the frequency block available and the channel bandwidths. The nominal channel spacing between and E-UTRA carrier and an adjacent NR carrier for intra-band contiguous EN-DC is defined as following:

$$\text{Nominal Channel spacing} = (BW_{LTE\_Channel} + BW_{NR\_Channel})/2+\{-5kHz, 0kHz, 5kHz\}$$

where $BW_{LTE\_Channel}$ and $BW_{NR\_Channel}$ are the channel bandwidths of the E-UTRA and NR carriers. The channel spacing can be adjusted depending on the channel raster to optimize performance in a particular deployment scenario.

For intra-band non-contiguous EN-DC the channel spacing between E-UTRA and NR carriers shall be larger than the nominal channel spacing defined in this subclause.

5.5 Configuration

5.5A Configuration for CA

5.5A.1 Inter-band CA configurations between FR1 and FR2

Table 5.5A.1-1: Inter-band CA configurations (two bands)

NR CA configuration	Uplink NR CA configuration	NR configuration for FR1	NR configuration for FR2
CA_n8A-n258A	CA_n8A-n258A	n8A	n258A
CA_n71A-n257A	-	n71A	n257A

CA_n77A-n257A	CA_n77A-n257A	n77A	n257A
CA_n77A-n257D		n77A	n257D
CA_n77A-n257E		n77A	n257E
CA_n77A-n257F		n77A	n257F
CA_n77C-n257A		n77C	n257A
CA_n77C-n257D		n77C	n257D
CA_n77C-n257E		n77C	n257E
CA_n77C-n257F		n77C	n257F
CA_n78A-n257A	CA_n78A-n257A	n78A	n257A
CA_n78A-n257D		n78A	n257D
CA_n78A-n257E		n78A	n257E
CA_n78A-n257F		n78A	n257F
CA_n78C-n257A		n78C	n257A
CA_n78C-n257D		n78C	n257D
CA_n78C-n257E		n78C	n257E
CA_n78C-n257F		n78C	n257F
CA_n79A-n257A	CA_n79A-n257A	n79A	n257A
CA_n79A-n257D		n79A	n257D
CA_n79A-n257E		n79A	n257E
CA_n79A-n257F		n79A	n257F
CA_n79C-n257A		n78C	n257A
CA_n79C-n257D		n78C	n257D
CA_n79C-n257E		n78C	n257E
CA_n79C-n257F		n78C	n257F
NOTE 1: NR configuration for FR1 and FR2 are defined in TS 38.101-1 and TS 38.101-2 respectively.			

5.5B Configuration for DC

5.5B.1 General

The channel bandwidth and bandwidth classes are specified for operation with EN-DC or NGEN-DC configured.

5.5B.2 Intra-band contiguous EN-DC

Supported channel bandwidths for E-UTRA operating bands are defined in TS 36.101 [5] and for NR operating bands in TS 38.101-1 [2].

Table 5.5B.2-1: Intra-band contiguous EN-DC configurations

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_(n)41AA	DC_(n)41AA	41A	n41A
DC_(n)41CA	DC_(n)41AA, DC_41A_n41A	41C	n41A
DC_(n)41DA	DC_(n)41AA, DC_41A_n41A	41D	n41A
DC_(n)71B	DC_(n)71B	71A	n71A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.3 Intra-band non-contiguous EN-DC

Supported channel bandwidths for E-UTRA operating bands are defined in TS 36.101 [5] and for NR operating bands in TS 38.101-1 [2].

Table 5.5B.3-1: Intra-band non-contiguous EN-DC configurations

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_3A_n3A	DC_3A_n3A[2]	3	n3A
DC_41A_n41A	DC_41A_n41A	41A	n41A
DC_41C_n41A	DC_41A_n41A	41C	n41A
DC_41D_n41A	DC_41A_n41A	41D	n41A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications. NOTE 2: Only single switched UL is supported in Rel.15.			

5.5B.4 Inter-band EN-DC within FR1

5.5B.4.1 Inter-band EN-DC configurations (two bands)

Table 5.5B.4.1-1: Inter-band EN-DC configurations (two bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A_n28A	DC_1A_n28A	1A	n28A
DC_1A_n40A	DC_1A_n40A	1A	n40A
DC_1A_n51A	DC_1A_n51A	1A	n51A
DC_1A_n77A DC_1A_n77C	DC_1A_n77A	1A	n77A CA_n77C
DC_1A_n78A DC_1A_n78C	DC_1A_n78A	1A	n78A CA_n78C
DC_1A_n79A DC_1A_n79C	DC_1A_n79A	1A	n79A CA_n79C
DC_2A_n5A	DC_2A_n5A	2A	n5A
DC_2A_n66A	DC_2A_n66A	2A	n66A
DC_2A_n71A	DC_2A_n71A	2A	n71A
DC_2A_n78A	DC_2A_n78A	2A	n78A
DC_3A_n7A	DC_3A_n7A	3A	n7A
DC_3A_n28A	DC_3A_n28A	3A	n28A
DC_3A_n40A	DC_3A_n40A	3A	n40A
DC_3A_n51A	DC_3A_n51A	3A	n51A
DC_3A_n77A DC_3A_n77C	DC_3A_n77A	3A	n77A CA_n77C
DC_3A_n78A DC_3A_n78C	DC_3A_n78A	3A	n78A CA_n78C
DC_3A_n79A DC_3A_n79C	DC_3A_n79A	3A	n79A CA_n79C
DC_3C_n78A	DC_3A_n78A	CA_3C	n78A
DC_5A_n40A	DC_5A_n40A	5A	n40A
DC_5A_n66A	DC_5A_n66A	5A	n66A
DC_5A_n78A	DC_5A_n78A	5A	n78A
DC_7A-7A_n78A	DC_7A_n78A	CA_7A-7A	n78A
DC_7A_n28A	DC_7A_n28A	7A	n28A
DC_7A_n51A	DC_7A_n51A	7A	n51A
DC_7A_n78A	DC_7A_n78A	7A	n78A
DC_7C_n78A	DC_7C_n78A	CA_7C	n78A
DC_8A_n40A	DC_8A_n40A	8A	n40A
DC_8A_n77A	DC_8A_n77A	8A	n77A
DC_8A_n78A	DC_8A_n78A	8A	n78A
DC_11A_n77A	DC_11A_n77A	11A	n77A
DC_11A_n78A	DC_11A_n78A	11A	n78A
DC_11A_n79A	DC_11A_n79A	11A	n79A
DC_12A_n5A	DC_12A_n5A	12A	n5A
DC_12A_n66A	DC_12A_n66A	12A	n66A
DC_18A_n77A	DC_18A_n77A	18A	n77A
DC_18A_n78A	DC_18A_n78A	18A	n78A
DC_18A_n79A	DC_18A_n79A	18A	n79A
DC_19A_n77A DC_19A_n77C	DC_19A_n77A	19A	n77A CA_n77C
DC_19A_n78A DC_19A_n78C	DC_19A_n78A	19A	n78A CA_n78C
DC_19A_n79A DC_19A_n79C	DC_19A_n79A	19A	n79A CA_n79C
DC_20A_n8A	DC_20A_n8A	20A	n8A
DC_20A_n28A	DC_20A_n28A	20A	n28A

DC_20A_n51A	DC_20A_n51A	20A	n51A
DC_20A_n77A	DC_20A_n77A	20A	n77A
DC_20A_n78A	DC_20A_n78A	20A	n78A
DC_21A_n77A DC_21A_n77C	DC_21A_n77A	21A	n77A CA_n77C
DC_21A_n78A DC_21A_n78C	DC_21A_n78A	21A	n78A CA_n78C
DC_21A_n79A DC_21A_n79C	DC_21A_n79A	21A	n79A CA_n79C
DC_25A_n41A	DC_25A_n41A	25A	n41A
DC_26A_n41A	DC_26A_n41A	26A	n41A
DC_26A_n77A	DC_26A_n77A	26A	n77A
DC_26A_n78A	DC_26A_n78A	26A	n78A
DC_26A_n79A	DC_26A_n79A	26A	n79A
DC_28A n51A	DC_28A_n51A	28A	n51A
DC_28A_n77A DC_28A_n77C	DC_28A_n77A	28A	n77A CA_n77C
DC_28A_n78A DC_28A_n78C	DC_28A_n78A	28A	n78A CA_n78C
DC_28A_n79A DC_28A_n79C	DC_28A_n79A	28A	n79A CA_n79C
DC_30A_n5A	DC_30A_n5A	30	n5A
DC_30A_n66A	DC_30A_n66A	30A	n66A
DC_38A_n78A	N/A	38A	n78A
DC_39A_n78A	DC_39A_n78A	39A	n78A
DC_39A_n79A	DC_39A_n79A	39A	n79A
DC_40A_n77A	N/A	40A	n77A
DC_41A_n77A	DC_41A_n77A	41A	n77A
DC_41A_n78A	DC_41A_n78A	41A	n78A
DC_41A_n79A	DC_41A_n79A	41A	n79A
DC_41C_n77A	DC_41C_n77A	CA_41C	n77A
DC_41C_n78A	DC_41C_n78A	CA_41C	n78A
DC_41C_n79A	DC_41C_n79A	CA_41C	n79A
DC_42A_n51A	DC_42A_n51A	42A	n51A
DC_42A_n77A DC_42A_n77C	N/A	42A	n77A CA_n77C
DC_42A_n78A DC_42A_n78C	N/A	42A	n78A CA_n78C
DC_42A_n79A DC_42A_n79C	N/A	42A	n79A CA_n79C
DC_42C_n77A	N/A	CA_42C	n77A
DC_42C_n78A	N/A	CA_42C	n78A
DC_42C_n79A	N/A	CA_42C	n79A
DC_42C_n79A	N/A	CA_42C	n79A
DC_42C_n77C	N/A	CA_42C	CA n77C
DC_42C_n78C	N/A	CA_42C	CA n78C
DC_42C_n79C	N/A	CA_42C	CA n79C
DC_42D_n77A	N/A	42	n77A
DC_42D_n78A	N/A	42	n78A
DC_42D_n79A	N/A	42	n79A
DC_42E_n77A	N/A	42	n77A
DC_42E_n78A	N/A	42	n78A
DC_42E_n79A	N/A	42	n79A

DC_46D_n78A[2]			
DC_46E_n78A[2]			
DC_66A_n5A	DC_66A_n5A	66A	n5A
DC_66A_n71A	DC_66A_n71A	66	n71A
DC_66A_n78A	DC_66A_n78A	66A	n78A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications. NOTE 2: Restricted to E-UTRA operation when inter-band carrier aggregation is configured. The downlink operating band for Band 46 is paired with the uplink operating band (external E-UTRA band) of the carrier aggregation configuration that is supporting the configured Pcell.			

5.5B.4.2 Inter-band EN-DC configurations (three bands)

Table 5.5B.4.2-1: Inter-band EN-DC configurations (three bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A-3A_n28A	DC_1A_n28A DC_3A_n28A	CA_1A-3A	n28A
DC_1A-3A_n77A DC_1A-3A_n77C	DC_1A_n77A DC_3A_n77A	CA_1A-3A	n77A CA_n77C
DC_1A-3A_n78A DC_1A-3A_n78C	DC_1A_n78A DC_3A_n78A	CA_1A-3A	n78A CA_n78C
DC_1A-3A_n79A DC_1A-3A_n79C	DC_1A_n79A DC_3A_n79A	CA_1A-3A	n79A CA_n79C
DC_1A-3C_n78A	DC_1A_n78A DC_3A_n78A	CA_1A-3C	n78A
DC_1A-5A_n78A	DC_1A_n78A DC_5A_n78A	CA_1A-5A	n78A
DC_1A-7A_n28A	DC_1A_n28A DC_7A_n28A	CA_1A-7A	n28A
DC_1A-7A_n78A	DC_1A_n78A DC_7A_n78A	CA_1A-7A	n78A
DC_1A-7A-7A_n78A	DC_1A_n78A DC_7A_n78A	CA_1A-7A-7A	n78A
DC_1A-8A_n78A	DC_1A_n78A DC_8A_n78A	CA_1A-8A	n78A
DC_1A-18A_n77A	DC_1A_n77A DC_18A_n77A	CA_1A-18A	n77A
DC_1A-18A_n78A	DC_1A_n78A DC_18A_n78A	CA_1A-18A	n78A
DC_1A-19A_n77A DC_1A-19A_n77C	DC_1A_n77A DC 19A_n77A	CA_1A-19A	n77A CA_n77C
DC_1A-19A_n78A DC_1A-19A_n78C	DC_1A_n78A DC_19A_n78A	CA_1A-19A	n78A CA_n78C
DC_1A-19A_n79A DC_1A-19A_n79C	DC_1A_n79A DC_19A_n79A	CA_1A-19A	n79A CA_n79C
DC_1A-19A_n77A	DC_1A_n77A DC 19A_n77A	CA_1A-19A	n77A
DC_1A-19A_n78A	DC_1A_n78A DC_19A_n78A	CA_1A-19A	n78A
DC_1A-19A_n79A	DC_1A_n79A DC_19A_n79A	CA_1A-19A	n79A
DC_1A-20A_n28A	DC_1A_n28A DC_20A_n28A	CA_1A-20A	n28A
DC_1A-20A_n78A	DC_1A_n78A DC_20A_n78A	CA_1A-20A	n78A
DC_1A-21A_n77A DC_1A-21A_n77C	DC_1A_n77A DC_21A_n77A	CA_1A-21A	n77A CA_n77C
DC_1A-21A_n78A DC_1A-21A_n78C	DC_1A_n78A DC_21A_n78A	CA_1A-21A	n78A CA_n78C
DC_1A-21A_n79A DC_1A-21A_n79C	DC_1A_n79A DC_21A_n79A	CA_1A-21A	n79A CA_n79C
DC_1A-21A_n77A	DC_1A_n77A DC_21A_n77A	CA_1A-21A	n77A
DC_1A-21A_n78A	DC_1A_n78A DC_21A_n78A	CA_1A-21A	n78A
DC_1A-21A_n79A	DC_1A_n79A DC_21A_n79A	CA_1A-21A	n79A
DC_1A-28A_n77A DC_1A-28A_n77C	DC_1A_n77A DC_28A_n77A	CA_1A-28A	n77A CA_n77C
DC_1A-28A_n78A DC_1A-28A_n78C	DC_1A_n78A DC_28A_n78A	CA_1A-28A	n78A CA_n78C
DC_1A-28A_n79A DC_1A-28A_n79C	DC_1A_n79A DC_28A_n79A	CA_1A-28A	n79A CA_n79C
DC_1A_n28A-n78A	DC_1A_n28A DC_1A_n78A	1A	CA_n28A-n78A
DC_1A-41A_n77A DC_1A-41C_n77A	DC_1A_n77A DC_41A_n77A DC_41C_n77A	CA_1A-41A CA_1A-41C	n77A

DC_1A-41A_n78A DC_1A-41C_n78A	DC_1A_n78A DC_41A_n78A DC_41C_n78A	CA_1A-41A CA_1A-41C	n78A
DC_1A-41C_n79A	DC_1A_n79A DC_41C_n79A	CA_1A-41C	n79A
DC_1A-42A_n77A DC_1A-42A_n77C	DC_1A_n77A	CA_1A-42A	n77A CA_n77C
DC_1A-42A_n78A DC_1A-42A_n78C	DC_1A_n78A	CA_1A-42A	n78A CA_n78C
DC_1A-42A_n79A DC_1A-42A_n79C	DC_1A_n79A	CA_1A-42A	n79A CA_n79C
DC_1A-42C_n77A	DC_1A_n77A	CA_1A-42C	n77A
DC_1A-42C_n78A	DC_1A_n78A	CA_1A-42C	n78A
DC_1A-42C_n79A	DC_1A_n79A	CA_1A-42C	n79A
DC_1A-42D_n77A	DC_1A_n77A	CA_1A-42D	n77A
DC_1A-42D_n78A	DC_1A_n78A	CA_1A-42D	n78A
DC_1A-42D_n79A	DC_1A_n79A	CA_1A-42D	n79A
DC_1A-42E_n77A	DC_1A_n77A	CA_1A-42E	n77A
DC_1A-42E_n78A	DC_1A_n78A	CA_1A-42E	n78A
DC_1A-42E_n79A	DC_1A_n79A	CA_1A-42E	n79A
DC_1A_n77A-n79A	DC_1A_n77A DC_1A_n79A	1A	CA_n77A-n79A
DC_1A_n78A-n79A	DC_1A_n78A DC_1A_n79A	1A	CA_n78A-n79A
DC_1A_SUL_n78A-n84A	DC_1A_n78A, DC_1A_n84A_ULSUP-TDM_n78A, DC_1A_n84A_ULSUP-FDM_n78A	1A	SUL_n78A-n84A
DC_2A-5A_n66A	DC_2A_n66A DC_5A_n66A	CA_2A-5A	n66
DC_2A-12A_n66A	DC_2A_n66A DC_12A_n66A	CA_2A-12A	n66
DC_2A-30A_n66A	DC_2A_n66A DC_30A_n66A	CA_2A-30A	n66
DC_2A-66A_n71A	DC_2A_n71A DC_66A_n71A	CA_2A-66A	n71A
DC_2A-(n)71B	DC_2A_n71A DC_(n)71B	CA_2A-71A	n71A
DC_3A_n3A-n77A	DC_3A_n77A	3A	CA_n3A-n77A
DC_3A_n3A-n78A	DC_3A_n78A	3A	CA_n3A-n78A
DC_3A-5A_n78A	DC_3A_n78A DC_5A_n78A	CA_3A-5A	n78A
DC_3A-7A-7A_n78A	DC_3A_n78A DC_7A_n78A	CA_3A-7A-7A	n78A
DC_3A-7A_n28A	DC_3A_n28A DC_7A_n28A	CA_3A-7A	n28A
DC_3A-7A_n78A	DC_3A_n78A DC_7A_n78A	CA_3A-7A	n78A
DC_3A-7C_n78A	DC_3A_n78A DC_7C_n78A	CA_3A-7C	n78A
DC_3C-7C_n78A	DC_3A_n78A DC_7C_n78A	CA_3C-7C	n78A
DC_3C-7A_n78A	DC_3A_n78A DC_7A_n78A	CA_3C-7A	n78A
DC_3A-8A_n78A	DC_3A_n78A DC_8A_n78A	CA_3A-8A	n78A
DC_3A-19A_n77A DC_3A-19A_n77C	DC_3A_n77A DC_19A_n77A	CA_3A-19A	n77A CA_n77C
DC_3A-19A_n78A DC_3A-19A_n78C	DC_3A_n78A DC_19A_n78A	CA_3A-19A	n78A CA_n78C
DC_3A-19A_n79A DC_3A-19A_n79C	DC_3A_n79A DC_19A_n79A	CA_3A-19A	n79A CA_n79C
DC_3A-20A_n28A	DC_3A_n28A DC_20A_n28A	CA_3A-20A	n28A
DC_3A-20A_n78A	DC_3A_n78A DC_20A_n78A	CA_3A-20A	n78A
DC_3C-20A_n78A	DC_3A_n78A DC_20A_n78A	CA_3C-20A	n78A

DC_3A-21A_n77A DC_3A-21A_n77C	DC_3A_n77A DC_21A_n77A	CA_3A-21A	n77A CA_n77C
DC_3A-21A_n78A DC_3A-21A_n78C	DC_3A_n78A DC_21A_n78A	CA_3A-21A	n78A CA_n78C
DC_3A-21A_n79A DC_3A-21A_n79C	DC_3A_n79A DC_21A_n79A	CA_3A-21A	n79A CA_n79C
DC_3A-28A_n77A DC_3A-28A_n77C	DC_3A_n77A DC_28A_n77A	CA_3A-28A	n77A CA_n77C
DC_3A-28A_n78A DC_3A-28A_n78C	DC_3A_n78A DC_28A_n78A	CA_3A-28A	n78A CA_n78C
DC_3A-28A_n79A DC_3A-28A_n79C	DC_3A_n79A DC_28A_n79A	CA_3A-28A	n79A CA_n79C
DC_3A_n28A-n78A	DC_3A_n28A DC_3A_n78A	3A	CA_n28A-n78A
DC_3A-38A_n78A	DC_38A_n78A DC_3A_n78A	CA_3A-38A	n78A
DC_3A-41A_n78A	DC_3A_n78A DC_41A_n78A	CA_3A-41A	n78A
DC_3A-42A_n77A DC_3A-42A_n77C	DC_3A_n77A	CA_3A-42A	n77A CA_n77C
DC_3A-42A_n78A DC_3A-42A_n78C	DC_3A_n78A	CA_3A-42A	n78A CA_n78C
DC_3A-42A_n79A DC_3A-42A_n79C	DC_3A_n79A	CA_3A-42A	n79A CA_n79C
DC_3A-42C_n77A	DC_3A_n77A	CA_3A-42C	n77A
DC_3A-42C_n78A	DC_3A_n78A	CA_3A-42C	n78A
DC_3A-42C_n79A	DC_3A_n79A	CA_3A-42C	n79A
DC_3A-42D_n77A	DC_3A_n77A	CA_3A-42A	n77A
DC_3A-42D_n78A	DC_3A_n78A	CA_3A-42A	n78A
DC_3A-42D_n79A	DC_3A_n79A	CA_3A-42A	n79A
DC_3A-42E_n77A	DC_3A_n77A	CA_3A-42E	n77A
DC_3A-42E_n78A	DC_3A_n78A	CA_3A-42E	n78A
DC_3A-42E_n79A	DC_3A_n79A	CA_1A-42E	n79A
DC_3A_n77A-n79A	DC_3A_n77A DC_3A_n79A	3A	CA_n77A-n79A
DC_3A_n78A-n79A	DC_3A_n78A DC_3A_n79A	3A	CA_n78A-n79A
DC_3A_SUL_n78A-n80A	DC_3A_n78A DC_3A_n80A_ULSUP-TDM_n78A DC_3A_n80A_ULSUP-FDM_n78A	3A	SUL_n78-n80
DC_3A_SUL_n78A-n82A	DC_3A_n78A DC_3A_n82A	3A	SUL_n78A-n82A
DC_3A_SUL_n79A-n80A	DC_3A_n79A, DC_3A_n80A_ULSUP-TDM_n79A, DC_3A_n80A_ULSUP-FDM_n79A	3A	SUL_n79A-n80A
DC_5A-7A-7A_n78A	DC_5A_n78A DC_7A_n78A	CA_5A-7A-7A	n78A
DC_5A-7A_n78A	DC_5A_n78A DC_7A_n78A	CA_5A-7A	n78A
DC_5A-30A_n66A	DC_5A_n66A DC_30A_n66A	CA_5A-30A	n66A
DC_7A-20A_n28A	DC_7A_n28A DC_20A_n28A	CA_7A-20A	n28A
DC_7A-20A_n78A	DC_7A_n78A DC_20A_n78A	CA_7A-20A	n78A
DC_7A-28A_n78A	DC_7A_n78A DC_28A_n78A	CA_7A-28A	n78A
DC_7A_n28A-n78A	DC_7A_n28A, DC_7A_n78A	7A	CA_n28A-n78A
DC_7C-28A_n78A	DC_7C_n78A DC_28A_n78A	CA_7C-28A	n78A
DC_7A-46A_n78A	DC_7A_n78A DC_46A_n78A	CA_7A-46A	n78A
DC_7A-46C_n78A	DC_7A_n78A DC_46C_n78A	CA_7A-46C	n78A
DC_7A-46D_n78A	DC_7A_n78A	CA_7A-46D	n78
DC_7A-46E_n78A	DC_7A_n78A	CA_7A-46E	n78

DC_8A_SUL_n78A-n81A	DC_8A_n78A, DC_8A_n81A_ULSUP-TDM_n78A, DC_8A_n81A_ULSUP-FDM_n78A	8A	SUL_n78A-n81A
DC_8A_SUL_n79A-n81A	DC_8A_n79A, DC_8A_n81A_ULSUP-TDM_n79A, DC_8A_n81A_ULSUP-FDM_n79A	8A	SUL_n79A-n81A
DC_12A-30A_n66A	DC_12A_n66A DC_30A_n66A	CA_12A-30A	n66A
DC_18A-28A_n77A	DC_18A_n77A DC_28A_n77A	CA_18A-28A	n77A
DC_18A-28A_n78A	DC_18A_n78A DC_28A_n78A	CA_18A-28A	n78A
DC_18A-28A_n79A	DC_18A_n79A DC_28A_n79A	CA_18A-28A	n79A
DC_19A-21A_n77A DC_19A-21A_n77C	DC_19A_n77A DC_21A_n77A	CA_19A-21A	n77A CA_n77C
DC_19A-21A_n78A DC_19A-21A_n78C	DC_19A_n78A DC_21A_n78A	CA_19A-21A	n78A CA_n78C
DC_19A-21A_n79A DC_19A-21A_n79C	DC_19A_n79A DC_21A_n79A	CA_19A-21A	n79A CA_n79C
DC_19A-42A_n77A DC_19A-42A_n77C	DC_19A_n77A	CA_19A-42A	n77A CA_n77C
DC_19A-42A_n78A DC_19A-42A_n78C	DC_19A_n78A	CA_19A-42A	n78A CA_n78C
DC_19A-42A_n79A DC_19A-42A_n79C	DC_19A_n79A	CA_19A-42A	n79A CA_n79C
DC_19A-42C_n77A	DC_19A_n77A	CA_19A-42C	n77A
DC_19A-42C_n78A	DC_19A_n78A	CA_19A-42C	n78A
DC_19A-42C_n79A	DC_19A_n79A	CA_19A-42C	n79A
DC_19A_n77A-n79A	DC_19A_n77A DC_19A_n79A	19A	CA_n77A-n79A
DC_19A_n78A-n79A	DC_19A_n78A DC_19A_n79A	19A	CA_n78A-n79A
DC_20A_n8A-n75A	DC_20A_n8A	20A	CA_n8A-n75A
DC_20A_n28A-n75A	DC_20A_n28A	20A	CA_n28A-n75A
DC_20A_n28A-n78A	DC_20A_n28A DC_20A_n78A	20A	CA_n28A-n78A
DC_20A_n75A-n78A	DC_20A_n78A	20A	CA_n75A-n78A
DC_20A_n76A-n78A	DC_20A_n78A	20A	CA_n76A-n78A
DC_20A_SUL_n78A-n82A	DC_20A_n78A, DC_20A_n82A_ULSUP-TDM_n78A, DC_20A_n82A_ULSUP-FDM_n78A	20A	SUL_n78A-n82A
DC_20A_SUL_n78A-n83A	DC_20A_n78A DC_20A_n83A	20A	SUL_n78A-n83A
DC_21A-42A_n77A DC_21A-42A_n77C	DC_21A_n77A	CA_21A-42A	n77A CA_n77C
DC_21A-42A_n78A DC_21A-42A_n78C	DC_21A_n78A	CA_21A-42A	n78A CA_n78C
DC_21A-42A_n79A DC_21A-42A_n79C	DC_21A_n79A	CA_21A-42A	n79A CA_n79C
DC_21A-42C_n77A	DC_21A_n77A	CA_21A-42C	n77A
DC_21A-42C_n78A	DC_21A_n78A	CA_21A-42C	n78A
DC_21A-42C_n79A	DC_21A_n79A	CA_21A-42C	n79A
DC_21A_n77A-n79A	DC_21A_n77A DC_21A_n79A	21A	CA_n77A-n79A
DC_21A_n78A-n79A	DC_21A_n78A DC_21A_n79A	21A	CA_n78A-n79A
DC_28A_SUL_n78A-n83A	DC_28A_n78A, DC_28A_n83A_ULSUP-TDM_n78A, DC_28A_n83A_ULSUP-FDM_n78A	28A	SUL_n78A-n83A
DC_28A-42A_n77A DC_28A-42A_n77C	DC_28A_n77A	CA_28A-42A	n77A CA_n77C
DC_28A-42A_n78A DC_28A-42A_n78C	DC_28A_n78A	CA_28A-42A	n78A CA_n78C
DC_28A-42A_n79A DC_28A-42A_n79C	DC_28A_n79A	CA_28A-42A	n79A CA_n79C
DC_28A-42C_n77A	DC_28A_n77A	CA_28A-42C	n77A

DC_28A-42C_n78A	DC_28A_n78A	CA_28A-42C	n78A
DC_28A-42C_n79A	DC_28A_n79A	CA_28A-42C	n79A
DC_41A-42A_n77A	DC_41A_n77A	CA_41A-42A	n77A
DC_41A-42A_n78A	DC_41A_n78A	CA_41A-42A	n78A
DC_41A-42C_n77A	DC_41A_n77A	CA_41A-42C	n77A
DC_41A-42C_n78A	DC_41A_n78A	CA_41A-42C	n78A
DC_41A-42A_n79A DC_41A-42C_n79A	DC_41A_n79A	CA_41A-42A CA_41A-42C	n79A
DC_41C-42A_n77A	DC_41C_n77A	CA_41C-42A	n77A
DC_41C-42A_n78A	DC_41C_n78A	CA_41C-42A	n78A
DC_41C-42A_n79A	DC_41C_n79A	CA_41C-42A	n79A
DC_41C-42C_n77A	DC_41A_n77A	CA_41C-42C	n77A
DC_41C-42C_n78A	DC_41A_n78A	CA_41C-42C	n78A
DC_41C-42C_n79A	DC_41A_n79A	CA_41C-42C	n79A
DC_66A_(n)71B	DC_66A_71A DC_(n)71B	CA_66A_71A	n71A
DC_66A_SUL_n78A-n86A	DC_66A_n78A, DC_66A_n86A_ULSUP-TDM_n78A, DC_66A_n86A_ULSUP-FDM_n78A	66A	SUL_n78A-n86A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.4.3 Inter-band EN-DC configurations (four bands)

Table 5.5B.4.3-1: Inter-band EN-DC configurations (four bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A-3A-5A_n78A	DC_1A_n78A DC_3A_n78A DC_5A_n78A	CA_1A-3A-5A	n78A
DC_1A-3A-7A_n28A	DC_1A_n28A DC_3A_n28A DC_7A_n28A	CA_1A-3A-7A	n28A
DC_1A-3A-7A_n78A	DC_1A_n78A DC_3A_n78A DC_7A_n78A	CA_1A-3A-7A	n78A
DC_1A-3C-7A_n78A	DC_1A_n78A DC_3A_n78A DC_7A_n78A	CA_1A-3C-7A	n78A
DC_1A-3A-7A-7A_n78A	DC_1A_n78A DC_3A_n78A DC_7A_n78A	CA_1A-3A-7A-7A	n78A
DC_1A-3A-8A_n28A	DC_1A_n28A DC_3A_n28A DC_8A_n28A	CA_1A-3A-8A	n28A
DC_1A-3A-8A_n78A	DC_1A_n78A DC_3A_n78A DC_8A_n78A	CA_1A-3A-8A	n78A
DC_1A-3A-20A_n28A	DC_1A_n28A DC_3A_n28A DC_20A_n28A	CA_1A-3A-20A	n28A
DC_1A-3A-20A_n78A	DC_1A_n78A DC_3A_n78A DC_20A_n78A	CA_1A-3A-20A	n78A
DC_1A-3A-28A_n77A	DC_1A_n77A DC_3A_n77A DC_28A_n77A	CA_1A-3A-28A	n77A
DC_1A-3A-28A_n78A	DC_1A_n78A DC_3A_n78A DC_28A_n78A	CA_1A-3A-28A	n78A
DC_1A-3A-28A_n79A	DC_1A_n79A DC_3A_n79A DC_28A_n79A	CA_1A-3A-28A	n79A
DC_1A-3A_n28A-n78A	DC_1A_n28A DC_1A_n78A DC_3A_n28A DC_3A_n78A	CA_1A-3A	CA_n28A-n78A
DC_1A-3A-19A_n77A	DC_1A_n77A DC_3A_n77A DC_19A_n77A	CA_1A-3A-19A	n77A
DC_1A-3A-19A_n78A	DC_1A_n78A DC_3A_n78A DC_19A_n78A	CA_1A-3A-19A	n78A
DC_1A-3A-19A_n79A	DC_1A_n79A DC_3A_n79A DC_19A_n79A	CA_1A-3A-19A	n79A
DC_1A-3A-21A_n77A	DC_1A_n77A DC_3A_n77A DC_21A_n77A	CA_1A-3A-21A	n77A
DC_1A-3A-21A_n78A	DC_1A_n78A DC_3A_n78A DC_21A_n78A	CA_1A-3A-21A	n78A
DC_1A-3A-21A_n79A	DC_1A_n79A DC_3A_n79A DC_21A_n79A	CA_1A-3A-21A	n79A
DC_1A-3A-42C_n77A	DC_1A_n77A DC_3A_n77A	CA_1A-3A-42C	n77A
DC_1A-3A-42C_n78A	DC_1A_n78A DC_3A_n78A	CA_1A-3A-42C	n78A
DC_1A-3A-42C_n79A	DC_1A_n79A DC_3A_n79A	CA_1A-3A-42C	n79A

DC_1A-3A-42C_n77C	DC_1A_n77A DC_3A_n77A	CA_1A-3A-42C	CA_n77C
DC_1A-3A-42C_n78C	DC_1A_n78A DC_3A_n78A	CA_1A-3A-42C	CA_n78C
DC_1A-3A-42C_n79C	DC_1A_n79A DC_3A_n79A	CA_1A-3A-42C	CA_n79C
DC_1A-5A-7A_n78A	DC_1A_n78A DC_5A_n78A DC_7A_n78A	CA_1A-5A-7A	n78A
DC_1A-5A-7A-7A_n78A	DC_1A_n78A DC_5A_n78A DC_7A_n78A	CA_1A-5A-7A-7A	n78A
DC_1A-7A-20A_n28A	DC_1A_n28A DC_7A_n28A DC_20A_n28A	CA_1A-7A-20A	n28A
DC_1A-7A-20A_n78A	DC_1A_n78A DC_7A_n78A DC_20A_n78A	CA_1A-7A-20A	n78A
DC_1A-7A_n28A-n78A	DC_1A_n28A DC_1A_n78A DC_7A_n28A DC_7A_n78A	CA_1A-7A	CA_n28A-n78A
DC_1A-18A-28A_n77A	DC_1A_n77A DC_18A_n77A DC_28A_n77A	CA_1A-18A-28A	n77A
DC_1A-18A-28A_n78A	DC_1A_n78A DC_18A_n78A DC_28A_n78A	CA_1A-18A-28A	n78A
DC_1A-18A-28A_n79A	DC_1A_n79A DC_18A_n79A DC_28A_n79A	CA_1A-18A-28A	n79A
DC_1A-19A-42A_n77A	DC_1A_n77A DC_19A_n77A	CA_1A-19A-42A	n77A
DC_1A-19A-42A_n78A	DC_1A_n78A DC_19A_n78A	CA_1A-19A-42A	n78A
DC_1A-19A-42A_n79A	DC_1A_n79A DC_19A_n79A	CA_1A-19A-42A	n79A
DC_1A-19A-42C_n77A	DC_1A_n77A DC_19A_n77A	CA_1A-19A-42C	n77A
DC_1A-19A-42C_n78A	DC_1A_n78A DC_19A_n78A	CA_1A-19A-42C	n78A
DC_1A-19A-42C_n79A	DC_1A_n79A DC_19A_n79A	CA_1A-19A-42C	n79A
DC_1A-19A-42C_n77C	DC_1A_n77A DC_19A_n77A	CA_1A-19A-42C	CA_n77C
DC_1A-19A-42C_n78C	DC_1A_n78A DC_19A_n78A	CA_1A-19A-42C	CA_n78C
DC_1A-19A-42C_n79C	DC_1A_n79A DC_19A_n79A	CA_1A-19A-42C	CA_n79C
DC_1A-20A_n28A-n78A	DC_1A_n28A DC_1A_n78A DC_20A_n28A DC_20A_n78A	CA_1A-20A	CA_n28A-n78A
DC_1A-21A-28A_n77A	DC_1A_n77A DC_21A_n77A DC_28A_n77A	CA_1A-21A-28A	n77A
DC_1A-21A-28A_n78A	DC_1A_n78A DC_21A_n78A DC_28A_n78A	CA_1A-21A-28A	n78A
DC_1A-21A-28A_n79A	DC_1A_n79A DC_21A_n79A DC_28A_n79A	CA_1A-21A-28A	n79A
DC_1A-21A-42A_n77A	DC_1A_n77A DC_21A_n77A	CA_1A-21A-42A	n77A
DC_1A-21A-42A_n78A	DC_1A_n78A DC_21A_n78A	CA_1A-21A-42A	n78A

DC_1A-21A-42A_n79A	DC_1A_n79A DC_21A_n79A	CA_1A-21A-42A	n79A
DC_1A-21A-42C_n77A	DC_1A_n77A DC_21A_n77A	CA_1A-21A-42C	n77A
DC_1A-21A-42C_n78A	DC_1A_n78A DC_21A_n78A	CA_1A-21A-42C	n78A
DC_1A-21A-42C_n79A	DC_1A_n79A DC_21A_n79A	CA_1A-21A-42C	n79A
DC_1A-21A-42C_n77C	DC_1A_n77A DC_21A_n77A	CA_1A-21A-42C	CA_n77C
DC_1A-21A-42C_n78C	DC_1A_n78A DC_21A_n78A	CA_1A-21A-42C	CA_n78C
DC_1A-21A-42C_n79C	DC_1A_n79A DC_21A_n79A	CA_1A-21A-42C	CA_n79C
DC_1A-28A-42A_n77A	DC_1A_n77A DC_28A_n77A	CA_1A-28A-42A	n77A
DC_1A-28A-42A_n78A	DC_1A_n78A DC_28A_n78A	CA_1A-28A-42A	n78A
DC_1A-28A-42A_n79A	DC_1A_n79A DC_28A_n79A	CA_1A-28A-42A	n79A
DC_1A-28A-42C_n77A	DC_1A_n77A DC_28A_n77A	CA_1A-28A-42A	n77A
DC_1A-28A-42C_n78A	DC_1A_n78A DC_28A_n78A	CA_1A-28A-42A	n78A
DC_1A-28A-42C_n79A	DC_1A_n79A DC_28A_n79A	CA_1A-28A-42A	n79A
DC_1A-41A-42A_n77A	DC_1A_n77A DC_41A_n77A	CA_1A-41A-42A	n77A
DC_1A-41A-42C_n77A	DC_1A_n77A DC_41A_n77A	CA_1A-41A-42C	n77A
DC_1A-41C-42A_n77A	DC_1A_n77A DC_41A_n77A	CA_1A-41C-42A	n77A
DC_1A-41A-42A_n78A	DC_1A_n78A DC_41A_n78A	CA_1A-41A-42A	n78A
DC_1A-41A-42C_n78A	DC_1A_n78A DC_41A_n78A	CA_1A-41A-42C	n78A
DC_1A-41C-42A_n78A	DC_1A_n78A DC_41A_n78A	CA_1A-41C-42A	n78A
DC_1A-41A-42A_n79A	DC_1A_n79A DC_41A_n79A	CA_1A-41A-42A	n79A
DC_1A-41A-42C_n79A	DC_1A_n79A DC_41A_n79A	CA_1A-41A-42C	n79A
DC_1A-41C-42A_n79A	DC_1A_n79A DC_41A_n79A	CA_1A-41C-42A	n79A
DC_1A-41C-42C_n77A	DC_1A_n77A DC_41A_n77A	CA_1A-41C-42C	n77A
DC_1A-41C-42C_n78A	DC_1A_n78A DC_41A_n78A	CA_1A-41C-42C	n78A
DC_1A-41C-42C_n79A	DC_1A_n79A DC_41A_n79A	CA_1A-41C-42C	n79A
DC_2A-66A_(n)71B	DC_2A_n71A DC_66A_n71A DC_(n)71B	CA_2A-66A-71A	CA_(n)71B
DC_3A-5A-7A-7A_n78A	DC_3A_n78A DC_5A_n78A DC_7A_n78A	CA_3A-5A-7A-7A	n78A
DC_3A-5A-7A_n78A	DC_3A_n78A DC_5A_n78A DC_7A_n78A	CA_3A-5A-7A	n78A
DC_3A-7A-20A_n28A	DC_3A_n28A DC_7A_n28A DC_20A_n28A	CA_3A-7A-20A	n28A
DC_3A-7A-20A_n78A	DC_3A_n78A DC_20A_n78A DC_7A_n78A	CA_3A-7A-20A	n78A

DC_3A-7A-28A_n78A	DC_3A-7A_n78A DC_3A-28A_n78A DC_7A-28A_n78A	CA_3A-7A-28A	n78A
DC_3A-7C-28A_n78A	DC_3A_n78A DC_7A_n78A DC_28A_n78A	CA_3A-7C-28A	n78A
DC_3A-7A_n28A-n78A	DC_3A_n28A DC_3A_n78A DC_7A_n28A DC_7A_n78A	CA_3A-7A	CA_n28A-n78A
DC_3A-19A-21A_n77A	DC_3A_n77A DC_19A_n77A DC_21A_n77A	CA_3A-19A-21A	n77A
DC_3A-19A-21A_n78A	DC_3A_n78A DC_19A_n78A DC_21A_n78A	CA_3A-19A-21A	n78A
DC_3A-19A-21A_n79A	DC_3A_n79A DC_19A_n79A DC_21A_n79A	CA_3A-19A-21A	n79A
DC_3A-19A-42A_n77A	DC_3A_n77A DC_19A_n77A	CA_3A-19A-42A	n77A
DC_3A-19A-42C_n77A	DC_3A_n77A DC_19A_n77A	CA_3A-19A-42C	n77A
DC_3A-19A-42C_n77C	DC_3A_n77A DC_19A_n77A	CA_3A-19A-42C	CA_n77C
DC_3A-19A-42A_n78A	DC_3A_n78A DC_19A_n78A	CA_3A-19A-42A	n78A
DC_3A-19A-42C_n78A	DC_3A_n78A DC_19A_n78A	CA_3A-19A-42C	n78A
DC_3A-19A-42C_n78C	DC_3A_n78A DC_19A_n78A	CA_3A-19A-42C	CA_n78C
DC_3A-19A-42A_n79A	DC_3A_n79A DC_19A_n79A	CA_3A-19A-42A	n79A
DC_3A-19A-42C_n79A	DC_3A_n79A DC_19A_n79A	CA_3A-19A-42C	n79A
DC_3A-19A-42C_n79C	DC_3A_n79A DC_19A_n79A	CA_3A-19A-42C	CA_n79C
DC_3A-20A_n28A-n78A	DC_3A_n28A DC_3A_n78A DC_20A_n28A DC_20A_n78A	CA_3A-20A	CA_n28A-n78A
DC_3A-21A-42C_n77A	DC_3A_n77A DC_21A_n77A	CA_3A-21A-42C	n77A
DC_3A-21A-42C_n78A	DC_3A_n78A DC_21A_n78A	CA_3A-21A-42C	n78A
DC_3A-21A-42C_n79A	DC_3A_n79A DC_21A_n79A	CA_3A-21A-42C	n79A
DC_3A-21A-42C_n77C	DC_3A_n77A DC_21A_n77A	CA_3A-21A-42C	CA_n77C
DC_3A-21A-42C_n78C	DC_3A_n78A DC_21A_n78A	CA_3A-21A-42C	CA_n78C
DC_3A-21A-42C_n79C	DC_3A_n79A DC_21A_n79A	CA_3A-21A-42C	CA_n79C
DC_3A-28A-42A_n77A	DC_3A_n77A DC_28A_n77A	CA_3A-28A-42A	n77A
DC_3A-28A-42A_n78A	DC_3A_n78A DC_28A_n78A	CA_3A-28A-42A	n78A
DC_3A-28A-42A_n79A	DC_3A_n79A DC_28A_n79A	CA_3A-28A-42A	n79A
DC_3A-28A-42C_n77A	DC_3A_n77A DC_28A_n77A	CA_3A-28A-42A	n77A
DC_3A-28A-42C_n78A	DC_3A_n78A DC_28A_n78A	CA_3A-28A-42A	n78A
DC_3A-28A-42C_n79A	DC_3A_n79A DC_28A_n79A	CA_3A-28A-42A	n79A

DC_7A-20A_n28A-n78A	DC_7A_n28A DC_7A_n78A DC_20A_n28A DC_20A_n78A	CA_7A-20A	CA_n28A-n78A
DC_19A-21A-42A_n77A	DC_19A_n77A DC_21A_n77A	CA_19A-21A-42A	n77A
DC_19A-21A-42A_n78A	DC_19A_n78A DC_21A_n78A	CA_19A-21A-42A	n78A
DC_19A-21A-42A_n79A	DC_19A_n79A DC_21A_n79A	CA_19A-21A-42A	n79A
DC_19A-21A-42C_n77A	DC_19A_n77A DC_21A_n77A	CA_19A-21A-42C	n77A
DC_19A-21A-42C_n78A	DC_19A_n78A DC_21A_n78A	CA_19A-21A-42C	n78A
DC_19A-21A-42C_n79A	DC_19A_n79A DC_21A_n79A	CA_19A-21A-42C	n79A
DC_19A-21A-42C_n77C	DC_19A_n77A DC_21A_n77A	CA_19A-21A-42C	CA_n77C
DC_19A-21A-42C_n78C	DC_19A_n78A DC_21A_n78A	CA_19A-21A-42C	CA_n78C
DC_19A-21A-42C_n79C	DC_19A_n79A DC_21A_n79A	CA_19A-21A-42C	CA_n79C
DC_21A-28A-42A_n77A	DC_21A_n77A DC_28A_n77A	CA_21A-28A-42A	n77A
DC_21A-28A-42A_n78A	DC_21A_n78A DC_28A_n78A	CA_21A-28A-42A	n78A
DC_21A-28A-42A_n79A	DC_21A_n79A DC_28A_n79A	CA_21A-28A-42A	n79A
DC_21A-28A-42C_n77A	DC_21A_n77A DC_28A_n77A	CA_21A-28A-42A	n77A
DC_21A-28A-42C_n78A	DC_21A_n78A DC_28A_n78A	CA_21A-28A-42A	n78A
DC_21A-28A-42C_n79A	DC_21A_n79A DC_28A_n79A	CA_21A-28A-42A	n79A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.4.4 Inter-band EN-DC configurations (five bands)

Table 5.5B.4.4-1: Inter-band EN-DC configurations (five bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A-3A-5A-7A_n78A	DC_1A_n78A DC_3A_n78A DC_5A_n78A DC_7A_n78A	CA_1A-3A-5A-7A	n78A
DC_1A-3A-5A-7A-7A_n78A	DC_1A_n78A DC_3A_n78A DC_5A_n78A DC_7A_n78A	CA_1A-3A-5A-7A-7A	n78A
DC_1A-3A-7A-20A_n28A	DC_1A_n28A DC_3A_n28A DC_7A_n28A DC_20A_n28A	CA_1A-3A-7A-20A	n28A
DC_1A-3A-7A-20A_n78A	DC_1A_n78A DC_3A_n78A DC_7A_n78A DC_20A_n78A	CA_1A-3A-7A-20A	n78A
DC_1A-3A-7A_n28A_n78A	DC_1A_n28A DC_1A_n78A DC_3A_n28A DC_3A_n78A DC_7A_n28A DC_7A_n78A	CA_1A-3A-7A	CA_n28A-n78A
DC_1A-3A-19A-21A_n77A	DC_1A_n77A DC_3A_n77A DC_19A_n77A DC_21A_n77A	CA_1A-3A-19A-21A	n77A
DC_1A-3A-19A-21A_n77C	DC_1A_n77A DC_3A_n77A DC_19A_n77A DC_21A_n77A	CA_1A-3A-19A-21A	CA_n77C
DC_1A-3A-19A-21A_n78A	DC_1A_n78A DC_3A_n78A DC_19A_n78A DC_21A_n78A	CA_1A-3A-19A-21A	n78A
DC_1A-3A-19A-21A_n78C	DC_1A_n78A DC_3A_n78A DC_19A_n78A DC_21A_n78A	CA_1A-3A-19A-21A	CA_n78C
DC_1A-3A-19A-21A_n79A	DC_1A_n79A DC_3A_n79A DC_19A_n79A DC_21A_n79A	CA_1A-3A-19A-21A	n79A
DC_1A-3A-19A-21A_n79C	DC_1A_n79A DC_3A_n79A DC_19A_n79A DC_21A_n79A	CA_1A-3A-19A-21A	CA_n79C
DC_1A-3A-19A-42A_n77A	DC_1A_n77A DC_3A_n77A DC_19A_n77A	CA_1A-3A-19A-42A	n77A
DC_1A-3A-19A-42A_n77C	DC_1A_n77A DC_3A_n77A DC_19A_n77A	CA_1A-3A-19A-42A	n77C
DC_1A-3A-19A-42C_n77A	DC_1A_n77A DC_3A_n77A DC_19A_n77A	CA_1A-3A-19A-42C	n77A
DC_1A-3A-19A-42C_n77C	DC_1A_n77A DC_3A_n77A DC_19A_n77A	CA_1A-3A-19A-42A	CA_n77C
DC_1A-3A-19A-42A_n78A	DC_1A_n78A DC_3A_n78A DC_19A_n78A	CA_1A-3A-19A-42A	n78A
DC_1A-3A-19A-42A_n78C	DC_1A_n78A DC_3A_n78A DC_19A_n78	CA_1A-3A-19A-42A	CA_n78C

DC_1A-3A-19A-42C_n78A	DC_1A_n78A DC_3A_n78A DC_19A_n78A	CA_1A-3A-19A-42C	n78A
DC_1A-3A-19A-42C_n78C	DC_1A_n78A DC_3A_n78A DC_19A_n78A	CA_1A-3A-19A-42C	CA_n78C
DC_1A-3A-19A-42A_n79A	DC_1A_n79A DC_3A_n79A DC_19A_n79A	CA_1A-3A-19A-42A	n79A
DC_1A-3A-19A-42A_n79C	DC_1A_n79A DC_3A_n79A DC_19A_n79A	CA_1A-3A-19A-42A	CA_n79C
DC_1A-3A-19A-42C_n79A	DC_1A_n79A DC_3A_n79A DC_19A_n79A	CA_1A-3A-19A-42C	n79A
DC_1A-3A-19A-42C_n79C	DC_1A_n79A DC_3A_n79A DC_19A_n79A	CA_1A-3A-19A-42C	CA_n79C
DC_1A-3A-20A_n28A-n78A	DC_1A_n28A DC_1A_n78A DC_3A_n28A DC_3A_n78A DC_20A_n28A DC_20A_n78A	CA_1A-3A-20A	CA_n28A-n78A
DC_1A-3A-21A-42C_n77A	DC_1A_n77A DC_3A_n77A DC_21A_n77A	CA_1A-3A-21A-42C	n77A
DC_1A-3A-21A-42C_n77C	DC_1A_n77A DC_3A_n77A DC_21A_n77A	CA_1A-3A-21A-42C	CA_n77C
DC_1A-3A-21A-42C_n78A	DC_1A_n78A DC_3A_n78A DC_21A_n78A	CA_1A-3A-21A-42C	n78A
DC_1A-3A-21A-42C_n78C	DC_1A_n78A DC_3A_n78A DC_21A_n78A	CA_1A-3A-21A-42C	CA_n78C
DC_1A-3A-21A-42C_n79A	DC_1A_n79A DC_3A_n79A DC_19A_n79A	CA_1A-3A-21A-42C	n79A
DC_1A-3A-21A-42C_n79C	DC_1A_n79A DC_3A_n79A DC_19A_n79A	CA_1A-3A-21A-42C	CA_n79C
DC_1A-3A-28A-42A_n77A	DC_1A_n77A DC_3A_n77A DC_28A_n77A	CA_1A-3A-28A-42A	n77A
DC_1A-3A-28A-42A_n78A	DC_1A_n78A DC_3A_n78A DC_28A_n78A	CA_1A-3A-28A-42A	n78A
DC_1A-3A-28A-42A_n79A	DC_1A_n79A DC_3A_n79A DC_28A_n79A	CA_1A-3A-28A-42A	n79A
DC_1A-3A-28A-42C_n77A	DC_1A_n77A DC_3A_n77A DC_28A_n77A	CA_1A-3A-28A-42C	n77A
DC_1A-3A-28A-42C_n78A	DC_1A_n78A DC_3A_n78A DC_28A_n78A	CA_1A-3A-28A-42C	n78A
DC_1A-3A-28A-42C_n79A	DC_1A_n79A DC_3A_n79A DC_28A_n79A	CA_1A-3A-28A-42C	n79A
DC_1A-7A-20A_n28A-n78A	DC_1A_n28A DC_1A_n78A DC_7A_n28A DC_7A_n78A DC_20A_n28A DC_20A_n78A	CA_1A-7A-20A	CA_n28A-n78A

DC_1A-19A-21A-42A_n77A	DC_1A_n77A DC_19A_n77A DC_21A_n77A	CA_1A-19A-21A-42A	n77A
DC_1A-19A-21A-42A_n78A	DC_1A_n78A DC_19A_n78A DC_21A_n78A	CA_1A-19A-21A-42A	n78A
DC_1A-19A-21A-42A_n79A	DC_1A_n79A DC_19A_n79A DC_21A_n79A	CA_1A-19A-21A-42A	n79A
DC_1A-19A-21A-42A_n77C	DC_1A_n77A DC_19A_n77A DC_21A_n77A	CA_1A-19A-21A-42A	CA_n77C
DC_1A-19A-21A-42A_n78C	DC_1A_n78A DC_19A_n78A DC_21A_n78A	CA_1A-19A-21A-42A	CA_n78C
DC_1A-19A-21A-42A_n79C	DC_1A_n79A DC_19A_n79A DC_21A_n79A	CA_1A-19A-21A-42A	CA_n79C
DC_1A-19A-21A-42C_n77A	DC_1A_n77A DC_19A_n77A DC_21A_n77A	CA_1A-19A-21A-42C	n77A
DC_1A-19A-21A-42C_n77C	DC_1A_n77A DC_19A_n77A DC_21A_n77A	CA_1A-19A-21A-42C	CA_n77C
DC_1A-19A-21A-42C_n78A	DC_1A_n78A DC_19A_n78A DC_21A_n78A	CA_1A-19A-21A-42C	n78A
DC_1A-19A-21A-42C_n78C	DC_1A_n78A DC_19A_n78A DC_21A_n78A	CA_1A-19A-21A-42C	n78C
DC_1A-19A-21A-42C_n79A	DC_1A_n79A DC_19A_n79A DC_21A_n79A	CA_1A-19A-21A-42C	n79A
DC_1A-19A-21A-42C_n79C	DC_1A_n79A DC_19A_n79A DC_21A_n79A	CA_1A-19A-21A-42C	CA_n79C
DC_1A-21A-28A-42A_n77A	DC_1A_n77A DC_21A_n77A DC_28A_n77A	CA_1A-21A-28A-42A	n77A
DC_1A-21A-28A-42A_n78A	DC_1A_n78A DC_21A_n78A DC_28A_n78A	CA_1A-21A-28A-42A	n78A
DC_1A-21A-28A-42A_n79A	DC_1A_n79A DC_21A_n79A DC_28A_n79A	CA_1A-21A-28A-42A	n79A
DC_1A-21A-28A-42C_n77A	DC_1A_n77A DC_21A_n77A DC_28A_n77A	CA_1A-21A-28A-42C	n77A
DC_1A-21A-28A-42C_n78A	DC_1A_n78A DC_21A_n78A DC_28A_n78A	CA_1A-21A-28A-42C	n78A
DC_1A-21A-28A-42C_n79A	DC_1A_n79A DC_21A_n79A DC_28A_n79A	CA_1A-21A-28A-42C	n79A
DC_3A-7A-20A_n28A-n78A	DC_3A_n28A DC_3A_n78A DC_7A_n28A DC_7A_n78A DC_20A_n28A DC_20A_n78A	CA_3A-7A-20A	CA_n28A-n78A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.4.5 Inter-band EN-DC configurations (six bands)

Table 5.5B.4.5-1: Inter-band EN-DC configurations (six bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A-3A-7A-20A_n28A-n78A	DC_1A_n28A DC_1A_n78A DC_3A_n28A DC_3A_n78A DC_7A_n28A DC_7A_n78A DC_20A_n28A DC_20A_n78A	CA_1A-3A-7A-20A	CA_n28A-n78A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.5 Inter-band EN-DC including FR2

Supported channel bandwidths for E-UTRA operating bands and CA configurations are defined in TS 36.101 [5] and for NR operating bands and CA configurations in TS 38.101-1 [2], TS 38.101-2 [3] and TS 38.101-3 [4].

5.5B.5.1 Inter-band EN-DC configurations (two bands)

Table 5.5B.5.1-1: Inter-band EN-DC configurations (two bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A_n257A DC_1A_n257D DC_1A_n257E DC_1A_n257F	DC_1A_n257A	1A	n257A CA_n257D CA_n257E CA_n257F
DC_2A_n257A DC_2A_n257(2A)	DC_2A_n257A	2A	n257A CA_n257(2A)
DC_2A-2A_n257A	DC_2A-2A_n257A	CA_2A-2A	n257A
DC_2A_n257A	DC_2A_n257A	2A	n257A
DC_2C_n257A	DC_2C_n257A	CA_2C	n257A
DC_2A_n260 DC_2A_n260(2A)	DC_2A_n260A	2A	n260A CA_n260(2A)
DC_2A-2A_n260A	DC_2A_n260A	CA_2A-2A	n260A
DC_2C_n260A	DC_2C_n260A	CA_2C	n260A
DC_3A_n257A DC_3A_n257D DC_3A_n257E DC_3A_n257F	DC_3A_n257A	3A	n257A CA_n257D CA_n257E CA_n257F
DC_3A_n258A	DC_3A_n258A	3A	n258A
DC_5A-5A_n257A	DC_5A_n257A	CA_5A-5A	n257A
DC_5A-5A_n260A	DC_5A_n260A	CA_5A-5A	n260A
DC_5A_n257A	DC_5A_n257A	5A	n257A
DC_5A_n260A DC_5A_n260B DC_5A_n260C DC_5A_n260D DC_5A_n260E DC_5A_n260F DC_5A_n260G DC_5A_n260H DC_5A_n260I DC_5A_n260J DC_5A_n260K DC_5A_n260L DC_5A_n260M DC_5A_n260O DC_5A_n260P DC_5A_n260Q DC_5A_n260(2A) DC_5A_n260(3A) DC_5A_n260(4A) DC_5A_n260(D_G) DC_5A_n260(D_H) DC_5A_n260(D_I) DC_5A_n260(D_O) DC_5A_n260(D_P) DC_5A_n260(D_Q) DC_5A_n260(E_O) DC_5A_n260(E_P) DC_5A_n260(E_Q)	DC_5A_n260A	5A	n260A CA_n260B CA_n260C CA_n260D CA_n260E CA_n260F CA_n260G CA_n260H CA_n260I CA_n260J CA_n260K CA_n260L CA_n260M CA_n260O CA_n260P CA_n260Q CA_n260(2A) CA_n260(3A) CA_n260(4A) CA_n260(D-G) CA_n260(D-H) CA_n260(D-I) CA_n260(D-O) CA_n260(D-P) CA_n260(D-Q) CA_n260(E-O) CA_n260(E-P) CA_n260(E-Q)

DC_5A_n261A DC_5A_n261B DC_5A_n261C DC_5A_n261D DC_5A_n261E DC_5A_n261F DC_5A_n261G DC_5A_n261H DC_5A_n261I DC_5A_n261J DC_5A_n261K DC_5A_n261L DC_5A_n261M DC_5A_n261O DC_5A_n261P DC_5A_n261Q DC_5A_n261(2A) DC_5A_n261(3A) DC_5A_n261(4A) DC_5A_n261(D_G) DC_5A_n261(D_H) DC_5A_n261(D_I) DC_5A_n261(D_O) DC_5A_n261(D_P) DC_5A_n261(D_Q) DC_5A_n261(E_O) DC_5A_n261(E_P) DC_5A_n261(E_Q)	DC_5A_n261A	5A	n261A CA_n261B CA_n261C CA_n261D CA_n261E CA_n261F CA_n261G CA_n261H CA_n261I CA_n261J CA_n261K CA_n261L CA_n261M CA_n261O CA_n261P CA_n261Q CA_n261(2A) CA_n261(3A) CA_n261(4A) CA_n261(D-G) CA_n261(D-H) CA_n261(D-I) CA_n261(D-O) CA_n261(D-P) CA_n261(D-Q) CA_n261(E-O) CA_n261(E-P) CA_n261(E-Q)
DC_5B_n257A	DC_5B_n257A	CA_5B	n257A
DC_5B_n260A	DC_5B_n260A	CA_5B	n260A
DC_7A-7A_n257A	DC_7A_n257A	CA_7A-7A	n257A
DC_7A_n257A	DC_7A_n257A	7A	n257A
DC_7A_n258A	DC_7A_n258A	7A	n258A
DC_8A_n257A	DC_8A_n257A	8A	n257A
DC_8A_n258A	DC_8A_n258A	8A	n258A
DC_11A_n257A	DC_11A_n257A	11A	n257A
DC_12A_n260A	DC_12A_n260A	12A	n260A
DC_13A_n257A	DC_13A_n257A	13A	n257A
DC_13A_n260A	DC_13A_n260A	13A	n260A
DC_18A_n257A	DC_18A_n257A	18A	n257A
DC_19A_n257A DC_19A_n257D DC_19A_n257E DC_19A_n257F	DC_19A_n257A	19A	n257A CA_n257D CA_n257E CA_n257F
DC_20A_n258A	DC_20A_n258A	20A	n258A
DC_21A_n257A DC_21A_n257D DC_21A_n257E DC_21A_n257F	DC_21A_n257A	21A	n257A CA_n257D CA_n257E CA_n257F
DC_26A_n257A	DC_26A_n257A	26A	n257A
DC_28A_n257A DC_28A_n257D DC_28A_n257E DC_28A_n257F	DC_28A_n257A	28A	n257A CA_n257D CA_n257E CA_n257F
DC_28A_n258A	DC_28A_n258A	28A	n258A
DC_30A_n260A	DC_30A_n260A	30A	CA_n260A
DC_41A_n257A DC_41C_n257A	DC_41A_n257A	41	n257A
DC_41A_n258A	DC_41A_n258A	41A	CA_n258A
DC_41C_n257A	DC_41C_n257A	CA_41C	n257A

DC_42A_n257A DC_42C_n257A DC_42A_n257D DC_42A_n257E DC_42A_n257F	DC_42A_n257A	42A	n257A CA_n257D CA_n257E CA_n257F
DC_42D_n257A	DC_42C_n257A	CA_42C	n257A
DC_42E_n257A	DC_42A_n257A	42	n257A
DC_48A-48A_n257A	DC_48A_n257A	CA_48A-48A	n257A
DC_48A-48A_n260A	DC_48A_n260A	CA_48A-48A	n260A
DC_48A_n257A	DC_48A_n257A	48A	n257A
DC_48C_n257A	DC_48C_n257A	CA_48C	n257A
DC_48A_n260A	DC_48A_n260A	48A	n260A
DC_48C_n260A	DC_48C_n260A	CA_48C	n260A
DC_66A-66A_n257A	DC_66A_n257A	CA_66A-66A	n257A
DC_66A-66A_n260A	DC_66A_n260A	CA_66A-66A	n260A
DC_66A_n257A DC_66A_n257(2A) DC_66A_n257G DC_66A_n257H DC_66A_n257I DC_66A_n257J DC_66A_n257K DC_66A_n257L DC_66A_n257M	DC_66A_n257A	66A	n257A CA_n257(2A) CA_n257G CA_n257H CA_n257I CA_n257J CA_n257K CA_n257L CA_n257M
DC_66A_n260A DC_66A_n260D DC_66A_n260E DC_66A_n260F DC_66A_n260G DC_66A_n260H DC_66A_n260I DC_66A_n260J DC_66A_n260K DC_66A_n260L DC_66A_n260M DC_66A_n260O DC_66A_n260P DC_66A_n260Q DC_66A_n260(2A) DC_66A_n260(3A) DC_66A_n260(4A) DC_66A_n260(D_G) DC_66A_n260(D_H) DC_66A_n260(D_I) DC_66A_n260(D_O) DC_66A_n260(D_P) DC_66A_n260(D_Q) DC_66A_n260(E_O) DC_66A_n260(E_P) DC_66A_n260(E_Q)	DC_66A_n260A	66A	n260A CA_n260D CA_n260E CA_n260F CA_n260G CA_n260H CA_n260I CA_n260J CA_n260K CA_n260L CA_n260M CA_n260O CA_n260P CA_n260Q CA_n260(2A) CA_n260(3A) CA_n260(4A) CA_n260(D-G) CA_n260(D-H) CA_n260(D-I) CA_n260(D-O) CA_n260(D-P) CA_n260(D-Q) CA_n260(E-O) CA_n260(E-P) CA_n260(E-Q)
DC_66C_n257A	DC_66C_n257A	CA_66C	n257A

DC_66A_n261A	DC_66A_n261A	66A	n261A
DC_66A_n261D			CA_n261D
DC_66A_n261E			CA_n261E
DC_66A_n261F			CA_n261F
DC_66A_n261G			CA_n261G
DC_66A_n261H			CA_n261H
DC_66A_n261I			CA_n261I
DC_66A_n261J			CA_n261J
DC_66A_n261K			CA_n261K
DC_66A_n261L			CA_n261L
DC_66A_n261M			CA_n261M
DC_66A_n261O			CA_n261O
DC_66A_n261P			CA_n261P
DC_66A_n261Q			CA_n261Q
DC_66A_n261(2A)			CA_n261(2A)
DC_66A_n261(3A)			CA_n261(3A)
DC_66A_n261(4A)			CA_n261(4A)
DC_66A_n261(D_G)			CA_n261(D-G)
DC_66A_n261(D_H)			CA_n261(D-H)
DC_66A_n261(D_I)			CA_n261(D-I)
DC_66A_n261(D_O)			CA_n261(D-O)
DC_66A_n261(D_P)			CA_n261(D-P)
DC_66A_n261(D_Q)			CA_n261(D-Q)
DC_66A_n261(E_O)			CA_n261(E-O)
DC_66A_n261(E_P)			CA_n261(E-P)
DC_66A_n261(E_Q)			CA_n261(E-Q)
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.5.2 Inter-band EN-DC configurations (three bands)

Table 5.5B.5.2-1: Inter-band EN-DC configurations (three bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A-3A_n257A DC_1A-3A_n257D DC_1A-3A_n257E DC_1A-3A_n257F	DC_1A_n257A DC_3A_n257A	CA_1A-3A	n257A CA_n257D CA_n257E CA_n257F
DC_1A-5A_n257A	DC_1A_n257A DC_5A_n257A	CA_1A-5A	n257A
DC_1A-7A_n257A	DC_1A_n257A DC_7A_n257A	CA_1A-7A	n257A
DC_1A-7A-7A_n257A	DC_1A_n257A DC_7A-7A_n257A	CA_1A-7A-7A	n257A
DC_1A-8A_n257A	DC_1A_257A DC_8A_n257A	CA_1A-8A	n257A
DC_1A-18A_n257A	DC_1A_257A DC_18A_n257A	CA_1A-18A	n257A
DC_1A-19A_n257A DC_1A-19A_n257D DC_1A-19A_n257E DC_1A-19A_n257F	DC_1A_57A DC_19A_n257A	CA_1A-19A	n257A CA_n257D CA_n257E CA_n257F
DC_1A-21A_n257A DC_1A-21A_n257D DC_1A-21A_n257E DC_1A-21A_n257F	DC_1A_n257A DC_21A_n257A	CA_1A-21A	n257A CA_n257D CA_n257E CA_n257F
DC_1A-28A_n257A DC_1A-28A_n257D DC_1A-28A_n257E DC_1A-28A_n257F	DC_1A_n257A DC_28A_n257A	CA_1A-28A	n257A CA_n257D CA_n257E CA_n257F
DC_1A-41A_n257A	DC_1A_n257A DC_41A_n257A	CA_1A-41A	n257A
DC_1A-41C_n257A	DC_1A_n257A DC_41C_n257A	CA_1A-41C	n257A
DC_1A-42A_n257A DC_1A-42A_n257D DC_1A-42A_n257E DC_1A-42A_n257F	DC_1A_n257A DC_42A_n257A	CA_1A-42A	n257A CA_n257D CA_n257E CA_n257F
DC_1A-42C_n257A	DC_1A_n257A DC_42A_n257A	CA_1A-42C	n257A
DC_1A-42D_n257A	DC_1A_n257A DC_42A_n257A	CA_1A-42C	n257A
DC_1A-42E_n257A	DC_1A_n257A DC_42A_n257A	CA_1A-42E	n257A
DC_2A-5A_n257A	DC_2A_n257A DC_5A_n257A	CA_2A-5A	n257A
DC_2A-5A_n260A	DC_2A_n260A DC_5A_n260A	CA_2A-5A	n260A
DC_2A-12A_n260A	DC_2A_n260A DC_12A_n260A	CA_2A-12A	n260A
DC_2A-13A_n257A	DC_2A_n257A DC_13A_n257A	CA_2A-13A	n257A
DC_2A-13A_n260A	DC_2A_n260A DC_13A_n260A	CA_2A-13A	n260A
DC_2A-30A_n260A	DC_2A_n260A DC_30A_n260A	CA_2A-30A	n260A
DC_2A-66A_n257A	DC_2A_n257A DC_66A_n257A	CA_2A-66A	n257A
DC_2A-66A_n260A	DC_2A_n260A DC_66A_n260A	CA_2A-66A	n260A
DC_3A-5A_n257A	DC_3A_n257A DC_5A_n257A	CA_3A-5A	n257A
DC_3A-7A-7A_n257A	DC_3A_n257A DC_7A_n257A	CA_3A-7A-7A	n257A
DC_3A-7A_n257A	DC_3A_n257A DC_7A_n257A	CA_3A-7A	n257A

DC_3A-19A_n257A DC_3A-19A_n257D DC_3A-19A_n257E DC_3A-19A_n257F	DC_3A_n257A DC_19A_n257A	CA_3A-19A	n257A CA_n257D CA_n257E CA_n257F
DC_3A-21A_n257A DC_3A-21A_n257D DC_3A-21A_n257E DC_3A-21A_n257F	DC_3A_n257A DC_21A_n257A	CA_3A-21A	n257A CA_n257D CA_n257E CA_n257F
DC_3A-28A_n257A DC_3A-28A_n257D DC_3A-28A_n257E DC_3A-28A_n257F	DC_3A_n257A DC_28A_n257A	CA_3A-28A	n257A CA_n257D CA_n257E CA_n257F
DC_3A-41A_n257A	DC_3A_n257A DC_41A_n257A	CA_3A-41A	n257A
DC_3A-42A_n257A DC_3A-42A_n257D DC_3A-42A_n257E DC_3A-42A_n257F	DC_3A_n257A DC_42A_n257A	CA_3A-42A	n257A CA_n257D CA_n257E CA_n257F
DC_3A-42C_n257A	DC_3A_n257A DC_42A_n257A	CA_3A-42C	n257A
DC_3A-42D_n257A	DC_3A_n257A DC_42A_n257A	CA_3A-42A	n257A
DC_3A-42E_n257A	DC_3A_n257A DC_42A_n257A	CA_3A-42E	n257A
DC_5A-30A_n260A	DC_5A_n260A DC_30A_n260A	CA_5A-30A	n260A
DC_5A-66A_n257A	DC_5A_n257A DC_66A_n257A	CA_5A-66A	n257A
DC_5A-66A_n260A	DC_5A_n260A DC_66A_n260A	CA_5A-66A	n260A
DC_5A-7A-7A_n257A	DC_5A_n257A DC_7A_n257A	CA_5A-7A-7A	n257A
DC_5A-7A_n257A	DC_5A_n257A DC_7A_n257A	CA_5A-7A	n257A
DC_5A_n78A-n257A	DC_5A_n78A DC_5A_n257A	5A	CA_n78A-n257A
DC_5B_n260A	DC_5B_n260A	CA_5B	n260A
DC_7A-7A_n257A	DC_7A_n257A	CA_7A-7A	n257A
DC_7A_n78A-n257A	DC_7A_n78A DC_7A_n257A	7A	CA_n78A-n257A
DC_12A-30A_n260A	DC_12A_n260A DC_30A_n260A	CA_12A-30A	n260A
DC_12A-66A_n260A	DC_12A_n260A DC_66A_n260A	CA_12A-66A	n260A
DC_13A-66A_n257A	DC_13A_n257A DC_66A_n257A	CA_13A-66A	n257A
DC_13A-66A_n260A	DC_13A_n260A DC_66A_n260A	CA_13A-66A	n260A
DC_18A-28A-n257A	DC_18A_n257A DC_28A_n257A	CA_18A-28A	n257A
DC_19A-42A_n257A DC_19A-42A_n257D DC_19A-42A_n257E DC_19A-42A_n257F	DC_19A_n257A DC_42A_n257A	CA_19A-42A	n257A CA_n257D CA_n257E CA_n257F
DC_19A-21A_n257A DC_19A-21A_n257D DC_19A-21A_n257E DC_19A-21A_n257F	DC_19A_n257A DC_21A_n257A	CA_19A-21A	n257A CA_n257D CA_n257E CA_n257F
DC_19A-42C_n257A	DC_19A_n257A DC_42A_n257A	CA_19A-42C	n257A
DC_21A-28A_n257A DC_21A-28A_n257D DC_21A-28A_n257E DC_21A-28A_n257F	DC_21A_n257A DC_28A_n257A	CA_21A-28A	n257A CA_n257D CA_n257E CA_n257F

DC_21A-42A_n257A DC_21A-42A_n257D DC_21A-42A_n257E DC_21A-42A_n257F	DC_21A_n257A DC_42A_n257A	CA_21A-42A	n257A CA_n257D CA_n257E CA_n257F
DC_21A-42C_n257A	DC_21A_n257A DC_42A_n257A	CA_21A-42C	n257A
DC_21A_n77A-n257A	DC_21A_n77A DC_21A_n257A	21A	CA_n77A-n257A
DC_21A_n78A-n257A	DC_21A_n78A DC_21A_n257A	21A	CA_n78A-n257A
DC_21A_n79A-n257A	DC_21A_n79A DC_21A_n257A	21A	CA_n79A-n257A
DC_28A-42A_n257A	DC_28A_n257A DC_42A_n257A	CA_28A-42A	n257A
DC_28A-42C_n257A	DC_28A_n257A DC_42A_n257A	CA_28A-42C	n257A
DC_30A-66A_n260A	DC_30A_n260A DC_66A_n260A	CA_30A-66A	n260A
DC_41A-42A_n257A	DC_41A_n257A DC_42A_n257A	CA_41A-42A	n257A
DC_41A-42C_n257A	DC_41A_n257A DC_42C_n257A	CA_41A-42C	n257A
DC_41C-42A_n257A	DC_41C_n257A DC_42A_n257A	CA_41C-42A	n257A
DC_41C-42C_n257A	DC_41A_n257A DC_42A_n257A	CA_41C-42C	n257A
DC_42C_n257A DC_42C_n257D DC_42C_n257E DC_42C_n257F	DC_42C_n257A	CA_42C	n257A CA_n257D CA_n257E CA_n257F
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.5.3 Inter-band EN-DC configurations (four bands)

Table 5.5B.5.3-1: Inter-band EN-DC configurations (four bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A-3A-5A_n257A	DC_1A_n257A DC_3A_n257A DC_5A_n257A	CA_1A-3A-5A	n257A
DC_1A-3A-7A-7A_n257A	DC_1A_n257A DC_3A_n257A DC_7A_n257A	CA_1A-3A-7A-7A	n257A
DC_1A-3A-7A_n257A	DC_1A_n257A DC_3A_n257A DC_7A_n257A	CA_1A-3A-7A	n257A
DC_1A-3A-19A_n257A	DC_1A_n257A DC_3A_n257A DC_19A_n257A	CA_1A-3A-19A	n257A
DC_1A-3A-21A_n257A	DC_1A_n257A DC_3A_n257A DC_21A_n257A	CA_1A-3A-21A	n257A
DC_1A-3A-28A_n257A	DC_1A_n257A DC_3A_n257A DC_28A_n257A	CA_1A-3A-28A	n257A
DC_1A-3A-42C_n257A	DC_1A_n257A DC_3A_n257A DC_42A_n257A	CA_1A-3A-42C	n257A
DC_1A-3A-42C_n257D	DC_1A_n257A DC_3A_n257A DC_42A_n257A	CA_1A-3A-42C	CA_n257D
DC_1A-3A-42C_n257E	DC_1A_n257A DC_3A_n257A DC_42A_n257A	CA_1A-3A-42C	CA_n257E
DC_1A-3A-42C_n257F	DC_1A_n257A DC_3A_n257A DC_42A_n257A	CA_1A-3A-42C	CA_n257F
DC_1A-3A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_3A_n78A DC_3A_n257A	CA_1A-3A	CA_n78A-n257A
DC_1A-5A-7A-7A_n257A	DC_1A_n257A DC_5A_n257A DC_7A_n257A	CA_1A-5A-7A-7A	n257A
DC_1A-5A-7A_n257A	DC_1A_n257A DC_5A_n257A DC_7A_n257A	CA_1A-5A-7A	n257A
DC_1A-5A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_5A_n78A DC_5A_n257A	CA_1A-5A	CA_n78A-n257A
DC_1A-7A-7A_n78A-n257A	DC_1A_n78A DC_1A_n257A, DC_7A_n78A DC_7A_n257A	CA_1A-7A-7A	CA_n78A-n257A
DC_1A-7A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_7A_n78A DC_7A_n257A	CA_1A-7A	CA_n78A-n257A
DC_1A-18A-28A_n257A	DC_1A_n257A DC_18A_n257A DC_28A_n257A	CA_1A-18A-28A	n257A
DC_1A-19A-42A_n257A	DC_1A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-19A-42A	n257A
DC_1A-19A-42C_n257A	DC_1A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-19A-42C	n257A
DC_1A-19A-42C_n257D	DC_1A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-19A-42A	CA_n257D

DC_1A-19A-42C_n257E	DC_1A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-19A-42A	CA_n257E
DC_1A-19A-42C_n257F	DC_1A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-19A-42A	CA_n257F
DC_1A-21A-28A_n257A	DC_1A_n257A DC_21A_n257A DC_28A_n257A	CA_1A-21A-28A	n257
DC_1A-21A-42A_n257A	DC_1A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-21A-42A	n257A
DC_1A-21A-42C_n257A	DC_1A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-21A-42C	n257A
DC_1A-21A-42C_n257D	DC_1A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-21A-42C	CA_n257D
DC_1A-21A-42C_n257E	DC_1A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-21A-42C	CA_n257E
DC_1A-21A-42C_n257F	DC_1A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-21A-42C	CA_n257F
DC_1A-28A-42A_n257A	DC_1A_n257A DC_28A_n257A DC_42A_n257A	CA_1A-28A-42A	n257A
DC_1A-28A-42C_n257A	DC_1A_n257A DC_28A_n257A DC_42A_n257A	CA_1A-28A-42A	n257A
DC_1A-41A-42A_n257A	DC_1A_n257A DC_41A_n257A DC_42A_n257A	CA_1A-41A-42A	n257A
DC_1A-41A-42C_n257A	DC_1A_n257A DC_41A_n257A DC_42A_n257A	CA_1A-41A-42C	n257A
DC_1A-41C-42A_n257A	DC_1A_n257A DC_41A_n257A DC_42A_n257A	CA_1A-41C-42A	n257A
DC_1A-41C-42C_n257A	DC_1A_n257A DC_41A_n257A DC_42A_n257A	CA_1A-41C-42C	n257A
DC_3A-5A-7A-7A_n257A	DC_3A_n257A DC_5A_n257A DC_7A_n257A	CA_3A-5A-7A-7A	n257A
DC_3A-5A-7A_n257A	DC_3A_n257A DC_5A_n257A DC_7A_n257A	CA_3A-5A-7A	n257A
DC_3A-5A_n78A-n257A	DC_3A_n78A DC_3A_n257A DC_5A_n78A DC_5A_n257A	CA_3A-5A	CA_n78A-n257A
DC_3A-7A-7A_n78A-n257A	DC_3A_n78A DC_3A_n257A DC_7A_n78A DC_7A_n257A	CA_3A-7A-7A	CA_n78A-n257A
DC_3A-7A_n78A-n257A	DC_3A_n78A DC_3A_n257A DC_7A_n78A DC_7A_n257A	CA_3A-7A	CA_n78A-n257A
DC_3A-19A-21A_n257A	DC_3A_n257A DC_19A_n257A DC_21A_n257A	CA_3A-19A-21A	n257A
DC_3A-19A-42A_n257A	DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_3A-19A-42A	n257A

DC_3A-19A-42C_n257A	DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_3A-19A-42C	n257A
DC_3A-19A-42C_n257D	DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_3A-19A-42C	CA_n257D
DC_3A-19A-42C_n257E	DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_3A-19A-42C	CA_n257E
DC_3A-19A-42C_n257F	DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_3A-19A-42C	CA_n257F
DC_3A-21A-42C_n257A	DC_3A_n257A DC_21A_n257A DC_42A_n257A	CA_3A-21A-42C	n257A
DC_3A-21A-42C_n257D	DC_3A_n257A DC_21A_n257A DC_42A_n257A	CA_3A-21A-42C	CA_n257D
DC_3A-21A-42C_n257E	DC_3A_n257A DC_21A_n257A DC_42A_n257A	CA_3A-21A-42C	CA_n257E
DC_3A-21A-42C_n257F	DC_3A_n257A DC_21A_n257A DC_42A_n257A	CA_3A-21A-42C	CA_n257F
DC_3A-28A-42A_n257A	DC_3A_n257A DC_28A_n257A DC_42A_n257A	CA_3A-28A-42A	n257A
DC_3A-28A-42C_n257A	DC_3A_n257A DC_28A_n257A DC_42A_n257A	CA_3A-28A-42A	n257A
DC_5A-7A-7A_n78A-n257A	DC_5A_n78A DC_5A_n257A DC_7A_n78A DC_7A_n257A	CA_5A-7A-7A	CA_n78A-n257A
DC_5A-7A_n78A-n257A	DC_5A_n78A DC_5A_n257A DC_7A_n78A DC_7A_n257A	CA_5A-7A	CA_n78A-n257A
DC_19A-21A-42A_n257A	DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_19A-21A-42A	n257A
DC_19A-21A-42C_n257A	DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_19A-21A-42C	n257A
DC_19A-21A-42C_n257D	DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_19A-21A-42C	CA_n257D
DC_19A-21A-42C_n257E	DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_19A-21A-42C	CA_n257E
DC_19A-21A-42C_n257F	DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_19A-21A-42C	CA_n257F
DC_21A-28A-42A_n257A	DC_21A_n257A DC_28A_n257A DC_42A_n257A	CA_21A-28A-42A	n257A
DC_21A-28A-42C_n257A	DC_21A_n257A DC_28A_n257A DC_42A_n257A	CA_21A-28A-42A	n257A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.5.4 Inter-band EN-DC configurations (five bands)

Table 5.5B.5.4-1: Inter-band EN-DC configurations (five bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A-3A-5A-7A_n257A	DC_1A_n257A DC_3A_n257A DC_5A_n257A DC_7A_n257A	CA_1A-3A-5A-7A	n257A
DC_1A-3A-5A-7A-7A_n257A	DC_1A_n257A DC_3A_n257A DC_5A_n257A DC_7A_n257A	CA_1A-3A-5A-7A-7A	n257A
DC_1A-3A-5A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_3A_n78A DC_3A_n257A DC_5A_n78A DC_5A_n257A	CA_1A-3A-5A	CA_n78A-n257A
DC_1A-3A-7A-7A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_3A_n78A DC_3A_n257A DC_7A_n78A DC_7A_n257A	CA_1A-3A-7A-7A	CA_n78A-n257A
DC_1A-3A-7A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_3A_n78A DC_3A_n257A DC_7A_n78A DC_7A_n257A	CA_1A-3A-7A	CA_n78A-n257A
DC_1A-3A-19A-21A_n257A	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_21A_n257A	CA_1A-3A-19A-21A	n257A
DC_1A-3A-19A-21A_n257D	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_21A_n257A	CA_1A-3A-19A-21A	CA_n257D
DC_1A-3A-19A-21A_n257E	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_21A_n257A	CA_1A-3A-19A-21A	CA_n257E
DC_1A-3A-19A-21A_n257F	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_21A_n257A	CA_1A-3A-19A-21A	CA_n257F
DC_1A-3A-19A-42A_n257A	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-19A-42A	n257A
DC_1A-3A-19A-42A_n257D	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-19A-42A	CA_n257D
DC_1A-3A-19A-42A_n257E	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-19A-42A	CA_n257E
DC_1A-3A-19A-42A_n257F	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-19A-42A	CA_n257F
DC_1A-3A-19A-42C_n257A	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-19A-42C	n257A

DC_1A-3A-19A-42C_n257D	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-19A-42C	CA_n257D
DC_1A-3A-19A-42C_n257E	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-19A-42C	CA_n257E
DC_1A-3A-19A-42C_n257F	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-19A-42C	CA_n257F
DC_1A-3A-21A-42C_n257A	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-21A-42C	n257A
DC_1A-3A-21A-42C_n257D	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-21A-42C	CA_n257D
DC_1A-3A-21A-42C_n257E	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-21A-42C	CA_n257E
DC_1A-3A-21A-42C_n257F	DC_1A_n257A DC_3A_n257A DC_19A_n257A DC_42A_n257A	CA_1A-3A-21A-42C	CA_n257F
DC_1A-3A-28A-42A_n257A	DC_1A_n257A DC_3A_n257A DC_28A_n257A DC_42A_n257A	CA_1A-3A-21A-42A	n257A
DC_1A-3A-28A-42C_n257A	DC_1A_n257A DC_3A_n257A DC_28A_n257A DC_42A_n257A	CA_1A-3A-28A-42C	n257A
DC_1A-5A-7A-7A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_5A_n78A DC_5A_n257A DC_7A_n78A DC_7A_n257A	CA_1A-5A-7A-7A	CA_n78A-n257A
DC_1A-5A-7A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_5A_n78A DC_5A_n257A DC_7A_n78A DC_7A_n257A	CA_1A-5A-7A	CA_n78A-n257A
DC_1A-19A-21A-42A_n257A	DC_1A_n257A DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-19A-21A-42A	n257A
DC_1A-19A-21A-42A_n257D	DC_1A_n257A DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-19A-21A-42A	CA_n257D
DC_1A-19A-21A-42A_n257E	DC_1A_n257A DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-19A-21A-42A	CA_n257E
DC_1A-19A-21A-42A_n257F	DC_1A_n257A DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-19A-21A-42A	CA_n257F
DC_1A-19A-21A-42C_n257A	DC_1A_n257A DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-19A-21A-42C	n257A

DC_1A-19A-21A-42C_n257D	DC_1A_n257A DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-19A-21A-42C	CA_n257D
DC_1A-19A-21A-42C_n257E	DC_1A_n257A DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-19A-21A-42C	CA_n257E
DC_1A-19A-21A-42C_n257F	DC_1A_n257A DC_19A_n257A DC_21A_n257A DC_42A_n257A	CA_1A-19A-21A-42C	CA_n257F
DC_1A-19A-28A-42C_n257A	DC_1A_n257A DC_19A_n257A DC_28A_n257A DC_42A_n257A	CA_1A-19A-28A-42C	n257A
DC_1A-21A-28A-42A_n257A	DC_1A_n257A DC_21A_n257A DC_28A_n257A DC_42A_n257A	CA_1A-21A-28A-42A	n257A
DC_3A-5A-7A-7A_n78A-n257A	DC_3A_n78A DC_3A_n257A DC_5A_n78A DC_3A_n257A DC_7A_n78A DC_7A_n257A	CA_3A-5A-7A-7A	CA_n78A-n257A
DC_3A-5A-7A_n78A-n257A	DC_3A_n78A DC_3A_n257A DC_5A_n78A DC_5A_n257A DC_7A_n78A DC_7A_n257A	CA_3A-5A-7A	CA_n78A-n257A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.5.5 Inter-band EN-DC configurations (six bands)

Table 5.5B.5.5-1: Inter-band EN-DC configurations (six bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A-3A-5A-7A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_3A_n78A DC_3A_n257A DC_5A_n78A DC_5A_n257A DC_7A_n78A DC_7A_n257A	CA_1A-3A-5A-7A	CA_n78A-n257A
NOTE 1: Uplink CA configurations are the configurations supported by the present release of specifications.			

5.5B.6 Inter-band EN-DC including FR1 and FR2

Supported channel bandwidths for E-UTRA operating bands and CA configurations are defined in TS 36.101 [5] and for NR operating bands and CA configurations in TS 38.101-1 [1], TS 38.101-2 [2] and TS 38.101-3 [3].

5.5B.6.1 Inter-band EN-DC configurations (two bands)

This section is N/A.

5.5B.6.2 Inter-band EN-DC configurations (three bands)

Table 5.5B.6.2-1: Inter-band EN-DC configurations (three bands)

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A_n77A-n257A	DC_1A_n77A DC_1A_n257A DC_1A_n77A-n257A	1A	CA_n77A-n257A
DC_1A_n77A-n257D	DC_1A_n77A DC_1A-n257A DC_1A_n77A-n257A	1A	CA_n77A-n257D
DC_1A_n77A-n257E	DC_1A_n77A DC_1A_n257A DC_1A_n77A-n257A	1A	CA_n77A-n257E
DC_1A_n77A-n257F	DC_1A_n77A DC_1A_n257A DC_1A_n77A-n257A	1A	CA_n77A-n257F
DC_1A_n77C-n257A	DC_1A_n77A DC_1A_n257A DC_1A_n77A-n257A	1A	CA_n77C-n257A
DC_1A_n77C-n257D	DC_1A_n77A DC_1A_n257A DC_1A_n77A-n257A	1A	CA_n77C-n257D
DC_1A_n77C-n257E	DC_1A_n77A DC_1A_n257A DC_1A_n77A-n257A	1A	CA_n77C-n257E
DC_1A_n77C-n257F	DC_1A_n77A DC_1A_n257A DC_1A_n77A-n257A	1A	CA_n77C-n257F
DC_1A_n78A-n257A	DC_1A_n78A DC_1A_n257A DC_1A_n78A-n257A	1A	CA_n78A-n257A
DC_1A_n78A-n257D	DC_1A_n78A DC_1A-n257A DC_1A_n78A-n257A	1A	CA_n78A-n257D
DC_1A_n78A-n257E	DC_1A_n78A DC_1A_n257A DC_1A_n78A-n257A	1A	CA_n78A-n257E
DC_1A_n78A-n257F	DC_1A_n78A DC_1A_n257A DC_1A_n78A-n257A	1A	CA_n78A-n257F
DC_1A_n78C-n257A	DC_1A_n78A DC_1A_n257A DC_1A_n78A-n257A	1A	CA_n78C-n257A
DC_1A_n78C-n257D	DC_1A_n78A DC_1A_n257A DC_1A_n78A-n257A	1A	CA_n78C-n257D
DC_1A_n78C-n257E	DC_1A_n78A DC_1A_n257A DC_1A_n78A-n257A	1A	CA_n78C-n257E
DC_1A_n78C-n257F	DC_1A_n78A DC_1A_n257A DC_1A_n78A-n257A	1A	CA_n78C-n257F
DC_1A_n79A-n257A	DC_1A_n79A DC_1A_n257A DC_1A_n79A-n257A	1A	CA_ n79A-n257A
DC_1A_n79A-n257D	DC_1A_n79A DC_1A-n257A DC_1A_n79A-n257A	1A	CA_ n79A-n257D
DC_1A_n79A-n257E	DC_1A_n79A DC_1A_n257A DC_1A_n79A-n257A	1A	CA_ n79A-n257E
DC_1A_n79A-n257F	DC_1A_n79A DC_1A_n257A DC_1A_n79A-n257A	1A	CA_n79A-n257F
DC_1A_n79C-n257A	DC_1A_n79A DC_1A_n257A DC_1A_n79A-n257A	1A	CA_ n79C-n257A

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_1A_n79C-n257D	DC_1A_n79A DC_1A_n257A DC_1A_n79A-n257A	1A	CA_ n79C-n257D
DC_1A_n79C-n257E	DC_1A_n79A DC_1A_n257A DC_1A_n79A-n257A	1A	CA_ n79C-n257E
DC_1A_n79C-n257F	DC_1A_n79A DC_1A_n257A DC_1A_n79A-n257A	1A	CA_ n79C-n257F
DC_3A_n77A-n257A	DC_3A_n77A DC_3A_n257A DC_3A_n77A-n257A	3A	CA_n77A-n257A
DC_3A_n77A-n257D	DC_3A_n77A DC_3A_n257A DC_3A_n77A-n257A	3A	CA_n77A-n257D
DC_3A_n77A-n257E	DC_3A_n77A DC_3A_n257A DC_3A_n77A-n257A	3A	CA_n77A-n257E
DC_3A_n77A-n257F	DC_3A_n77A DC_3A_n257A DC_3A_n77A-n257A	3A	CA_n77A-n257F
DC_3A_n77C-n257A	DC_3A_n77A DC_3A_n257A DC_3A_n77A-n257A	3A	CA_n77C-n257A
DC_3A_n77C-n257D	DC_3A_n77A DC_3A_n257A DC_3A_n77A-n257A	3A	CA_n77C-n257D
DC_3A_n77C-n257E	DC_3A_n77A DC_3A_n257A DC_3A_n77A-n257A	3A	CA_n77C-n257E
DC_3A_n77C-n257F	DC_3A_n77A DC_3A_n257A DC_3A_n77A-n257A	3A	CA_n77C-n257F
DC_3A_n78A-n257A	DC_3A_n78A DC_3A_n257A DC_3A_n78A-n257A	3A	CA_n78A-n257A
DC_3A_n78A-n257D	DC_3A_n78A DC_3A_n257A DC_3A_n78A-n257A	3A	CA_n78A-n257D
DC_3A_n78A-n257E	DC_3A_n78A DC_3A_n257A DC_3A_n78A-n257A	3A	CA_n78A-n257E
DC_3A_n78A-n257F	DC_3A_n78A DC_3A_n257A DC_3A_n78A-n257A	3A	CA_n78A-n257F
DC_3A_n78C-n257A	DC_3A_n78A DC_3A_n257A DC_3A_n78A-n257A	3A	CA_n78C-n257A
DC_3A_n78C-n257D	DC_3A_n78A DC_3A_n257A DC_3A_n78A-n257A	3A	CA_n78C-n257D
DC_3A_n78C-n257E	DC_3A_n78A DC_3A_n257A DC_3A_n78A-n257A	3A	CA_n78C-n257E
DC_3A_n78C-n257F	DC_3A_n78A DC_3A_n257A DC_3A_n78A-n257A	3A	CA_n78C-n257F
DC_3A_n79A-n257A	DC_3A_n79A DC_3A_n257A DC_3A_n79A-n257A	3A	CA_n79A-n257A
DC_3A_n79A-n257D	DC_3A_n79A DC_3A_n257A DC_3A_n79A-n257A	3A	CA_n79A-n257D

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_3A_n79A-n257E	DC_3A_n79A DC_3A_n257A DC_3A_n79A-n257A	3A	CA_n79A-n257E
DC_3A_n79A-n257F	DC_3A_n79A DC_3A_n257A DC_3A_n79A-n257A	3A	CA_n79A-n257F
DC_3A_n79C-n257A	DC_3A_n79A DC_3A_n257A DC_3A_n79A-n257A	3A	CA_n79C-n257A
DC_3A_n79C-n257D	DC_3A_n79A DC_3A_n257A DC_3A_n79A-n257A	3A	CA_n79C-n257D
DC_3A_n79C-n257E	DC_3A_n79A DC_3A_n257A DC_3A_n79A-n257A	3A	CA_n79C-n257E
DC_3A_n79C-n257F	DC_3A_n79A DC_3A_n257A DC_3A_n79A-n257A	3A	CA_n79C-n257F
DC_7A-7A_n78-n257A	DC_7A_n78A DC_7A_n257A DC_7A_n78A-n257A	CA_7A-7A	CA_n78A-n257A
DC_19A_n77A-n257A	DC_19A_n77A DC_19A_n257A DC_19A_n77A-n257A	19A	CA_n77A-n257A
DC_19A_n77A-n257D	DC_19A_n77A DC_19A_n257A DC_19A_n77A-n257A	19A	CA_n77A-n257D
DC_19A_n77A-n257E	DC_19A_n77A DC_19A_n257A DC_19A_n77A-n257A	19A	CA_n77A-n257E
DC_19A_n77A-n257F	DC_19A_n77A DC_19A_n257A DC_19A_n77A-n257A	19A	CA_n77A-n257F
DC_19A_n77C-n257A	DC_19A_n77A DC_19A_n257A DC_19A_n77A-n257A	19A	CA_n77C-n257A
DC_19A_n77C-n257D	DC_19A_n77A DC_19A_n257A DC_19A_n77A-n257A	19A	CA_n77C-n257D
DC_19A_n77C-n257E	DC_19A_n77A DC_19A_n257A DC_19A_n77A-n257A	19A	CA_n77C-n257E
DC_19A_n77C-n257F	DC_19A_n77A DC_19A_n257A DC_19A_n77A-n257A	19A	CA_n77C-n257F
DC_19A_n78A-n257A	DC_19A_n78A DC_19A_n257A DC_19A_n78A-n257A	19A	CA_n78A-n257A
DC_19A_n78A-n257D	DC_19A_n78A DC_19A_n257A DC_19A_n78A-n257A	19A	CA_n78A-n257D
DC_19A_n78A-n257E	DC_19A_n78A DC_19A_n257A DC_19A_n78A-n257A	19A	CA_n78A-n257E
DC_19A_n78A-n257F	DC_19A_n78A DC_19A_n257A DC_19A_n78A-n257A	19A	CA_n78A-n257F
DC_19A_n78C-n257A	DC_19A_n78A DC_19A_n257A DC_19A_n78A-n257A	19A	CA_ n78C-n257A
DC_19A_n78C-n257D	DC_19A_n78A DC_19A_n257A DC_19A_n78A-n257A	19A	CA_ n78C-n257D

EN-DC configuration	Uplink EN-DC configuration (NOTE 1)	E-UTRA configuration	NR configuration
DC_19A_n78C-n257E	DC_19A_n78A DC_19A_n257A DC_19A_n78A-n257A	19A	CA_ n78C-n257E
DC_19A_n78C-n257F	DC_19A_n78A DC_19A_n257A DC_19A_n78A-n257A	19A	CA_ n78C-n257F
DC_19A_n79A-n257A	DC_19A_n79A DC_19A_n257A DC_19A_n79A-n257A	19A	CA_n79A-n257A
DC_19A_n79A-n257D	DC_19A_n79A DC_19A_n257A DC_19A_n79A-n257A	19A	CA_n79A-n257D
DC_19A_n79A-n257E	DC_19A_n79A DC_19A_n257A DC_19A_n79A-n257A	19A	CA_n79A-n257E
DC_19A_n79A-n257F	DC_19A_n79A DC_19A_n257A DC_19A_n79A-n257A	19A	CA_n79A-n257F
DC_19A_n79C-n257A	DC_19A_n79A DC_19A_n257A DC_19A_n79A-n257A	19A	CA_n79C-n257A
DC_19A_n79C-n257D	DC_19A_n79A DC_19A_n257A DC_19A_n79A-n257A	19A	CA_n79C-n257D
DC_19A_n79C-n257E	DC_19A_n79A DC_19A_n257A DC_19A_n79A-n257A	19A	CA_n79C-n257E
DC_19A_n79C-n257F	DC_19A_n79A DC_19A_n257A DC_19A_n79A-n257A	19A	CA_n79C-n257F

6 Transmitter characteristics

6.1 General

For Tx test cases the identified beam peak direction can be stored and reused for a device under test in various configurations/environments for the full duration of device testing as long as beam peak direction is the same.

6.2 Transmitter power

6.2A Transmitter power for CA without EN-DC

6.2A.1.1 UE maximum output power for inter-band NR CA between FR 1 and FR 2 without EN-DC

FFS

6.2A.2.1 UE maximum output power reduction for inter-band NR CA between FR 1 and FR 2 without EN-DC

FFS

6.2A.3.1 UE additional maximum output power reduction for inter-band NR CA between FR 1 and FR 2 without EN-DC

FFS

6.2A.4.1 UE Configured output power level for inter-band NR CA between FR 1 and FR 2 without EN-DC

FFS

6.2A.4.2 ΔTIB,c for CA

FFS

6.2A.4.2.1 ΔTIB,c for inter-band NR CA between FR 1 and FR 2 without EN-DC

FFS

6.2B Transmitter power for EN-DC

6.2B.1 UE Maximum Output Power for EN-DC

FFS

6.2B.1.1 UE Maximum Output Power for Intra-Band Contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- Test points are TBD: Pending on 38.101-3 [4] clause 6.2B.1.1 MPR requirements.

- Test procedure for test points other than dynamic power sharing are TBD.

- Message contents are incomplete.

- The test tolerance is TBD

6.2B.1.1.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2B.1.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting intra-band contiguous EN-DC.

6.2B.1.1.3 Minimum conformance requirements

The following UE Power Classes define the total maximum output power for any transmission bandwidth(s) of the CG(s) configured.

The maximum output power is measured as the total maximum output power across the UE antenna connector(s). The period of measurement shall be at least one sub frame.

Table 6.2B.1.1.3-1: Maximum output power for EN-DC (continuous sub-blocks)

DC configuration	Power class 2 (dBm)	Tolerance (dB)	Power class 3 (dBm)	Tolerance (dB)
DC_(n)71B			23	+2/-3
DC_(n)41AA	26	+2/-2[1]	23	+2/-2[1]
NOTE 1: If all transmitted resource blocks over all component carriers are confined within FUL_low and FUL_low + 4 MHz or/and FUL_high – 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB				

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.1.

6.2B.1.1.4 Test description

6.2B.1.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies and channel bandwidths based on EN-DC operating bands specified in clause 5.3B.1.2, channel bandwidths and sub-carrier spacings for the NR cell specified in TS 38.521-1 [8] clause 5.3 and channel bandwidth for the E-UTRA cell are specified in TS 36.521-1 [10] clause 5.4.2.All of these configurations shall be tested with applicable test parameters for each EN-DC configuration specified in clause 5.3B.1.2, and are shown in table 6.2B.1.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 6.2B.1.1.4.1-1: Test configuration table

Initial Conditions					
Test Environment as specified in TS 38.508-1 [6] subclause 4.1		NC, TL/VL, TL/VH, TH/VL, TH/VH			
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1		TBD			
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1		**TBD**			
Test SCS for the NR cell as specified in TS 38.521-1 [8] Table 5.3.5-1		TBD			
Test Parameters					
Test ID	**Downlink Configuration**	**EN-DC Uplink Configuration**			
		E-UTRA Cell		**NR Cell**	
		Modulation	**RB allocation**	**Modulation**	**RB allocation**
1	N/A for MOP testing.	TBD	TBD	TBD	TBD
2		TBD	TBD	TBD	TBD
3		TBD	TBD	TBD	TBD
4		TBD	TBD	TBD	TBD
FFS					

1. Connect the SS to the UE antenna connectors as shown in [6] TS 38.508-1 A.3.1.1 for SS diagram and A.3.2.1 for UE diagram.

2. The parameter settings for the E-UTRA cell are set up according to TS 36.508 [11] subclause 4.4.3, and the parameter settings for the NR cell are set up according to TS 38.508-1 [6] subclause 4.4.3.

3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0 and TS 38.521-1 [8] Annex C.0 for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H and TS 38.521-1 [8] Annex G for E-UTRA CG and NR CG respectively.

4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.

5. Propagation conditions are set according to TS 36.521-1 [10] Annex B.0 and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.2B.1.1.4.3.

6.2B.1.1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format 0_1 for C_RNTI to schedule the UL RMC according to table 6.2B.1.1.4.1-1on E-UTRA CC and NR CC

respectively. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands to the UE for NR and E-UTRA carrier until the UE transmits at its P_{UMAX} level; allow at least 200 ms from the first TPC command for the UE to reach P_{UMAX} level.

3. Measure the mean transmitted power over all EN-DC component carriers in the EN-DC, which shall meet the requirements described in table 6.2B.1.1.5-1 the period of the measurement shall be at least the continuous duration of [one active sub-frame].

NOTE 1: When switching to CP-OFDM waveform, as specified in the test configuration table 6.2B.1.1.4.1-1, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message according to TS 38.508-1 [6] clause 4.6.3 table [TBD] PUSCH-Config without [DFT-s-OFDM] condition. When switching to DFT-s-OFDM waveform, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message with [DFT-s-OFDM] condition.

6.2B.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

6.2B.1.1.5 Test requirements

The maximum output power for the DC configuration, derived in step 3 shall be within the range prescribed by the DC UE Power Class and tolerance in Table 6.2B.1.1.5-1.

Table 6.2B.1.1.5-1: Maximum output power for EN-DC (continuous sub-blocks) for bandwidth < 20MHz

DC configuration	Power class2	Tolerance (dB)	Power class 3 (dBm)	Tolerance (dB)
DC_(n)71B			23	+2+TT/-3-TT
DC_(n)41AA	26	+2+T/-2[1]+T	23	+2+TT/-2[1]+TT
NOTE 1: If all transmitted resource blocks over all component carriers are confined within FUL_low and FUL_low + 4 MHz or/and FUL_high – 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB NOTE 2: TT for each frequency and channel bandwidth is specified in TBD				

6.2B.1.2 UE Maximum Output Power for Intra-Band Non-Contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- Test points analysis is TBD: Pending on MPR requirements in TS 38.101-3 Clause6.2B.2.2
- The test tolerance analysis for UE is TBD
- Test configuration is TBD.
- Test procedure for test points other than dynamic power sharing are TBD.
- Message contents are incomplete.

6.2B.1.2.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2B.1.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting intra-band non contiguous EN-DC.

6.2B.1.2.3 Minimum conformance requirements

The following UE Power Classes define the total maximum output power for any transmission bandwidth(s) of the CG(s) configured.

The maximum output power is measured as the total maximum output power across the UE antenna connector(s). The period of measurement shall be at least one sub frame.

Table 6.2B.1.1.3-1: Maximum output power for EN-DC (non-continuous sub-blocks)

DC configuration	Power class 2 (dBm)	Tolerance (dB)	Power class 3 (dBm)	Tolerance (dB)
DC_3A_n3A(2)			23	+2/-3
DC_41A_n41A	26	+2/-2[1]	23	+2/-2[1]
NOTE 1: If all transmitted resource blocks over all component carriers are confined within FUL_low and FUL_low + 4 MHz or/and FUL_high – 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB NOTE 2: Only single switched UL is supported in Rel.15				

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.1.

6.2B.1.2.4 Test description

6.2B.1.2.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies and channel bandwidths based on EN-DC operating bands specified in Table 5.3B.1.3-1, channel bandwidths and sub-carrier spacings for the NR cell are specified in TS 38.521-1 [8] clause 5.3 and channel bandwidth for the E-UTRA cell are specified in TS 36.521-1 [10] clause 5.4.2 .All of these configurations shall be tested with applicable test parameters for each EN-DC configuration specified in Table 5.3B.1.3-1, and are shown in table 6.2B.1.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 6.2B.1.2.4.1-1: Test configuration table

Initial Conditions					
Test Environment as specified in TS 38.508-1 [6] subclause 4.1		NC, TL/VL, TL/VH, TH/VL, TH/VH			
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1		TBD			
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1		TBD			
Test SCS for the NR cell as specified in TS 38.521-1 [8] Table 5.3.5-1		TBD			
Test Parameters					
Test ID	**Downlink Configuration**	**EN-DC Uplink Configuration**			
		E-UTRA Cell		**NR Cell**	
		Modulation	**RB allocation**	**Modulation**	**RB allocation**
1	N/A for MOP testing.	TBD	TBD	TBD	TBD
2		TBD	TBD	TBD	TBD
3		TBD	TBD	TBD	TBD
4		TBD	TBD	TBD	TBD
FFS					

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [6] A.3.1.1 for SS diagram and A.3.2.1 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.

3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0 and TS 38.521-1 [8] Annex C.0 for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H and TS 38.521-1 [8] Annex G for E-UTRA CG and NR CG respectively.

4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.

5. Propagation conditions are set according to TS 36.521-1 [10] Annex B.0 and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.2B.1.2.4.3.

6.2B.1.2.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format 0_1 for C_RNTI to schedule the UL RMC according to table 6.2B.1.2.4.1-1on E-UTRA CC and NR CC respectively. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands to the UE for NR and E-UTRA carrier until the UE transmits at its P_{UMAX} level; allow at least 200 ms from the first TPC command for the UE to reach P_{UMAX} level.

3. Measure the mean transmitted power over all EN-DC component carriers in the EN-DC, which shall meet the requirements described in table 6.2B.1.2.5-1 the period of the measurement shall be at least the continuous duration of one active sub-frame.

6.2B.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1[FFS]

6.2B.1.2.5 Test requirements

The maximum output power for the DC configuration, derived in step 3 shall be within the range prescribed by the DC UE Power Class and tolerance in Table 6.2B.1.2.5-1.

Table 6.2B.1.2.5-1: Maximum output power for EN-DC (non-continuous sub-blocks)

DC configuration	Power class 2 (dBm)	Tolerance (dB)	Power class 3 (dBm)	Tolerance (dB)
DC_(n)71B			23	+2+TT/-3-TT
DC_(n)41AA	26	+2+TT/-2^1-TT	23	+2+TT/-2^1-TT
NOTE 1: If all transmitted resource blocks over all component carriers are confined within FUL_low and FUL_low + 4 MHz or/and FUL_high – 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB NOTE 2: TT for each frequency and channel bandwidth is TBD				

6.2B.1.3 UE Maximum Output Power for Inter-Band EN-DC within FR1

Editor's note: The following aspects are either missing or not yet determined:

- Initial condition is not complete.

- Test point analysis is TBD: Pending on Inter-Band EN-DC MPR requirements

- There are NA in minimum requirements (38.101-3)

- Test tolerance is TBD

- Test procedure for test points other than dynamic power sharing are TBD.

- Message contents are incomplete

- Channel bandwidth set for inter-band EN-DC is not specified in 38.101-3 clause 5.3B.

6.2B.1.3.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2B.1.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC.

6.2B.1.3.3 Minimum conformance requirements

For inter-band EN-DC of LTE and NR in FR1, the following UE Power Classes define the maximum output power for any transmission bandwidth within the aggregated channel bandwidth. The maximum output power is measured as the sum of the maximum output power at each UE antenna connector. The period of measurement shall be at least one sub frame (1ms). UE maximum output power shall be measured over all component carriers from different bands. If each band has separate antenna connectors, maximum output power is measured as the sum of maximum output power at each UE antenna connector.

Table 6.2B.1.3.3-1: Maximum output power for inter-band EN-DC (two bands)

DC configuration	Power class 3 (dBm)	Tolerance (dB)
DC_1A_n28A	23	+2/-3
DC_1A_n40A	23	+2/-3
DC_1A_n51A	23	+2/-3
DC_1A_n77A	23	+2/-3
DC_1A_n78A DC_1A_n84A_ULSUP-TDM_n78A DC_1A_n84A_ULSUP-FDM_n78A	23	+2/-3
DC_1A_n79A	23	+2/-3
DC_2A_n5A	23	+2/-3
DC_2A_n66A	23	+2/-3
DC_2A_n71A	23	+2/-3
DC_2A_n78A	23	+2/-3
DC_3A_n7A	23	+2/-3
DC_3A_n28A	23	+2/-3
DC_3A_n40A	23	+2/-3
DC_3A_n51A	23	+2/-3
DC_3A_n77A	23	+2/-3
DC_3A_n78A DC_3A_n80A_ULSUP-TDM_n78A, DC_3A_n80A_ULSUP-FDM_n78A	23	+2/-3
DC_3A_n79A DC_3A_n80A_ULSUP-TDM_n79A, DC_3A_n80A_ULSUP-FDM_n79A	23	+2/-3
DC_3A_n82A	23	+2/-3
DC_5A_n40A	23	+2/-3
DC_5A_n66A	23	+2/-3
DC_5A_n78A	23	+2/-3
DC_7A_n28A	23	+2/-3
DC_7A_n51A	23	+2/-3
DC_7A_n78A	23	+2/-3
DC_8A_n40A	23	+2/-3
DC_8A_n77A	23	+2/-3
DC_8A_n78A DC_8A_n81A_ULSUP-TDM_n78A, DC_8A_n81A_ULSUP-FDM_n78A	23	+2/-3
DC_8A_n79A DC_8A_n81A_ULSUP-TDM_n79A, DC_8A_n81A_ULSUP-FDM_n79A	23	+2/-3
DC_11A_n77A	23	+2/-3
DC_11A_n78A	23	+2/-3
DC_11A_n79A	23	+2/-3
DC_12A_n5A	23	+2/-3
DC_12A_n66A	23	+2/-3

DC configuration	Power class 3 (dBm)	Tolerance (dB)
DC_18A_n77A	23	+2/-3
DC_18A_n78A	23	+2/-3
DC_18A_n79A	23	+2/-3
DC_19A_n77A	23	+2/-3
DC_19A_n78A	23	+2/-3
DC_19A_n79A	23	+2/-3
DC_20A_n8A	23	+2/-3
DC_20A_n28A DC_20A_n83A	23	+2/-3
DC_20A_n51A	23	+2/-3
DC_20A_n77A	23	+2/-3
DC_20A_n78A DC_20A_n82A_ULSUP -TDM_n78A, DC_20A_n82A_ULSUP -FDM_n78A	23	+2/-3
DC_21A_n77A	23	+2/-3
DC_21A_n78A	23	+2/-3
DC_21A_n79A	23	+2/-3
DC_25A_n41A	23	+2/-3
DC_26A_n41A	23	+2/-3
DC_26A_n77A	23	+2/-3
DC_26A_n78A	23	+2/-3
DC_26A_n79A	23	+2/-3
DC_28A n51A	23	+2/-3
DC_28A_n77A	23	+2/-3
DC_28A_n78A DC_28A_n83A_ULSUP -TDM_n78A, DC_28A_n83A_ULSUP -FDM_n78A	23	+2/-3
DC_28A_n79A	23	+2/-3
DC_30A_n5A	23	+2/-3
DC_30A_n66A	23	+2/-3
DC_38A_n78A	N/A	N/A
DC_39A_n78A	23	+2/-3
DC_39A_n79A	23	+2/-3
DC_40A_n77A	N/A	N/A
DC_41A_n77A	23	+2/-3
DC_41A_n78A	23	+2/-3
DC_41A_n79A	23	+2/-3
DC_42A_n51A	23	+2/-3
DC_42A_n77A	N/A	N/A
DC_42A_n78A	N/A	N/A
DC_42A_n79A	N/A	N/A
DC_66A_n5A	23	+2/-3
DC_66A_n71A	23	+2/-3
DC_66A_n78A, DC_66A_n86A_ULSUP -TDM_n78A,	23	+2/-3

DC configuration	Power class 3 (dBm)	Tolerance (dB)
DC_66A_n86A_ULSUP-FDM_n78A		

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.1.

6.2B.1.3.4 Test description

6.2B.1.3.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, DC configuration specified in clause 5.5B.4 and test channel bandwidths specified in [TBD], and sub-carrier spacing based on NR operating bands specified in TS 38.521-1 [8] clause 5.3 .All of these configurations shall be tested with applicable test parameters for each EN-DC configuration, and are shown in table 6.2B.1.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 6.2B.1.3.4.1-1: Test configuration table

Initial Conditions					
Test Environment as specified in TS 38.508-1 [6] subclause 4.1	NC, TL/VL, TL/VH, TH/VL, TH/VH				
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1	TBD				
Test Channel Bandwidths as specified in TS 38.508-1 [6] subclause 4.3.1	TBD				
Test SCS as specified in TS 38.508-1 [6] subclause [TBD]	TBD				
Test Parameters					
Test ID	**Downlink Configuration**	**EN-DC Uplink Configuration**			
		E-UTRA Cell		**NR Cell**	
		Modulation	**RB allocation**	**Modulation**	**RB allocation**
1	N/A for MOP testing.	TBD	TBD	TBD	TBD
2		TBD	TBD	TBD	TBD
3		TBD	TBD	TBD	TBD
4		TBD	TBD	TBD	TBD
FFS					

1. Connect the SS to the UE antenna connectors as shown in [6] TS 38.508-1 A.3.1.1 for SS and A.3.2.1 for UE.
2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.
3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0 and TS 38.521-1 [8] Annex C.0 for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H and TS 38.521-1 [8] Annex G for E-UTRA CG and NR CG respectively.
4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.
5. Propagation conditions are set according to TS 36.521-1 [10] and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.2B.1.3.4.3.

6.2B.1.3.3.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to table 6.2B.1.3.4.1-1on E-UTRA CC and NR CC respectively. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands to the UE for NR and E-UTRA carrier until the UE transmits at its P_{UMAX} level; allow at least 200 ms for the UE to reach P_{UMAX} level.

3. Measure the mean transmitted power over all EN-DC component carriers in the EN-DC, which shall meet the requirements described in table 6.2B.1.3.5-1 the period of the measurement shall be at least the continuous duration of one active sub-frame.

NOTE 1: When switching to CP-OFDM waveform, as specified in the test configuration table 6.2B.1.3.4.1-1, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message according to TS 38.508-1 [6] clause 4.6.3 table [TBD] without PUSCH-Config [DFT-s-OFDM] condition. When switching to DFT-s-OFDM waveform, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message with [DFT-s-OFDM] condition.

6.2B.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

6.2B.1.3.5 Test requirements

The maximum output power for the DC configuration, derived in step 3 shall be within the range prescribed by the UE Power Class and tolerance in Table 6.2B.1.3.5-1.

Table 6.2B.1.3.5-1: Maximum output power for inter-band EN-DC (two bands)

DC configuration	Power class 3 (dBm)	Tolerance (dB)
DC_1A_n28A	23	+2 +TT/-3+TT
DC_1A_n40A	23	+2 +TT/-3+TT
DC_1A_n51A	23	+2 +TT/-3+TT
DC_1A_n77A	23	+2 +TT/-3+TT
DC_1A_n78A DC_1A_n84A_ULSUP-TDM_n78A DC_1A_n84A_ULSUP-FDM_n78A	23	+2 +TT/-3+TT
DC_1A_n79A	23	+2 +TT/-3+TT
DC_2A_n5A	23	+2 +TT/-3+TT
DC_2A_n66A	23	+2 +TT/-3+TT
DC_2A_n71A	23	+2 +TT/-3+TT
DC_2A_n78A	23	+2 +TT/-3+TT
DC_3A_n7A	23	+2 +TT/-3+TT
DC_3A_n28A	23	+2 +TT/-3+TT
DC_3A_n40A	23	+2 +TT/-3+TT
DC_3A_n51A	23	+2 +TT/-3+TT
DC_3A_n77A	23	+2 +TT/-3+TT
DC_3A_n78A DC_3A_n80A_ULSUP-TDM_n78A, DC_3A_n80A_ULSUP-FDM_n78A	23	+2 +TT/-3+TT
DC_3A_n79A DC_3A_n80A_ULSUP-TDM_n79A, DC_3A_n80A_ULSUP-FDM_n79A	23	+2 +TT/-3+TT
DC_3A_n82A	23	+2 +TT/-3+TT
DC_5A_n40A	23	+2 +TT/-3+TT
DC_5A_n66A	23	+2 +TT/-3+TT
DC_5A_n78A	23	+2 +TT/-3+TT
DC_7A_n28A	23	+2 +TT/-3+TT
DC_7A_n51A	23	+2 +TT/-3+TT
DC_7A_n78A	23	+2 +TT/-3+TT
DC_8A_n40A	23	+2 +TT/-3+TT
DC_8A_n77A	23	+2 +TT/-3+TT
DC_8A_n78A DC_8A_n81A_ULSUP-TDM_n78A, DC_8A_n81A_ULSUP-FDM_n78A	23	+2 +TT/-3+TT
DC_8A_n79A DC_8A_n81A_ULSUP-TDM_n79A, DC_8A_n81A_ULSUP-FDM_n79A	23	+2 +TT/-3+TT
DC_11A_n77A	23	+2 +TT/-3+TT
DC_11A_n78A	23	+2 +TT/-3+TT
DC_11A_n79A	23	+2 +TT/-3+TT
DC_12A_n5A	23	+2 +TT/-3+TT
DC_12A_n66A	23	+2 +TT/-3+TT

DC configuration	Power class 3 (dBm)	Tolerance (dB)
DC_18A_n77A	23	+2 +TT/-3+TT
DC_18A_n78A	23	+2 +TT/-3+TT
DC_18A_n79A	23	+2 +TT/-3+TT
DC_19A_n77A	23	+2 +TT/-3+TT
DC_19A_n78A	23	+2 +TT/-3+TT
DC_19A_n79A	23	+2 +TT/-3+TT
DC_20A_n8A	23	+2 +TT/-3+TT
DC_20A_n28A DC_20A_n83A	23	+2 +TT/-3+TT
DC_20A_n51A	23	+2 +TT/-3+TT
DC_20A_n77A	23	+2 +TT/-3+TT
DC_20A_n78A DC_20A_n82A_ULSUP-TDM_n78A, DC_20A_n82A_ULSUP-FDM_n78A	23	+2 +TT/-3+TT
DC_21A_n77A	23	+2 +TT/-3+TT
DC_21A_n78A	23	+2 +TT/-3+TT
DC_21A_n79A	23	+2 +TT/-3+TT
DC_25A_n41A	23	+2 +TT/-3+TT
DC_26A_n41A	23	+2 +TT/-3+TT
DC_26A_n77A	23	+2 +TT/-3+TT
DC_26A_n78A	23	+2 +TT/-3+TT
DC_26A_n79A	23	+2 +TT/-3+TT
DC_28A n51A	23	+2 +TT/-3+TT
DC_28A_n77A	23	+2 +TT/-3+TT
DC_28A_n78A DC_28A_n83A_ULSUP-TDM_n78A, DC_28A_n83A_ULSUP-FDM_n78A	23	+2 +TT/-3+TT
DC_28A_n79A	23	+2 +TT/-3+TT
DC_30A_n5A	23	+2 +TT/-3+TT
DC_30A_n66A	23	+2 +TT/-3+TT
DC_38A_n78A	N/A	N/A
DC_39A_n78A	23	+2 +TT/-3+TT
DC_39A_n79A	23	+2 +TT/-3+TT
DC_40A_n77A	N/A	N/A
DC_41A_n77A	23	+2 +TT/-3+TT
DC_41A_n78A	23	+2 +TT/-3+TT
DC_41A_n79A	23	+2 +TT/-3+TT
DC_42A_n51A	23	+2 +TT/-3+TT
DC_42A_n77A	N/A	N/A
DC_42A_n78A	N/A	N/A
DC_42A_n79A	N/A	N/A
DC_66A_n5A	23	+2 +TT/-3+TT
DC_66A_n71A	23	+2 +TT/-3+TT

DC configuration	Power class 3 (dBm)	Tolerance (dB)
DC_66A_n78A, DC_66A_n86A_ULSUP-TDM_n78A, DC_66A_n86A_ULSUP-FDM_n78A	23	+2 +TT/-3+TT
NOTE 1: TT for each frequency and channel bandwidth is TBD		

6.2B.1.4 UE Maximum Output Power for Inter-Band EN-DC including FR2

FFS

6.2B.2 UE Maximum Output Power reduction for EN-DC

6.2B.2.1 UE Maximum Output Power reduction for Intra-Band Contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- Initial condition is not complete.
- Minimum requirements is TBD (38.101-3)
- Test requirement is TBD
- Message contents are not complete.
- UE Power Class test requirements
- Test tolerance is not complete.
- The UL Reference Measurement channels are TBD

6.2B.2.1.1 Test purpose

Editor's Note: Explanatory text is needed.

6.2B.2.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting intra-band EN-DC.

6.2B.2.1.3 Minimum conformance requirements

TBD

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.2.1.

6.2B.2.1.4 Test description

6.2B.2.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table [TBD]. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2B.2.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes [TBD]. Configurations of PDSCH and PDCCH before measurement are specified in Annexes [TBD].

Table 6.2B.2.1.4.1-1: Test configuration table

Initial Conditions			
Test Environment as specified in TS 38.508-1 [5] subclause [TBD]	TBD		
Test Frequencies as specified in TS 38.508-1 [5] subclause [TBD]	TBD		
Test Channel Bandwidths as specified in TS 38.508-1 [6] subclause [TBD]	TBD		
Test SCS as specified in TS 38.508-1 [5] subclause [TBD]	TBD		
Test Parameters for Channel Bandwidths			
Test ID	**Downlink Configuration**	**Uplink Configuration**	
	N/A for MPR testing	**Modulation**	**RB allocation**
1		TBD	TBD
2		TBD	TBD
NOTE 1: The specific configuration of each RB allocation is defined in Table [TBD].			

1. Connect the SS to the UE antenna connectors as shown in [TBD].
2. The parameter settings for the cell are set up according to [TBD].
3. Downlink signals are initially set up according to [TBD], and uplink signals according to [TBD].
4. The UL Reference Measurement channels are [TBD].
5. Propagation conditions are set according to [TBD].
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.2B.2.1.4.3.

6.2B.2.1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to table 6.2B.2.1.4.1-1 on both EN-DC component carriers. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
2. Send continuously uplink power control "up" commands to the UE for NR and E-UTRA carrier until the UE transmits at its P_{UMAX} level; allow at least 200 ms for the UE to reach P_{UMAX} level.
3. Measure the mean power over all component carriers for the EN-DC configuration, which shall meet the requirements described in table 6.2B.2.1.5-1. The period of the measurement shall be at least the continuous duration of [one active sub-frame].

NOTE 1: When switching to CP-OFDM waveform, as specified in the test configuration table 6.2B.2.1.4.1-1, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message according to TS 38.508-1 [6] clause [TBD] table [TBD] without [DFT-s-OFDM] condition. When switching to DFT-s-OFDM waveform, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message with [DFT-s-OFDM] condition.

6.2B.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

Editor's note: Exceptions to network signal values should be added as sub-clauses below.

6.2B.2.1.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in table 6.2B.2.1.5-1.

Table 6.2B.2.1.5-1: UE Power Class test requirements

TBD

6.2B.2.2 UE Maximum Output Power reduction for Intra-Band Non-Contiguous EN-DC

FFS

6.2B.2.3 UE Maximum Output Power reduction for Inter-Band EN-DC within FR1

FFS

6.2B.2.4 UE Maximum Output Power reduction for Inter-Band EN-DC including FR2

FFS

6.2B.3 UE additional maximum output power reduction for EN-DC

6.2B.3.1 UE Additional Maximum Output Power reduction for Intra-band contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- SA message contents in TS 38.508-1[6] subclause 4.6 is FFS.

- UE Power Class test requirements

- Testing with dynamic power sharing is FFS.

6.2B.3.1.1 Test purpose

Additional emission requirements can be signalled by the network with network signalling value indicated by the field *additionalSpectrumEmission.* To meet these additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2B.1.1.3-1. Unless stated otherwise, an A-MPR of 0 dB shall be used.

6.2B.3.1.2 Test applicability

The requirements of this test apply in test case 6.5B.2.1.2 Additional spectrum emission mask for network signalled values NS_04 and NS_35 to all types of NR UE release 15 and forward, supporting intra-band contiguous EN-DC.

6.2B.3.1.3 Minimum conformance requirements

For EN-DC band combinations with additional requirements the A-MPR allowed are specified in table 6.2B.3.1.3-1 for combinations of network signalling values indicated in E-UTRA and NR cell group(s). Unless otherwise stated the A-MPR allowed below is in addition to the MPR requirements specified in sub-clause 6.2B.2.1.

Table 6.2B.3.1.3-1: Allowed power reduction for intra-band contiguous EN-DC

DC configuration	Requirement (sub-clause)	E-UTRA network signalling value	NR network signalling value	A-MPR
DC_(n)71B	6.5B.2.1.2.3.1	NS_35	NS_35	6.2B.3.1.3.1
DC_(n)41AA[1]	6.5B.2.1.2.3.2	NS_04	NS_04	6.2B.3.1.3.2
NOTE 1: Only applies to UEs that support dual UL transmission for this EN-DC combination. NOTE 2: The network signalling value for NR is mapped to configured FBI and *AdditionalSpecrumEmission* values as specified in [6].				

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.3.1.

6.2B.3.1.3.1 A-MPR for DC_(n)71B

For DC_(n)71B with configured with network signalling values as per Table 6.2B.3.1.1-1 the allowed A-MPR is defined by

- for UE indicating support of dynamicPowerSharing in the *UE-MRDC-Capability* IE

$$AMPR_{DC} = CEIL\{M_{A,DC}(A), 0.5\}$$

where A-MPR$_{DC}$ is the total power reduction allowed (dB),

- for OFDM:

$M_{A,DC}$ = 10.00 - 11.67*A; 0.00 < A ≤ 0.30

7.10 - 2.00*A; 0.30 < A ≤ 0.80

5.50; 0.80 < A ≤ 1.00

- for DFT-S-OFDM:

$M_{A,DC}$ = 10.00 - 13.33*A; 0.00 < A ≤ 0.30

7.00 - 3.33*A; 0.30 < A ≤ 0.60

5.00; 0.60 < A ≤ 1.00

where

$$A = \frac{L_{CRB,LTE}+L_{CRB,NR}}{N_{RB,LTE}+N_{RB,NR}}$$

with L_{CRB} and N_{RB} the number of allocated PRB and transmission bandwidth for the respective CG,

- for UE not indicating support of dynamicPowerSharing

$$AMPR_{LTE} = CEIL\{M_{A,LTE}, 0.5\}$$

$$AMPR_{NR} = CEIL\{M_{A,NR}, 0.5\}$$

where A-MPR is the total power reduction allowed per CG with

$$M_{A,LTE} = M_{A,DC}(A_{LTE,wc}) - \Delta_{LTE}$$

$$M_{A,NR} = M_{A,DC}(A_{NR,wc}) - \Delta_{NR}$$

$$A_{LTE,wc} = \frac{L_{CRB,LTE}+1}{N_{RB,LTE}+\tilde{N}_{RB,NR}}$$

$$A_{NR,wc} = \frac{1+L_{CRB,NR}}{N_{RB,LTE}+N_{RB,NR}}$$

$$\Delta_{LTE} = 10\ log_{10}\frac{L_{CRB,LTE}}{L_{CRB,LTE}+\tilde{N}_{RB,NR}}$$

$$\Delta_{NR} = 10\ log_{10}\frac{L_{CRB,NR}}{N_{RB,LTE}+L_{CRB,NR}}$$

where $\tilde{N}_{RB,NR}$ is the transmission bandwidth configuration of the SCG channel for SCS = 15 kHz.

6.2B.3.1.3.2 A-MPR for NS_04

When the UE is configured for B41/n41 intra-band contiguous EN-DC and it receives IE NS_04, the UE determines the total allowed maximum output power reduction as specified in this subclause. The A-MPR for EN-DC defined in this section is used instead of MPR defined in 6.2B.2.2, not additively.

The UE determines the Channel Configuration Case and the value of $A\text{-}MPR_{IM3}$ as follows:

If $F_{IM3,low\_block,low} < 2490.5$ MHz

Channel Configuration Case B. $A\text{-}MPR_{IM3}$ defined in subclause 6.2B.3.1.3.2.2.

Else

Channel Configuration Case A. $A\text{-}MPR_{IM3}$ defined in subclause 6.2B.3.1.3.2.1.

where

- $F_{IM3,low\_block,low} = (2 * F_{low\_channel,low\_edge}) - F_{high\_channel,high\_edge}$
- $F_{low\_channel,low\_edge}$ is the lowermost frequency of lower transmission bandwidth configuration.
- $F_{high\_channel,high\_edge}$ is the uppermost frequency of upper transmission bandwidth configuration.

The UE determines the total allowed maximum output power reduction as follows:

For UEs not supporting dynamic power sharing, with backoff applied independently

$A\text{-}MPR_{E\text{-}UTRA} = MAX(A\text{-}MPR_{single,\ E\text{-}UTRA}, A\text{-}MPR_{IM3})$

$A\text{-}MPR_{NR} = MAX(A\text{-}MPR_{single,NR}, A\text{-}MPR_{IM3})$

For UEs supporting dynamic power sharing, with IM# backoff applied equally to E-UTRA and NR

$A\text{-}MPR_{E\text{-}UTRA} = MAX(A\text{-}MPR_{single,E\text{-}UTRA}, A\text{-}MPR_{IM3})$

$A\text{-}MPR_{NR} = MAX(A\text{-}MPR_{single,NR}, A\text{-}MPR_{IM3})$

where

- $A\text{-}MPR_{single,\ E\text{-}UTRA}$ is the A-MPR defined for the E-UTRA transmission in [5]
- $A\text{-}MPR_{single,NR}$ is the A-MPR defined for the NR transmission in [2]

6.2B.3.1.3.2.1 $A\text{-}MPR_{IM3}$ for NS_04 to meet -13 dBm / 1MHz for 26dBm UE power

A-MPR in this sub-clause is relative to 26 dBm for power class 2. The same A-MPR is used relative to 23 dBm for power class 3. For the UE is configured with channel configurations Case A or Case C, the allowed maximum output power reduction for IM3s applied to transmission on the MCG and the SCG with non-contiguous resource allocation is defined as follows:

$$A\text{-}MPR_{IM3} = M_A$$

Where M_A is defined as follows

$$M_A = \begin{cases} 14 & ; \quad 0 \le B < 0.5 \\ 9 & ; \quad 0.5 \le B < 1.0 \\ 7 & ; \quad 1.0 \le B < 2.0 \\ 5 & ; \quad 2.0 < B \end{cases}$$

Where:

For UEs supporting dynamic power sharing,

$$B = (L_{CRB\_alloc,\ E\text{-}UTRA} * 12 * SCS_{E\text{-}UTRA} + L_{CRB\_alloc,NR} * 12 * SCS_{NR})/1{,}000{,}000$$

For UEs not supporting dynamic power sharing,

For E-UTRA

$$B = (L_{CRB\_alloc,\ E\text{-}UTRA} * 12 * SCS_{E\text{-}UTRA} + 12 * SCS_{NR})/1{,}000{,}000$$

For NR

$B = (12* SCS_{E\text{-}UTRA} + L_{CRB\_alloc,NR} * 12 * SCS_{NR})/1{,}000{,}000$

6.2B.3.1.3.2.2 A-MPR for NS_04 to meet -25 dBm / 1MHz for 26 dBm UE power

A-MPR in this sub-clause is relative to 26 dBm. The same A-MPR is used relative to 23 dBm for power class 3. For the UE is configured with channel configurations Case B or Case D, the allowed maximum output power reduction for IM3s applied to transmission on the MCG and the SCG with non-contiguous resource allocation is defined as follows:

$$A\text{-}MPR_{IM3} = M_A$$

Where M_A is defined as follows

$$M_A = \begin{cases} 14 ; & 0 \le B < 1.0 \\ 13 ; & 1.0 \le B < 2.0 \\ 12 ; & 2.0 \le B < 5.0 \\ 11 ; & 5.0 < B \end{cases}$$

Where:

For UEs supporting dynamic power sharing,

$B = (L_{CRB\_alloc,\ E\text{-}UTRA} * 12* SCS_{E\text{-}UTRA} + L_{CRB\_alloc,NR} * 12 * SCS_{NR})/1{,}000.000$

For UEs not supporting dynamic power sharing,

For E-UTRA

$B = (L_{CRB\_alloc,E\text{-}UTRA} * 12* SCS_{E\text{-}UTRA} + 12 * SCS_{NR})/1{,}000{,}000$

For NR

$B = (L_{CRB\_alloc,E\text{-}UTRA} * 12* SCS_{E\text{-}UTRA} + 12 * SCS_{NR})/1{,}000{,}000$

6.2B.3.1.4 Test description

6.2B.3.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.2B.2.1-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2B.3.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex TS 36.521-1 [10] Annex C and in Annex C2 for LTE link and NR link respectively.

Table 6.2B.3.1.4.1-0: E-UTRA test configuration table

E-UTRA Test Parameters				
E-UTRA Channel Bandwidth	**E-UTRA Test Frequency (Note 1)**	**Downlink**	**Uplink**	
		N/A for A-MPR testing.	**Modulation**	**RB allocation**
20 MHz	Low range and High range (Note 2)		QPSK	100
NOTE 1: E-UTRA Test Frequency as specified in TS 36.508 [6] subclause 4.3.1 NOTE 2: NR carrier shall be the outermost carrier during test.				

Table 6.2B.3.1.4.1-1: Test configuration table (network signalled value "NS_35")

TBD

Table 6.2B.3.1.4.1-2: NR test configuration table for NS_04

Initial Conditions						
Test Environment as specified in TS 38.508-1 [6] subclause 4.1					Normal	
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1					Low range and High range (Note 1)	
Test Channel Bandwidths as specified in TS 38.508-1 [6] subclause 4.3.1					Lowest and Highest	
Test SCS as specified in Table 5.3.5-1					Lowest and Highest	
A-MPR test parameters for "NS_04"						
				Downlink Configuration	**Uplink Configuration**	
Test ID	**Freq**	**ChBw**	**SCS**	N/A for A-MPR testing.	**Modulation**	**NR RB allocation**
1	Low	Default	Default		DFT-s-OFDM 64 QAM	Outer_1RB_Left
2	High	Default	Default		DFT-s-OFDM 64 QAM	Outer_1RB_Right
3	Low	Lowest	Default		DFT-s-OFDM 64 QAM	Full
4	Low	Highest	Default		DFT-s-OFDM 64 QAM	Full
5	High	Lowest	Default		DFT-s-OFDM 64 QAM	Full
6	High	Highest	Default		DFT-s-OFDM 64 QAM	Full
NOTE 1: NR carrier shall be the outermost carrier during test.						

Editor's note: The following lines belong at the end of section 6.2B.3.1.4.1. As new tables are added to this section, these lines should always follow the tables.

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [6] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2.1 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex Cand uplink signals according to TS 36.521-1 [10] Annex H and Annex G for LTE link and NR link respectively.

4. The UL Reference Measurement channels are set according to TS 36.521-1 [10] Annex A.2 and Annex A for LTE link and NR link respectively. 5. Propagation conditions are set according to TS 36.521-1 [10] Annex B and Annex Bfor LTE link and NR link respectively.

5. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.2B.3.1.4.3.

6.2B.3.1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to table 6.2B.3.1.4.1-1 on both EN-DC component carriers. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands to the UE for NR and E-UTRA carrier until the UE transmits at its P_{UMAX} level; allow at least 200 ms for the UE to reach P_{UMAX} level.

3. Measure the mean power over all component carriers for the EN-DC configuration, which shall meet the requirements described in table 6.2B.3.1.5.1-1 thru 6.2B.3.1.5.2-1. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). [For TDD slots with transient periods are not under test.]

NOTE 1: When switching to DFT-s-OFDM waveform, as specified in the test configuration table 6.5B.2.1.2.4.1-1 and 6.5B.2.1.2.4.1-2, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message according to TS 38.508-1 [6] clause 4.6.3 table 4.6.3-89 PUSCH-Config without CP-OFDM condition. When switching to CP-OFDM waveform, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message with CP-OFDM condition.

6.2B.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1, with the following exceptions for each network signalled value.

6.2B.3.1.4.3.1 Message contents exceptions (network signalled value "NS_04")

1. Information element additionalSpectrumEmission is set to NS_04. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2B.3.1.4.3.1-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_04"

Derivation Path: TS 38.508-1 [6] clause [TBD], Table [TBD]			
Information Element	**Value/remark**	**Comment**	**Condition**
additionalSpectrumEmission	4 (NS_04)		

6.2B.3.1.4.3.2 Message contents exceptions (network signalled value "NS_35")

1. Information element additionalSpectrumEmission is set to NS_35. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2B.3.1.4.3.2-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_35"

Derivation Path: TS 38.508-1 [5] clause [TBD], Table [TBD]			
Information Element	**Value/remark**	**Comment**	**Condition**
additionalSpectrumEmission	2 (NS_35)		

6.2B.3.1.5 Test requirement

6.2B.3.1.5.1 Test requirement for network signalled value “NS_35”

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in table 6.2B.3.1.5.1-1. The allowed A-MPR values specified in table 6.2B.3.1.3-1 are in addition to the allowed MPR requirements specified in clause 6.2B.1.1.3. For the UE maximum output power modified by MPR and/or A-MPR, the power limits specified in table 6.2B.1.1.3-1 apply.

Table 6.2B.3.1.5.1-1: UE Power Class test requirements for network signalled value "NS_35"

Configuration ID	MPR (dB)	A-MPR (dB)	[$\Delta T_{C,c}$ (dB)]	$P_{CMAX,c}$ (dBm)	$T(P_{CMAX\_L,c})$ (dB)	Upper limit (dBm)	Lower limit (dBm)
1	TBD	TBD	TBD	TBD	TBD	TBD	TBD
2	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3	TBD	TBD	TBD	TBD	TBD	TBD	TBD
NOTE 1: FFS							

6.2B.3.1.5.2 Test requirement for network signalled value “NS_04”

Table 6.2B.3.1.5.2-1: UE Power Class test requirements for network signalled value "NS_04" for UEs not supporting dynamic power sharing with backoff applied independently

Configuration ID	$F_{IM3,low\_block.low}$	$A\text{-}MPR_{IM3}$(dB)	$A\text{-}MPR_{NR}$ (dB)	$A\text{-}MPR_{LTE}$ (dB)	TBD	$P_{CMAX,c}$ (dBm)	$T(P_{CMAX\_L,c})$ (dB)	Upper limit (dBm)	Lower limit (dBm)
1	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
2	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
4	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
5	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
6	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Table 6.2B.3.1.5.2-2: UE Power Class test requirements for network signalled value "NS_04" for UEs supporting dynamic power sharing with backoff applied equally to LTE and NR

Configuration ID	$F_{IM3,low\_block.low}$	$A\text{-}MPR_{IM3}$(dB)	A-MPR (dB)	TBD	$P_{CMAX,c}$ (dBm)	$T(P_{CMAX\_L,c})$ (dB)	Upper limit (dBm)	Lower limit (dBm)
1	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
2	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
4	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
5	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
6	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

6.2B.3.2 UE Additional Maximum Output Power reduction for Intra-Band Non-Contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- SA message contents in TS 38.508-1[6] subclause 4.6 is FFS

- UE Power Class test requirements

- Test tolerance is not complete.

6.2B.3.2.1 Test purpose

Additional emission requirements can be signalled by the network with network signalling value indicated by the field *additionalSpectrumEmission.* To meet these additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2B.1.1.3-1. Unless stated otherwise, an A-MPR of 0 dB shall be used.

6.2B.3.2.2 Test applicability

The requirements of this test apply in test case 6.5B.2.1.2 Additional spectrum emission mask for network signalled values NS_04 to all types of NR UE release 15 and forward, supporting intra-band non-contiguous EN-DC.

6.2B.3.2.3 Minimum conformance requirements

For EN-DC band combinations with additional requirements the A-MPR allowed are specified in table 6.2B.3.2.3-1 for combinations of network signalling values indicated in E-UTRA and NR cell group(s). Unless otherwise stated the A-MPR allowed below is in addition to the MPR requirements specified in sub-clause 6.2B.2.1.

Table 6.2B.3.2.3-1: Allowed power reduction for intra-band non-contiguous EN-DC

DC configuration	Requirement (sub-clause)	E-UTRA network signalling value	NR network signalling value	A-MPR (subclause)
DC_41A_n41[1]	6.6.3.3.19 and 6.6.2.2.2 of TS 36.101 [5] and 6.5.2.3.2 and 6.5.3.3.1 of TS 38.101-1 [2]	NS_04	NS_04	6.2B.3.2.3.1
NOTE 1: Only applies to UEs that support dual UL transmission for this EN-DC combination.				

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.3.2.

6.2B.3.2.3.1 A-MPR for NS_04

When the UE is configured for B41/n41 intra-band non-contiguous EN-DC and it receives IE NS_04, the UE determines the total allowed maximum output power reduction as specified in this subclause. The A-MPR for EN-DC defined in this section is used instead of MPR defined in 6.2B.2.2, not additively.

The UE determines the Channel Configuration Case and the value of $A\text{-}MPR_{IM3}$ as follows:

If AND($F_{IM3,low\_block,high} < F_{filter,low}$, MAX($SEM_{-13,high}$, $F_{IM3,high\_block,low}$) > $F_{filter,high}$)

Channel Configuration Case C. $A\text{-}MPR_{IM3}$ defined in Subclause 6.2B.3.1.3.2.1

Else

Channel Configuration Case D. $A\text{-}MPR_{IM3}$ defined in Subclause 6.2B.3.1.3.2.2

where

- $F_{IM3,low\_block,high} = (2 * F_{low\_channel,high\_edge}) - F_{high\_channel,low\_edge}$
- $F_{IM3,high\_block,low} = (2 * F_{high\_channel,low\_edge}) - F_{low\_channel,high\_edge}$
- $F_{low\_channel,low\_edge}$ is the lowermost frequency of lower transmission bandwidth configuration.
- $F_{low\_channel,high\_edge}$ is the uppermost frequency of lower transmission bandwidth configuration.
- $F_{high\_channel,low\_edge}$ is the lowermost frequency of upper transmission bandwidth configuration.
- $F_{high\_channel,high\_edge}$ is the uppermost frequency of upper transmission bandwidth configuration.
- $F_{filter,low}$ = 2480 MHz
- $F_{filter,high}$ = 2745 MHz
- $SEM_{-13,high}$ = Threshold frequency where upper spectral emission mask for upper channel drops from -13 dBm / 1MHz to -25 dBm / 1MHz, as specified in Subclause 6.2B.3.1.3.2.2.

The UE determines the value of $A\text{-}MPR_{ACLRoverlap}$ as specified in Table 6.2B.3.2.3.1-1:

Table 6.2B.3.2.3.1-1: $A\text{-}MPR_{ACLRoverlap}$

W_{gap}	$A\text{-}MPR_{ACLRoverlap}$
< $BW_{channel,E\text{-}UTRA}$ + $BW_{channel,NR}$	4 dB
≥ $BW_{channel,E\text{-}UTRA}$ + $BW_{channel,NR}$	0 dB
NOTE 1: $W_{gap} = F_{high\_channel,low\_edge} - F_{low\_channel,high\_edge}$	

The UE determines the total allowed maximum output power reduction as follows:

For UEs not supporting dynamic power sharing, with backoff applied independently

$A\text{-}MPR_{E\text{-}UTRA}$ = MAX($A\text{-}MPR_{single,\ E\text{-}UTRA}$, $A\text{-}MPR_{IM3}$, $A\text{-}MPR_{ACLRoverlap}$)

$A\text{-}MPR_{NR}$ = MAX($A\text{-}MPR_{single,NR}$, $A\text{-}MPR_{IM3}$, $A\text{-}MPR_{ACLRoverlap}$)

For UEs supporting dynamic power sharing , with IM3 backoff applied equally to E-UTRA and NR

$A\text{-}MPR_{EN\text{-}DC}$ = MAX($A\text{-}MPR_{single,LTE}$, $A\text{-}MPR_{single,NR}$, $A\text{-}MPR_{IM3}$, $A\text{-}MPR_{ACLRoverlap}$)

$A\text{-}MPR_{E\text{-}UTRA}$ = MAX($A\text{-}MPR_{single,E\text{-}UTRA}$, $A\text{-}MPR_{EN\text{-}DC}$)

$A\text{-}MPR_{NR}$ = MAX($A\text{-}MPR_{single,NR}$, $A\text{-}MPR_{EN\text{-}DC}$)

where

- $A\text{-}MPR_{single,E\text{-}UTRA}$ is the A-MPR defined for the E-UTRA transmission in TS 36.101 [5].
- $A\text{-}MPR_{single,NR}$ is the A-MPR defined for the NR transmission in TS 38.101-1 [2].

6.2B.3.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.2B.3.1-1. All of these configurations shall be tested

with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2B.3.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A2. Configurations of PDSCH and PDCCH before measurement are specified in Annex TS 36.521-1 [10] Annex C and in Annex C2 for LTE link and NR link respectively.

Table 6.2B.3.2.4.1-0: E-UTRA test configuration table

E-UTRA Test Parameters				
E-UTRA Channel Bandwidth	**E-UTRA Test Frequency (Note 1)**	**Downlink**	**Uplink**	
		N/A for A-MPR testing.	**Modulation**	**RB allocation**
20 MHz	Low range and High range (Note 2)		QPSK	100
NOTE 1: E-UTRA Test Frequency as specified in TS 36.508 [6] subclause 4.3.1 NOTE 2: NR carrier shall be the outermost carrier during test.				

Table 6.2B.3.2.4.1-1: NR test configuration table for NS_04

Initial Conditions						
Test Environment as specified in TS 38.508-1 [6] subclause 4.1				Normal		
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1				Low range and High range (Note 1)		
Test Channel Bandwidths as specified in TS 38.508-1 [6] subclause 4.3.1				Lowest and Highest		
Test SCS as specified in Table 5.3.5-1				Lowest and Highest		
A-MPR test parameters for "NS_04"						
				Downlink Configuration	**Uplink Configuration**	
Test ID	**Freq**	**ChBw**	**SCS**	N/A for A-MPR testing	**Modulation**	**NR RB allocation**
1	Low	Default	Default		DFT-s-OFDM 64 QAM	Outer_1RB_Left
2	High	Default	Default		DFT-s-OFDM 64 QAM	Outer_1RB_Right
3	Low	Lowest	Default		DFT-s-OFDM 64 QAM	Full
4	Low	Highest	Default		DFT-s-OFDM 64 QAM	Full
5	High	Lowest	Default		DFT-s-OFDM 64 QAM	Full
6	High	Highest	Default		DFT-s-OFDM 64 QAM	Full
NOTE 1: NR carrier shall be the outermost carrier during test.						

Editor's note: The following lines belong at the end of section 6.2B.3.2.4.1. As new tables are added to this section, these lines should always follow the tables.

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [6] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2.1 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.

3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C for LTE link and NR link respectively, and uplink signals according to TS 36.521-1 [10] Annex H and Annex G for LTE link and NR link respectively.

4. The UL Reference Measurement channels are set according to TS 36.521-1 [10] Annex A.2 and Annex A for LTE link and NR link respectively.

5. Propagation conditions are set according to TS 36.521-1 [10] Annex B and Annex B for LTE link and NR link respectively.

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.2B.3.2.4.3.

6.2B.3.2.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to table 6.2B.3.2.4.1-1 on both EN-DC component carriers. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands to the UE for NR and E-UTRA carrier until the UE transmits at its P_{UMAX} level; allow at least 200 ms starting from the first TPC command in this step for the UE to reach P_{UMAX} level.

3. Measure the mean power over all component carriers for the EN-DC configuration, which shall meet the requirements described in table 6.2B.3.2.5-1. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). [For TDD slots with transient periods are not under test.]

NOTE 1: When switching to DFT-s-OFDM waveform, as specified in the test configuration table 6.5B.2.1.2.4.1-1 and 6.5B.2.1.2.4.1-2, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message according to TS 38.508-1 [6] clause 4.6.3 table 4.6.3-89 PUSCH-Config without CP-OFDM condition. When switching to CP-OFDM waveform, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message with CP-OFDM condition.

6.2B.3.2.4.3 Message contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1, with the following exceptions for each network signalled value.

6.2B.3.2.4.3.1 Message contents exceptions (network signalled value "NS_04")

1. Information element additionalSpectrumEmission is set to NS_04. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2B.3.2.4.3.1-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_04"

Derivation Path: TS 38.508-1 [6] clause [TBD], Table [TBD]			
Information Element	**Value/remark**	**Comment**	**Condition**
additionalSpectrumEmission	4 (NS_04)		

6.2B.3.2.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in table 6.2B.3.2.5-1. The allowed A-MPR values specified in table 6.2B.3.2.3-1 are in addition to the allowed MPR requirements specified in clause 6.2B.1.1.3. For the UE maximum output power modified by MPR and/or A-MPR, the power limits specified in table 6.2B.1.1.3-1 apply.

Table 6.2B.3.2.5-1: UE Power Class test requirements (network signalled value "NS_04")

Configuration ID	MPR (dB)	A-MPR (dB)	[$\Delta T_{C,c}$ (dB)]	$P_{CMAX,c}$ (dBm)	T($P_{CMAX\_L,c}$) (dB)	Upper limit (dBm)	Lower limit (dBm)
1	TBD	TBD	TBD	TBD	TBD	TBD	TBD
2	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3	TBD	TBD	TBD	TBD	TBD	TBD	TBD
NOTE 1: FFS							

6.2B.3.3 UE Additional Maximum Output Power reduction for Inter-Band EN-DC within FR1

FFS

6.2B.3.4 UE Additional Maximum Output Power reduction for Inter-Band EN-DC including FR2

FFS

6.2B.4 Configured Output Power for EN-DC

6.2B.4.1 Configured Output Power Level for EN-DC

6.2B.4.1.1 Configured Output Power Level for Intra-Band Contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- Minimum requirements are pending RAN4.

- Test description is FFS.

- MU and TT are FFS.

6.2B.4.1.1.1 Test purpose

Editor's Note: Explanatory test is needed.

6.2B.4.1.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting intra-band contiguous EN-DC.

6.2B.4.1.1.3 Minimum conformance requirements

FFS.

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.4.1.1.

6.2B.4.1.1.4 Test description

FFS

6.2B.4.1.1.5 Test requirement

FFS

6.2B.4.1.2 Configured Output Power for Intra-Band Non-Contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- Minimum requirements are pending RAN4.

- Test description is FFS.

- MU and TT are FFS.

6.2B.4.1.2.1 Test purpose

Editor's Note: Explanatory test is needed.

6.2B.4.1.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting intra-band non-contiguous EN-DC.

6.2B.4.1.2.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.4.1.2.

6.2B.4.1.2.4 Test description

FFS

6.2B.4.1.2.5 Test requirement

FFS

6.2B.4.1.3 Configured Output Power for Inter-Band EN-DC within FR1

Editor's note: The following aspects are either missing or not yet determined:

- Minimum requirements are pending RAN4.

- Test description is not complete.

6.2B.4.1.3.1 Test purpose

Editor's Note: Explanatory test is needed.

6.2B.4.1.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC within FR1.

6.2B.4.1.3.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.4.1.3.

6.2B.4.1.3.4 Test description

FFS

6.2B.4.1.3.5 Test requirement

FFS

6.2B.4.1.4 Configured Output Power for Inter-Band EN-DC including FR2

Editor's note: The following aspects are either missing or not yet determined:

- Minimum requirements are pending RAN4.

- Test description is FFS.

- MU and TT are FFS.

6.2B.4.1.4.1 Test purpose

Editor's Note: Explanatory test is needed.

6.2B.4.1.4.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC including FR2.

6.2B.4.1.4.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.4.1.4.

6.2B.4.1.4.4 Test description

FFS

6.2B.4.1.4.5 Test requirement

FFS

6.2B.4.1.5 Configured Output Power for Inter-Band EN-DC including both FR1 and FR2

Editor's note: The following aspects are either missing or not yet determined:

- Minimum requirements are pending RAN4.

- Test description is FFS.

- MU and TT are FFS.

6.2B.4.1.5.1 Test purpose

Editor's Note: Explanatory test is needed.

6.2B.4.1.5.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC including both FR1 and FR2.

6.2B.4.1.5.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.101-3 [4] clause 6.2B.4.1.5.

6.2B.4.1.5.4 Test description

FFS

6.2B.4.1.5.5 Test requirement

FFS

6.2B.4.2 ΔTIB,c for EN-DC

For the UE which supports inter-band EN-DC configuration, $\Delta T_{IB,c}$ in Tables below applies where unless otherwise stated, the same $\Delta T_{IB,c}$ is applicable to NR band(s) part for DC configurations which have the same NR operating band combination. Unless otherwise stated, $\Delta T_{IB,c}$ is set to zero.

6.2B.4.2.1 ΔTIB,c for Intra-Band Contiguous EN-DC

FFS

6.2B.4.2.2 ΔTIB,c for Intra-Band Non-Contiguous EN-DC

FFS

6.2B.4.2.3 ΔTIB,c for Inter-Band EN-DC within FR1

6.2B.4.2.3.1 $\Delta T_{IB,c}$ for EN-DC two bands

Table 6.2B.4.2.3.1-1: $\Delta T_{IB,c}$ due to EN-DC(two bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1_n28	1	0.3
	n28	0.6
DC_1_n40	1	0.5
	n40	0.5
DC_1_n51	1	0.6
	n51	0.6
DC_1_n77	1	0.6
	n77	0.8
DC_1_n78	1	0.3
	n78	0.8
DC_2_n5	2	0.3
	n5	0.3
DC_2_n66	2	0.5
	n66	0.5
DC_2_n71	2	0.3
	n71	0.3
DC_2A_n78A	2	0.6
	n78	0.8
DC_3_n7	3	0.5
	n7	0.5
DC_3_n28	3	0.3
	n28	0.3
DC_3_n40	3	0.5
	n40	0.5
DC_3_n51	3	0.3
	n51	0.3
DC_3_n77	3	0.6
	n77	0.8
DC_3_n78	3	0.6
	n78	0.8
DC_5A_n40A	5	0.3
	n40	0.3
DC_5A_n66A	5	0.3
	n66	0.3
DC_5_n78	5	0.6
	n78	0.8
DC_7_n28	7	0.3
	n28	0.3
DC_7_n51	7	0.3
	n51	0.3
DC_7_n78	7	0.5
	n78	0.8
DC_8_n40	8	0.3
	n40	0.3
DC_8_n77	8	0.6
	n77	0.8
DC_8_n78	8	0.6
	n77	0.8
DC_11_n77	11	0.4
	n77	0.8
DC_11_n78	11	0.4
	n78	0.8
DC_12A_n5A	12	0.4
	n5	0.8
DC_12A_n66A	12	0.8
	n66	0.3
DC_18_n77	18	0.3
	n77	0.8
DC_18_n78	18	0.3
	n78	0.8
DC_19_n77	19	0.3
	n77	0.8
DC_19_n78	19	0.3

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
	n78	0.8
DC_20_n8	20	0.4
	n8	0.4
DC_20_n28	20	0.5
	n28	0.5
DC_20_n51	20	0.5
	n51	0.5
DC_20_n77	20	0.6
	n77	0.8
DC_20_n78	20	0.6
	n78	0.8
DC_21_n77	21	0.4
	n77	0.8
DC_21_n78	21	0.4
	n78	0.8
	n77	0.8
DC_25_n41	25	0.5
	n41	0.3[1]
		0.8[2]
DC_26_n41	26	0.3
	n41	0.3
DC_26A_n77A	26	0.3
	n77	0.8
DC_26_n78	26	0.3
	n78	0.8
DC_28_n51	28	0.5
	n51	0.5
DC_28_n77	28	0.5
	n77	0.8
DC_28_n78	28	0.5
	n78	0.8
DC_30A_n5A	30	0.3
	n5	0.3
DC_30A_n66A	30	0.5
	n66	0.8
DC_38_n78	n78	0.5
DC_39_n78	39	0.3
	n78	0.8
DC_39_n79	39	0.3
	n79	0.8
DC_40_n77	n77	0.5
DC_41_n77	41	0.3
	n77	0.8
DC_41_n78	41	0.3
	n78	0.8
DC_41_n79	41	0.3
	n79	0.8
DC_42_n51	42	0.6
	n51	0.8
DC_66_n5	66	0.3
	n5	0.3
DC_66_n71	66	0.3
	n71	0.3
DC_66_n78	66	0.6
	n78	0.8

NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545-2690MHz.
NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496-2545MHz.

6.2B.4.2.3.2 ΔTIB,c for EN-DC three bands

Table 6.2B.4.2.3.2-1: $\Delta T_{IB,c}$ due to EN-DC (three bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1-3_n28	1	0.3
	3	0.3
	n28	0.6
DC_1-3_n77	1	0.6
	3	0.6
	n77	0.8
DC_1-3_n78	1	0.6
	3	0.6
	n78	0.8
DC_1-3_n79	1	0.3
	3	0.3
DC_1-5_n78	1	0.3
	5	0.6
	n78	0.8
DC_1-7_n28	1	0.5
	7	0.6
	n28	0.6
DC_1-7_n78	1	0.6
	7	0.6
	n78	0.8
DC_1-7-7_n78	1	0.6
	7	0.6
	n78	0.8
DC_1-8_n78	1	0.3
	8	0.6
	n78	0.8
DC_1-1A_n77	1	0.3
	18	0.3
	n77	0.8
DC_1-18_n78	1	0.3
	18	0.3
	n78	0.8
DC_1-19_n77	1	0.3
	19	0.3
	n77	0.8
DC_1-19_n78	1	0.3
	19	0.3
	n78	0.8
DC_1-19_n79	1	0.3
	19	0.3
DC_1-20_n28	1	0.3
	20	0.6
	N28	0.6
DC_1-20_n78	1	0.3
	20	0.3
	n78	0.8
DC_1-21_n77	1	0.3
	21	0.3
	n77	0.8
DC_1-21_n78	1	0.6
	21	0.4
	n78	0.8
DC_1-21_n79	1	0.3
	21	0.3
DC_1-41_n77	1	0.5
	41	0.5
	n77	0.8
DC_1-41_n78	1	0.5
	41	0.5
	n78	0.8
DC_1-41_n79	1	0.5
	41	0.5
DC_1-28_n77	1	0.3

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
	28	0.6
	n77	0.8
DC_1-28_n78	1	0.3
	28	0.6
	n78	0.8
DC_1_n28-n78	1	0.3
	n28	0.6
	n78	0.8
DC_1_n28-n79	1	0.3
	28	0.3
DC_1-42_n77	1	0.6
	42	0.8
	n77	0.8
DC_1-42_n78	1	0.3
	42	0.8
	n78	0.8
DC_1-42_n79	1	0.3
	42	0.8
DC_1_SUL_n78-n84	1	0.3
	n78	0.8
	n84	0.3
DC_1_n77-n79	1	0.6
	n77	0.8
	n79	0
DC_1_n78-n79	1	0.3
	n78	0.8
	n79	0.5
DC_2-(n)71B	2	0.3
	71	0.3
	n71	
DC_2-5_n66	2	0.5
	5	0.3
	n66	0.5
DC_2-30_n66	2	0.5
	30	0.3
	n66	0.5
DC_2-66_n71	2	0.5
	66	0.5
	n71	0.3
DC_3_n3-n77	3	0.6
	n3	0.6
	n77	0.8
DC_3_n3-n78	3	0.6
	n3	0.6
	n78	0.8
DC_3-5_n78	3	0.6
	5	0.6
	n78	0.8
DC_3-7_n28	3	0.5
	7	0.5
	n28	0.3
DC_3-7_n78, DC_3-7-7_n78	3	0.6
	7	0.6
	n78	0.8
DC_3-8_n78	3	0.6
	8	0.6
	n78	0.8
DC_3-19_n77	3	0.6
	19	0.3
	n77	0.8
DC_3-19_n78	3	0.6
	19	0.3
	n78	0.8

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_3-19_n79	3	0.3
	19	0.3
DC_3-20_n28	3	0.3
	20	0.5
	n28	0.5
DC_3-20_n78	3	0.5
	20	0.3
	n78	0.8
DC_3-21_n77	3	0.8
	21	0.9
	n77	0.8
DC_3-21_n78	3	0.8
	21	0.9
	n78	0.8
DC_3-21_n79	3	0.8
	21	0.9
DC_3-28_n78	3	0.5
	28	0.3
	n78	0.8
DC_3A_n28-n78	3	0.5
	n28	0.3
	n78	0.8
DC_3-38_n78	3	0.6
	n78	0.8
DC_3-41_n78	3	0.6
	41	0.3[1]
		0.8[2]
	n78	0.8
DC_3-42_n77	3	0.6
	42	0.8
	n787	0.8
DC_3-42_n78	3	0.6
	42	0.8
	n78	0.8
DC_3-42_n79	3	0.6
	42	0.8
DC_3_n77-n79	3	0.6
	n77	0.8
	n79	0
DC_3_n78-n79	3	0.6
	n78	0.8
	n79	0.5
DC_3_SUL_n78-n80	3	0.6
	n78	0.8
	n80	0.6
DC_3A_SUL_n78A-n82A	3	0.5
	n78	0.8
	n82	0.3
DC_5-7_n78, DC_5-7-7_n78	5	0.6
	7	0.6
	n78	0.8
DC_5_30_n66	5	0.3
	30	0.3
	n66	0.5
DC_7-7_n78	7	0.5
	n78	0.8
DC_7-20_n28	7	0.3
	20	0.6
	n28	0.6
DC_7-20_n78	7	0.3
	20	0.3
	n78	0.8
DC_7-28_n78	7	0.3

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
	28	0.3
	n78	0.8
DC_7_n28-n78	7	0.3
	n28	0.3
	n78	0.8
DC_7-46_n78	7	0.5
	n78	0.8
DC_8_SUL_n78- n81	8	0.6
	n78	0.8
	n81	0.6
DC_18-28_n77	18	0.5
	28	0.5
	n77	0.8
DC_18-28_n78	18	0.5
	28	0.5
	n78	0.8
DC_18-28_n79	18	0.5
	28	0.5
DC_19-21_n77	19	0.3
	21	0.4
	n77	0.8
DC_19-21_n78	19	0.3
	21	0.4
	n78	0.8
DC_19-21_n79	19	0.3
	21	0.4
DC_19-42_n77	19	0.3
	42	0.8
	n77	0.8
DC_19-42_n78	19	0.3
	42	0.8
	n78	0.8
DC_19-42_n79	19	0.3
	42	0.8
DC_19_n77-n79	19	0.3
	n77	0.8
	n79	0
DC_19_n78-n79	19	0.3
	n78	0.8
	n79	0.5
DC_20_n8-n75	20	0.4
	n8	0.4
DC_20_n28-n75	20	0.5
	n28	0.7
DC_20_n28-n78	20	0.6
	n28	0.6
	n78	0.8
DC_20_n75-n78	20	0.5
	n78	0.8
DC_20_n76-n78	20	0.5
	n78	0.8
DC_20A_SUL_n78A-n82A	20	0.6
	n78	0.8
	n82	0.6
DC_20A_SUL_n78A-n83A	20	0.8
	n78	0.8
	n83	0.8
DC_21-42_n77	21	0.4
	42	0.8
	n77	0.8
DC_21-42_n78	21	0.4
	42	0.8
	n78	0.8

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_21-42_n79	21	0.4
	42	0.8
DC_21_n77-n79	21	0.4
	n77	0.8
	n79	0
DC_21_n78-n79	21	0.4
	n78	0.8
	n79	0.5
DC_28-42_n77	28	0.5
	42	0.8
	n77	0.8
DC_28-42_n78	28	0.5
	42	0.8
	n78	0.8
DC_28-42_n79	28	0.5
	42	0.8
DC_28_SUL_n78-n83	28	0.5
	n78	0.8
	n83	0.5
DC_41-42_n77	41	0.5
	42	0.8
	n77	0.8
DC_41-42_n78	41	0.5
	42	0.8
	n78	0.8
DC_41-42_n79	41	0.
	42	0.8
DC_41_n77	41	0.3
	n77	0.8
DC_41_n78	41	0.3
	n78	0.8
DC_41_n79	41	0.3
	n79	0.8
DC_66_(n)71	66	0.3
	71	0.3
	n71	0.3
DC_66_SUL_n78-n86	66	0.6
	n78	0.8
	n86	0.6
NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545-2690MHz. NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496-2545MHz.		

6.2B.4.2.3.3 ΔTIB,c for EN-DC four bands

Table 6.2B.4.2.3.3-1: $\Delta T_{IB,c}$ due to EN-DC(four bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1-3-5_n78	1	0.6
	3	0.6
	5	0.3
	n78	0.8
DC_1-3-7_n28	1	0.6
	3	0.6
	7	0.6
	n28	0.6
DC_1-3-7_n78 DC_1-3-7-7_n78	1	0.7
	3	0.7
	7	0.7
	n78	0.8
DC_1-3-8_n78	1	0.6
	3	0.6
	8	0.6
	n78	0.8
DC_1-3-28_n77	1	0.6
	3	0.6
	28	0.6
	n77	0.8
DC_1-3-28_n78	1	0.6
	3	0.6
	28	0.6
	n78	0.8
DC_1-3_n28-n78	1	0.6
	3	0.6
	n28	0.6
	n78	0.8
DC_1-3-28_n79	1	0.6
	3	0.6
	28	0.6
DC_1-3-19_n78	1	0.6
	3	0.6
	19	0.3
	n78	0.8
DC_1-3-19_n79	1	0.3
	3	0.3
	19	0.3
DC_1-3-20_n28	1	0.3
	3	0.3
	20	0.6
	n28	0.6
DC_1-3-20_n78	1	0.6
	3	0.6
	20	0.3
	n78	0.8
DC_1-3-21_n77	1	0.6
	3	0.8
	21	0.9
	n77	0.8
DC_1-3-21_n78	1	0.6
	3	0.8
	21	0.9
	n78	0.8
DC_1-3-21_n79	1	0.3
	3	0.8
	21	0.9
DC_1-3-42_n77	1	0.6
	3	0.6
	42	0.8
	n77	0.8
DC_1-3-42_n78	1	0.6
	3	0.6

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
	42	0.8
	n78	0.8
DC_1-3-42_n79	1	0.6
	3	0.6
	42	0.8
DC_1-5-7_n78 DC_1-5-7-7_n78	1	0.6
	5	0.6
	7	0.6
	n78	0.8
DC_1-7-20_n28	1	0.5
	7	0.6
	20	0.6
	n28	0.6
DC_1-7-20_n78	1	0.6
	7	0.7
	20	0.4
	n78	0.8
DC_1-7_n28-n78	1	0.6
	7	0.6
	n28	0.6
	n78	0.8
DC_1-18-28_n77	1	0.3
	18	0.5
	28	0.5
	n77	0.8
DC_1-18-28_n78	1	0.3
	18	0.5
	28	0.5
	n78	0.8
DC_1-18-28_n79	1	0.3
	18	0.5
	28	0.5
DC_1-19-42_n77	1	0.6
	19	0.3
	42	0.8
	n77	0.8
DC_1-19-42_n78	1	0.3
	19	0.3
	42	0.8
	n78	0.8
DC_1-19-42_n79	1	0.3
	19	0.3
	42	0.8
DC_1-20_n28-n78	1	0.3
	20	0.6
	n28	0.6
	n78	0.8
DC_1-21-28_n77	1	0.6
	21	0.4
	28	0.6
	n77	0.8
DC_1-21-28_n78	1	0.3
	21	0.4
	28	0.6
	n78	0.8
DC_1-21-28_n79	1	0.3
	21	0.4
	28	0.6
DC_1-21-42_n77	1	0.6
	21	0.4
	42	0.8
	n77	0.8
DC_1-21-42_n78	1	0.3

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
	21	0.4
	42	0.8
	n78	0.8
DC_1-21-42_n79	1	0.3
	21	0.4
	42	0.8
DC_1-28-42_n77	1	0.6
	28	0.6
	42	0.8
	n77	0.8
DC_1-28-42_n78	1	0.3
	28	0.6
	42	0.8
	n78	0.8
DC_1-28-42_n79	1	0.3
	28	0.6
	42	0.8
DC_1-41-42_n77	1	0.5
	41	0.5
	42	0.8
	n77	0.8
DC_1-41-42_n78	1	0.5
	41	0.5
	42	0.8
	n78	0.8
DC_1-41-42_n79	1	0.5
	41	0.5
	42	0.8
DC_2-66-(n)71B	2	0.5
	66	0.5
	71	0.3
	n71	
DC_3-5-7_n78 DC_3-5-7-7_n78A	3	0.6
	5	0.6
	7	0.6
	n78	0.8
DC_3-7-20_n28	3	0.5
	7	0.5
	20	0.6
	n28	0.5
DC_3-7-20_n78	3	0.6
	7	0.6
	20	0.3
	n78	0.8
DC_3-7-28_n78	3	0.6
	7	0.6
	28	0.6
	n78	0.8
DC_3-7_n28-n78	3	0.6
	7	0.6
	n28	0.6
	n78	0.8
DC_3-19-21_n77	3	0.8
	19	0.3
	21	0.9
	n77	0.8
DC_3-19-21_n78	3	0.8
	19	0.3
	21	0.9
	n78	0.8
DC_3-19-21_n79	3	0.8
	19	0.3
	21	0.9

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_3-19-42_n77	3	0.6
	19	0.3
	42	0.8
	n77	0.8
DC_3-19-42_n78	3	0.6
	19	0.3
	42	0.8
	n78	0.8
DC_3-19-42_n79	3	0.6
	19	0.3
	42	0.8
DC_3-20_n28-n78	3	0.6
	20	0.6
	n28	0.6
	n78	0.8
DC_3-28-42_n77	3	0.6
	28	0.5
	42	0.8
	n77	0.8
DC_3-28-42_n78	3	0.6
	28	0.5
	42	0.8
	n78	0.8
DC_3-28-42_n79	3	0.6
	28	0.5
	42	0.8
DC_3-21-42_n77	3	0.8
	21	0.9
	42	0.8
	n77	0.8
DC_3-21-42_n78	3	0.8
	21	0.9
	42	0.8
	n78	0.8
DC_3-21-42_n79	3	0.8
	21	0.9
	42	0.8
DC_7-20_n28-n78	7	0.3
	20	0.6
	n28	0.6
	n78	0.8
DC_19-21-42_n77	19	0.3
	21	0.4
	42	0.8
	n77	0.8
DC_19-21-42_n78	19	0.3
	21	0.4
	42	0.8
	n78	0.8
DC_19-21-42_n79	19	0.3
	21	0.4
	42	0.8
DC_21-28-42_n77	21	0.4
	28	0.5
	42	0.8
	n77	0.8
DC_21-28-42_n78	21	0.4
	28	0.5
	42	0.8
	n78	0.8
DC_21-28-42_n79	21	0.4
	28	0.5
	42	0.8

6.2B.4.2.3.4 ΔTIB,c for EN-DC five bands

Table 6.2B.4.2.3.4-1: $\Delta T_{IB,c}$ due to EN-DC (five bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1-3-5-7_n78, DC_1-3-5-7-7_n78	1	0.6
	3	0.6
	5	0.6
	7	0.6
	n78	0.8
DC_1-3-7-20_n28	1	0.6
	3	0.6
	7	0.6
	20	0.6
	n28	0.6
DC_1-3-7-20_n78	1	0.6
	3	0.6
	7	0.6
	20	0.6
	n78	0.6
DC_1-3-7_n28-n78	1	0.7
	3	0.7
	7	0.7
	n28	0.6
	n78	0.8
DC_1-3-19-21_n77	1	0.6
	3	0.8
	19	0.3
	21	0.9
	n77	0.8
DC_1-3-19-21_n78	1	0.6
	3	0.8
	19	0.3
	21	0.9
	n78	0.8
DC_1-3-19-21_n79	1	0.3
	3	0.8
	19	0.3
	21	0.9
DC_1-3-19-42_n77	1	0.6
	3	0.6
	19	0.3
	42	0.8
	n77	0.8
DC_1-3-19-42_n78	1	0.6
	3	0.6
	19	0.3
	42	0.8
	n78	0.8
DC_1-3-19-42_n79	1	0.6
	3	0.6
	19	0.3
	42	0.8
DC_1-3-20_n28-n78	1	0.6
	3	0.6
	20	0.6
	n28	0.6
	n78	0.8
DC_1-3-21-42C_n77	1	0.6
	3	0.8
	21	0.9
	42	0.8
	n77	0.6

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1-3-21-42C_n78	1	0.6
	3	0.8
	21	0.9
	42	0.8
	n78	0.6
DC_1-3-21-42C_n79	1	0.6
	3	0.8
	21	0.9
	42	0.8
	n79	0
DC_1-3-28-42_n77	1	0.6
	3	0.6
	28	0.6
	42	0.8
	n77	0.8
DC_1-3-28-42_n78	1	0.6
	3	0.6
	28	0.6
	42	0.8
	n78	0.8
DC_1-3-28-42_n79	1	0.6
	3	0.6
	28	0.6
	42	0.8
DC_1-7-20_n28-n78	1	0.6
	7	0.7
	20	0.6
	n28	0.6
	n78	0.8
DC_1-19-21-42_n77	1	0.3
	19	0.3
	21	0.4
	42	0.8
	n77	0.8
DC_1-19-21-42_n78	1	0.3
	19	0.3
	21	0.4
	42	0.8
	n78	0.8
DC_1-19-21-42_n79	1	0.3
	19	0.3
	21	0.4
	42	0.8
DC_1-21-28-42_n77	1	0.6
	21	0.4
	28	0.6
	42	0.8
	n77	0.8
DC_1-21-28-42_n78	1	0.3
	21	0.4
	28	0.6
	42	0.8
	n78	0.8
DC_1-21-28-42_n79	1	0.3
	21	0.4
	28	0.6
	42	0.8
DC_3-7-20_n28-n78	3	0.6

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
	7	0.6
	20	0.6
	n28	0.6
	n78	0.8

6.2B.4.2.3.5 ΔTIB,c for EN-DC six bands

Table 6.2B.4.2.3.5-1: $\Delta T_{IB,c}$ due to EN-DC (six bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1-3-7-20_n28-n78	1	0.7
	3	0.7
	7	0.7
	20	0.6
	n28	0.6
	n78	0.8

6.2B.4.2.4 ΔTIB,c for Inter-Band EN-DC including FR2

6.2B.4.2.4.1 $\Delta T_{IB,c}$ for EN-DC two bands

Table 6.2B.4.2.4.1-1: $\Delta T_{IB,c}$ due to EN-DC(two bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)

6.2B.4.2.4.2 $\Delta T_{IB,c}$ for EN-DC three bands

Table 6.2B.4.2.4.2-1: $\Delta T_{IB,c}$ due to EN-DC (three bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1-3_n257	1	0.3
	3	0.3
DC_1-7-7_n257	1	0.5
	7	0.6
DC_1-8_n257	1	0.3
	8	0.3
DC_1-18_n257	1	0.3
	18	0.3
DC_1-19_n257	1	0.3
	19	0.3
DC_1-21_n257	1	0.3
	21	0.3
DC_1-28_n257	1	0.3
	28	0.6
DC_1-41_n257	1	0.5
	41	0.5
DC_1-42_n257	1	0.3
	42	0.8
DC_1_n77-n257	1	0.6
	n77	0.8
DC_1_n78-n257	1	0.3
	n78	0.8
DC_1_n79-n257	1	0
	n79	0
DC_2-5_n257	2	0.3
	5	0.3
DC_2-5_n260	2	0.3
	5	0.3
DC_2-12_n260	2	0.3
	12	0.3
DC_2-13_n257	2	0.3
	13	0.3
DC_2-13_n260	2	0.3
	13	0.3
DC_2-30_n260	2	0.5
	30	0.5
DC_2-66_n257	2	0.5
	66	0.5
DC_2-66_n260	2	0.5
	66	0.5
DC_3-19_n257	3	0.3
	19	0.3
DC_3-21_n257	3	0.8
	21	0.9
DC_3-28_n257	3	0.3
	28	0.3
DC_3-41_n257	3	0.5
	41	0.3[1]/0.8[2]
DC_3-42_n257	3	0.6
	42	0.8
DC_3_n77-n257	3	0.6
	n77	0.8
DC_3_n78-n257	3	0.6
	n78	0.8
DC_3_n79-n257	3	0
	n79	0
DC_5-30_n260	5	0.5
	30	0.5
DC_5-66_n257	5	0.3
	66	0.3
DC_5-66_n260	5	0.3
	66	0.3
DC_5_n78-n257	5	0.6

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
	n78	0.8
	n257	0
DC_7_n78-n257	7	0.5
	n78	0.8
	n257	0
DC_12-30_n260	12	0.5
	30	0.5
DC_12-66_n260	12	0.3
	66	0.3
DC 13-66_n260	13	0.3
	66	0.3
DC_18-28_n257	18	0.5
	28	0.5
DC_19-21_n257	19	0.3
	21	0.4
	42	0.8
DC_19-42_n257	19	0.3
	42	0.8
DC_19_n77-n257	19	0.3
	n77	0.8
DC_19_n78-n257	19	0.3
	n78	0.8
DC_19_n79-n257	19	0
	n79	0
DC_21-28_n257	21	0.4
	28	0.3
DC_21-42_n257	21	0.4
	42	0.8
DC_21_n77-n257	21	0.4
	n77	0.8
DC_21_n78-n257	21	0.4
	n78	0.8
DC_21_n79-n257	21	0
	n79	0
DC_28-42_n257	28	0.5
	42	0.8
DC_41-42_n257	41	0.5
	42	0.8
NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545-2690MHz. NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496-2545MHz.		

6.2B.4.2.4.3 $\Delta T_{IB,c}$ for EN-DC four bands

Table 6.2B.4.2.4.3-1: $\Delta T_{IB,c}$ due to EN-DC(four bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1A-3A-7A-7A_n257A	1	0.6
	3	0.6
	7	0.6
DC_1-3-19_n257	1	0.3
	3	0.3
	19	0.3
DC_1-3-21_n257	1	0.3
	3	0.8
	21	0.9
DC_1-3-28_n257	1	0.6
	3	0.6
	28	0.6
DC_1-3-42_n257	1	0.6
	3	0.6
	42	0.8
DC_1-3_n78-n257	1	0.6
	3	0.6
	n78	0.8
DC_1-5-7-7_n257	1	0.5
	5	0.3
	7	0.6
DC_1-5_n78-n257	1	0.3
	5	0.6
	n78	0.8
DC_1-7_n78-n257	1	0.6
	7	0.6
	n78	0.8
DC_1-18-28_n257	1	0.3
	18	0.5
	28	0.5
DC_1-19-42_n257	1	0.3
	19	0.3
	42	0.8
DC_1-21-28_n257	1	0.3
	21	0.4
	28	0.6
DC_1-21-42_n257	1	0.3
	21	0.4
	42	0.8
DC_1-28-42_n257	1	0.3
	28	0.6
	42	0.8
DC_1-41-42_n257	1	0.5
	41	0.5
	42	0.8
DC_19-21-42_n257	19	0.3
	21	0.4
	42	0.8
DC_3-5_n78-n257	3	0.6
	5	0.6
	n78	0.8
DC_3-7_n78-n257	3	0.6
	7	0.6
	n78	0.8
DC_3-19-21_n257	3	0.8
	19	0.3
	21	0.9
DC_3-19-42_n257	3	0.6
	19	0.3
	42	0.8
DC_3-21-42_n257	3	0.8
	21	0.9
	42	0.8

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_3-28-42_n257	3	0.6
	28	0.5
	42	0.8
DC_5-7_n78-n257	5	0.6
	7	0.6
	n78	0.8
DC_7-7_n78-n257	7	0.5
	n78	0.8
DC_21-28-42_n257	21	0.4
	28	0.5
	42	0.8

6.2B.4.2.4.4 $\Delta T_{IB,c}$ for EN-DC five bands

Table 6.2B.4.2.4.4-1: $\Delta T_{IB,c}$ due to EN-DC (five bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1-3-5-7-7_n257	1	0.6
	3	0.6
	5	0.3
	7	0.6
DC_1-3-5_n78-n257	1	0.6
	3	0.6
	5	0.6
	n78	0.8
DC_1-3-7_n78-n257	1	0.7
	3	0.7
	7	0.7
	n78	0.8
DC_1-3-19-21_n257	1	0.3
	3	0.8
	19	0.3
	21	0.9
DC_1-3-19-42_n257	1	0.6
	3	0.6
	19	0.3
	42	0.8
DC_1-3-21-42C_n257	1	0.6
	3	0.8
	21	0.9
	42	0.8
DC_1-3-28-42_n257	1	0.6
	3	0.6
	28	0.6
	42	0.8
DC_1-5-7_n78-n257	1	0.6
	5	0.6
	7	0.6
	n78	0.8
DC_1-7-7_n78-n257	1	0.6
	7	0.6
	n78	0.8
DC_1-19-21-42_n257	1	0.3
	19	0.3
	21	0.4
	42	0.8
DC_1-21-28-42_n257	1	0.3
	21	0.4
	28	0.6
	42	0.8
DC_3-5-7_n78-n257	3	0.6
	5	0.6
	7	0.6
	n78	0.8
DC_3-7-7_n78-n257	3	0.6
	7	0.6
	n78	0.8
DC_5-7-7_n78-n257	5	0.6
	7	0.6
	n78	0.8

6.2B.4.2.4.5 $\Delta T_{IB,c}$ for EN-DC six bands

Table 6.2B.4.2.4.5-1: $\Delta T_{IB,c}$ due to EN-DC (six bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1-3-5-7_n78-n257	1	0.6
	3	0.6
	5	0.6
	7	0.6
	n78	0.8
DC_1-3-7-7_n78-n257	1	0.7
	3	0.7
	7	0.7
	n78	0.8
DC_1-5-7-7_n78-n257	1	0.6
	5	0.6
	7	0.6
	n78	0.8
DC_3-5-7-7_n78-n257	3	0.6
	5	0.6
	7	0.6
	n78	0.8

6.2B.4.2.5 Inter-band EN-DC including both FR1 an FR2

6.2B.4.2.5.1 $\Delta T_{IB,c}$ for EN-DC three bands

Table 6.2B.4.2.5.1-1: $\Delta T_{IB,c}$ due to EN-DC (three bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta T_{IB,c}$ (dB)
DC_1_n77-n257	1	0.6
	n77	0.8
DC_1_n78-n257	1	0.3
	n78	0.8
DC_3_n77-n257	3	0.6
	n77	0.8
DC_3_n78-n257	3	0.6
	n78	0.8
DC_19_n77-n257	19	0.3
	n77	0.8
DC_19_n78-n257	19	0.3
	n78	0.8

6.3 Output power dynamics

6.3B.1 Minimum Output Power for EN-DC

6.3B.1.1 Minimum Output Power for intra-band contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- Measurement uncertainty and TT is FFS.

Working assumption: E-UTRA is not tested during test procedure

6.3B.1.1.1 Test purpose

Same test purpose as in clause 6.3.1.1 in TS 38.521-1 [8] for the NR carrier.

6.3B.1.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting intra-band contiguous EN-DC.

6.3B.1.1.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 6.3.1.3 in TS 38.521-1 [8] for the NR carrier.

The normative reference for this requirement is TS 38.101-3 [4] clause 6.3.

6.3B.1.1.4 Test description

Same test descriptions as in clause 6.3.1.4 in TS 38.521-1 [8] for the NR carrier with the following exceptions:

Table 6.3B.1.1.4-1: Test configuration table

E-UTRA Test Parameters				
E-UTRA Channel Bandwidth	**E-UTRA Test Frequency**	**Downlink**	**Uplink**	
		N/A for min output power test	**Modulation**	**RB allocation**
5 MHz	MidRange		QPSK	25
NOTE 1: E-UTRA Test Frequency as specified in TS 36.508 [11] subclause 4.3.1				

For Initial conditions as in clause 6.3.1.4.1 in TS 38.521-1 [8], the following steps will be added to configure E-UTRA component:

2.1. The parameter settings for the E-UTRA cell are set up according to TS36.508 [11] subclause 4.4.3 with E-UTRA channel bandwidth and test frequencies defined in Table 6.3B.1.1.4-1.

3.1. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.

4.1. The UL Reference Measurement channels are set according to Table 6.3B.1.1.4-1.

Step 6 of Initial conditions as in clause 6.3.1.4.1 in TS 38.521-1 [8] is replaced by:

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5.

Same test procedure as in clause 6.3.1.4.2 in TS 38.521-1 [8] with the following steps added for E-UTRA component:

1.1. For E-UTRA component, SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to table 6.3B.1.1.4-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2.1. For E-UTRA component, send continuously uplink power control "down" commands in every uplink scheduling information to the UE.

6.3B.1.1.5 Test requirements

Same test requirement as in clause 6.3.1.5 in TS 38.521-1 [8] for the NR carrier.

6.3B.1.2 Minimum output power for intra-band non-contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- Minimum requirement are pending RAN4.

- Initial condition is not complete.

- Message contents are not complete.

- The test tolerance is not complete.

6.3B.1.2.1 Test purpose

Same test purpose as in clause 6.3.1.1 in TS 38.521-1 [8] for the NR carrier.

6.3B.1.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting intra-band non-contiguous EN-DC.

6.3B.1.2.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.101-1 [2] clause 6.3.

6.3B.1.2.4 Test description

6.3B.1.2.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table [TBD]. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.3B.1.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes [TBD]. Configurations of PDSCH and PDCCH before measurement are specified in Annexes [TBD].

Table 6.3B.1.2.4.1-1: Test configuration table

Initial Conditions					
Test Environment as specified in TS 38.508-1 [6] subclause 4.1	NC, TL/VL, TL/VH, TH/VL, TH/VH				
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1	TBD				
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1	TBD				
Test SCS for the NR cell as specified in TS 38.508-1 [8] Table 5.3.5-1	TBD				
Test Parameters					
Test ID	**Downlink Configuration**	**EN-DC Uplink Configuration**			
		E-UTRA Cell		**NR Cell**	
		Modulation	**RB allocation**	**Modulation**	**RB allocation (Note 1)**
1	N/A for min output power test	TBD	TBD	TBD	TBD
2		TBD	TBD		
3		TBD	TBD		
4		TBD	TBD		
NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.					

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [6] Annex A, Figure A.3.1.1 for SS diagram and A.3.2.1 for UE diagram.
2. The parameter settings for the cell are set up according to [TBD].
3. Downlink signals are initially set up according to [TBD], and uplink signals according to [TBD].
4. The UL Reference Measurement channels are [TBD].
5. Propagation conditions are set according to [Annex B.0].
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.3B.1.2.4.3.

6.3B.1.2.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to table 6.3B.1.2.4.1-1on both EN-DC component carriers. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "down" commands to the UE for NR and E-UTRA carrier in every uplink scheduling information to the UE; allow at least 200ms to ensure that the UE transmits at its minimum output power.

3. Measure the mean power of the UE in the associated measurement bandwidth specified in Table 6.3B.1.2.5-1 for the specific channel bandwidth under test in the EN-DC. The period of the measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. For TDD slots with transient periods are not under test.

6.3B.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

6.3B.1.2.5 Test requirements

FFS

6.3B.1.3 Minimum output power for inter-band EN-DC within FR1

Editor's note: Working assumption: E-UTRA is not tested during test procedure

6.3B.1.3.1 Test purpose

Same test purpose as in clause 6.3.1.1 in TS 38.521-1 [8] for the NR carrier.

6.3B.1.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC.

6.3B.1.3.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 6.3.1.3 in TS 38.521-1 [8] for the NR carrier.

The normative reference for this requirement is TS 38.101-3 [4] clause 6.3.

6.3B.1.3.4 Test description

Same test descriptions as in clause 6.3.1.4 in TS 38.521-1 [8] for the NR carrier with the following exceptions:

Table 6.3B.1.3.4-1: Test configuration table

E-UTRA Test Parameters				
E-UTRA Channel Bandwidth	**E-UTRA Test Frequency**	**Downlink**	**Uplink**	
		N/A for min output power test	**Modulation**	**RB allocation**
5 MHz	MidRange		QPSK	25
NOTE 1: E-UTRA Test Frequency as specified in TS 36.508 [11] subclause 4.3.1				

For Initial conditions as in clause 6.3.1.4.1 in TS 38.521-1 [8], the following steps will be added to configure E-UTRA component:

2.1. The parameter settings for the E-UTRA cell are set up according to TS36.508 [11] subclause 4.4.3 with E-UTRA channel bandwidth and test frequencies defined in Table 6.3B.1.3.4-1.

3.1. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.

4.1. The UL Reference Measurement channels are set according to Table 6.3B.1.3.4-1.

Step 6 of Initial conditions as in clause 6.3.1.4.1 in TS 38.521-1 [8] is replaced by:

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5.

Same test procedure as in clause 6.3.1.4.2 in TS 38.521-1 [8] with the following steps added for E-UTRA component:

1.1. For E-UTRA component, SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to table 6.3B.1.3.4-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2.1. For E-UTRA component, send continuously uplink power control "down" commands in every uplink scheduling information to the UE.

6.3B.1.3.5 Test requirements

Same test requirement as in clause 6.3.1.5 in TS 38.521-1 [8] for the NR carrier.

6.4 Transmit signal quality

FFS

6.5 Output RF spectrum emissions

6.5A Output RF spectrum emissions for CA

6.5A.1 Occupied bandwidth for CA without EN-DC

FFS

6.5A.2 Out-of-band emissions for CA without EN-DC

FFS

6.5A.3 Spurious emissions for CA without EN-DC

FFS

6.5B Output RF spectrum emissions for DC

6.5B.1 Occupied bandwidth for EN-DC

6.5B.1.1 Occupied bandwidth for Intra-Band Contiguous EN-DC

FFS

6.5B.1.2 Occupied bandwidth for Intra-Band Non-Contiguous EN-DC

FFS

6.5B.1.3 Occupied bandwidth for Inter-Band EN-DC within FR1

Editor's note: This clause is incomplete. The following aspects are either missing or not yet determined:

- Measurement uncertainty and TT is FFS.

  Working assumption: E-UTRA is not tested during test procedure

6.5B.1.3.1 Test purpose

Same test purpose as in clause 6.5.1.1 in TS 38.521-1 [8] for the NR carrier.

6.5B.1.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC.

6.5B.1.3.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 6.5.1.3 in TS 38.521-1 [8] for the NR carrier.

The normative reference for this requirement is TS 38.101-3 [4] clause 6.5B.1.

6.5B.1.3.4 Test description

Same test description as in clause 6.5.1.4 in TS 38.521-1 [8] for the NR carrier with the following exceptions:

Table 6.5B.1.3.4-1: E-UTRA Test Configuration Table

E-UTRA Test Parameters				
E-UTRA Channel Bandwidth	**E-UTRA Test Frequency**	**Downlink**	**Uplink**	
		N/A for Occupied bandwidth	**Modulation**	**RB allocation**
5 MHz	MidRange		QPSK	25
NOTE 1: E-UTRA Test Frequency as specified in TS 36.508 [11] subclause 4.3.1				

For Initial conditions as in clause 6.5.1.4.1 in TS 38.521-1 [8], the following steps will be added to configure E-UTRA component:

2.1. The parameter settings for the cell are set up according to TS 36.508 [11] subclause 4.4.3 with E-UTRA channel bandwidth and test frequencies defined in Table 6.5B.1.3.4-1.

3.1. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.

4.1. The UL Reference Measurement channels are set according to Table 6.5B.1.3.4-1.

Step 6 of Initial conditions as in clause 6.5.1.4.1 in TS 38.521-1 [8] is replaced by:

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG according to TS 38.508 [6] clause 4.5.

Same test procedure as in clause 6.5.1.4.2 in TS 38.521-1 [8] with the following steps added for E-UTRA component:

1.1. For E-UTRA component, SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to Table 6.5B.1.3.4-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2.1. For E-UTRA component, send continuously power control "up" commands to the UE until the UE transmits at P_{UMAX} level.

6.5B.1.3.5 Test requirement

Same test requirement as in clause 6.5.1.5 in TS 38.521-1 [8] for the NR carrier.

6.5B.1.4 Occupied bandwidth for Inter-Band EN-DC including FR2

FFS

6.5B.2 Out-of-band emissions for EN-DC

6.5B.2.1 Out-of-band emissions for Intra-band contiguous EN-DC

6.5B.2.1.1 Spectrum emissions mask for intra-band contiguous EN-DC

FFS

6.5B.2.1.2 Additional spectrum emissions mask for intra-band contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- SA message contents in TS 38.508-1[6] subclause 4.6 is FFS.

- Measurement uncertainty and test tolerance are FFS

6.5B.2.1.2.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions under the deployment scenarios where additional requirements are specified.

6.5B.2.1.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting intra-band non contiguous EN-DC.

6.5B.2.1.2.3 Minimum conformance requirements

6.5B.2.1.2.3.1 Minimum requirement for network signalled value "NS_35"

For contiguous intra-band EN-DC configuration of DC_(n)71B when NS_35 is indicated for the UE the requirements in table 6.5B.2.1.2.3-1 apply in the frequency ranges immediately adjacent and outside the aggregation of the said sub-blocks

When NS_35 is indicated in the MCG and NS_35 is indicated in the SCG the requirements in table 6.5B.2.1.2.3.1-1 apply in the frequency ranges immediately adjacent and outside the aggregated sub-blocks of the EN-DC Configuration.

Table 6.5B.2.1.2.3.1-1: Additional requirements

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement [dBm]	Measurement bandwidth
0 MHz ≤ Δf < 0.1 MHz	0.015 MHz ≤ f_offset < 0.085 MHz	-13	30 kHz
0.1 MHz ≤ Δf < ENBW	0.15 MHz ≤ f_offset < ENBW-0.05 MHz	-13	100 kHz
ENBW ≤ Δf < ENBW +5 MHz	ENBW + 0.5 MHz ≤ f_offset < ENBW + 4.5 MHz	-25	1 MHz
NOTE: ENBW is the aggregated bandwidth in MHz of an E-UTRA sub-block and an adjacent NR sub-block; there is no frequency separation between the said sub-blocks. The sub-block bandwidths include any internal guard bands.			

The normative reference for this requirement is TS 38.101-3 [4] clause 6.5B.2.1.2.1.

6.5B.2.1.2.3.2 Minimum requirement for network signalled value "NS_04"

Additional spectrum emission requirements are signalled by the network to indicate that the UE shall meet an additional requirement for a specific deployment scenario as part of the cell handover/broadcast message.

The Band 41/n41 SEM transition point from -13 dBm/MHz to -25 dBm/MHz is based on the emission bandwidth. The emission bandwidth is defined as the width of the signal between two points, one below the carrier centre frequency and one above the carrier centre frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Since the 26 dB emission bandwidth is implementation dependent, the transmission bandwidths occupied by RBs is used for the SEM. The emission bandwidth for LTE carriers is document in 36.101 [5], and the emission bandwidth for NR carriers is documented in 38.101-1 [2]. The total emission bandwidth for contiguous intra-band EN-DC is the sum of the emission bandwidth for each CC plus the guard band between contiguous CCs.

When "NS_04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5B.2.1.2.3.2-1.

Table 6.5B.2.1.2.3.2-1: n41 SEM with NS_04

	Spectrum emission limit (dBm)/ measurement bandwidth for each channel bandwidth						
ΔfOOB MHz	**10 MHz**	**15 MHz**	**20 MHz**	**40 MHz**	**50 MHz**	**> 50 MHz**	**Measurement bandwidth**
± 0 - 1	-18	-20	-21	-24	-25		30 kHz
± 1 - 5	-10						1 MHz
± 5 - X	-13						
± X - (BWChannel + 5 MHz)	-25						
NOTE 1: X is defined as the sum of the emission bandwidth of the component carriers plus the guard band between contiguous CCs.							

The normative reference for this requirement is TS 38.101-3 [4] clause 6.5B.2.1.2.2.

6.5B.2.1.2.4 Test description

6.5B.2.1.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.2B.3.1-1. These configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in test configuration table 6.2B.3.1.4.1-1 through 6.2B.3.1.4.1-2. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2 Configurations of PDSCH and PDCCH before measurement are specified in Annex TS 36.521-1 [10] Annex C and in Annex C2 for LTE link and NR link respectively.

Table 6.5B.2.1.2.4.1-0: E-UTRA test configuration table

E-UTRA Test Parameters				
E-UTRA Channel Bandwidth	**E-UTRA Test Frequency (Note 1)**	**Downlink**	**Uplink**	
		N/A for A-MPR testing.	**Modulation**	**RB allocation**
20 MHz	Low range and High range (Note 2)		QPSK	100
NOTE 1: E-UTRA Test Frequency as specified in TS 36.508 [6] subclause 4.3.1 NOTE 2: NR carrier shall be the outermost carrier during test.				

Table 6.5B.2.1.2.4.1-1: Test configuration table for NS_35

TBD

Table6.5B.2.1.2.4.1-2: NR test configuration table for NS_04

Initial Conditions						
Test Environment as specified in TS 38.508-1 [6] subclause 4.1					Normal	
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1					Low range and High range (Note 1)	
Test Channel Bandwidths as specified in TS 38.508-1 [6] subclause 4.3.1					Lowest and Highest	
Test SCS as specified in Table 5.3.5-1					Lowest and Highest	
A-MPR test parameters for "NS_04"						
				Downlink Configuration	**Uplink Configuration**	
Test ID	**Freq**	**ChBw**	**SCS**	N/A for A-MPR testing.	**Modulation**	**NR RB allocation**
1	Low	Default	Default		DFT-s-OFDM 64 QAM	Outer_1RB_Left
2	High	Default	Default		DFT-s-OFDM 64 QAM	Outer_1RB_Right
3	Low	Lowest	Default		DFT-s-OFDM 64 QAM	Full
4	Low	Highest	Default		DFT-s-OFDM 64 QAM	Full
5	High	Lowest	Default		DFT-s-OFDM 64 QAM	Full
6	High	Highest	Default		DFT-s-OFDM 64 QAM	Full
NOTE 1: NR carrier shall be the outermost carrier during test.						

Editor's note: The following lines belong at the end of section 6.5B.2.1.2.4.1. As new tables are added to this section, these lines should always follow the tables.

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [6] Annex A, Figure A.3.1.1.1 for SS diagram and section A.3.2.1 for UE diagram..
2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.
3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C and Annex C for LTE link and NR link respectively and uplink signals according to TS 36.521-1 [10] Annex H and Annex G for LTE link and NR link respectively.
4. The UL Reference Measurement channels are set according to TS 36.521-1 [10] Annex A.2 and Annex A for LTE link and NR link respectively.
5. Propagation conditions are set according to TS 36.521-1 [10] Annex B and Annex B for LTE link and NR link respectively.
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.5B.2.1.2.4.3.

6.5B.2.1.2.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to table 6.2B.3.1.4.1-1 on both EN-DC component carriers. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
2. Send continuously uplink power control "up" commands to the UE for NR and E-UTRA carrier until the UE transmits at its P_{UMAX} level; allow at least 200 ms starting from the first TPC command in this step for the UE to reach P_{UMAX} level.
3. Measure the mean power over all component carriers for the EN-DC configuration, which shall meet the requirements described in table 6.5B.2.1.2.5.1-1 thru 6.5B.2.1.2.5.2-1 . The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). [For TDD slots with transient periods are not under test.]
4. Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 6.5B.2.1.2.5-1. The centre frequency of the filter shall be stepped in contiguous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active time slots.

NOTE 1: When switching to DFT-s-OFDM waveform, as specified in the test configuration table 6.5B.2.1.2.4.1-1 and 6.5B.2.1.2.4.1-2, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message according to TS 38.508-1 [6] clause 4.6.3 table 4.6.3-89 PUSCH-Config without CP-OFDM condition. When switching to CP-OFDM waveform, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message with CP-OFDM condition.

6.5B.2.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1, with the following exceptions for each network signalled value.

Editor's note: Exceptions to network signal values should be added as sub-clauses below.

6.5B.2.1.2.4.3.1 Message contents exceptions for network signalled value "NS_35"

For "NS_35" see A-MPR test case in table 6.2B.3.1.4.3.2-1.

6.5B.2.1.2.4.3.2 Message contents exceptions for network signalled value "NS_04"

For "NS_35" see A-MPR test case in table 6.2B.3.1.4.3.1-1.

6.5B.2.1.2.5 Test requirement

6.5B.2.1.2.5.1 Test requirement for network signalled value "NS_35"

When "NS_35" is indicated in the cell measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in table 6.2B.3.1.5.1-1, and the power of any UE shall not exceed the described values in table 6.5B.2.1.2.5.1-1. The requirements in the table apply in the frequency ranges immediately adjacent and outside the aggregation of the sub-blocks.

Table 6.5B.2.1.2.5.1-1: Additional requirements for "NS_35"

Δf_{OOB}	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement [dBm]	Measurement bandwidth
0 MHz ≤ Δf < 0.1 MHz	0.015 MHz ≤ f_offset < 0.085 MHz	-13 + TT	30 kHz
0.1 MHz ≤ Δf < ENBW	0.15 MHz ≤ f_offset < ENBW – 0.05 MHz	-13 + TT	100 kHz
ENBW ≤ Δf < ENBW +5 MHz	ENBW + 0.5 MHz ≤ f_offset < ENBW + 4.5 MHz	-25 + TT	1 MHz
NOTE: ENBW is the aggregated bandwidth of an E-UTRA sub-block and an adjacent NR sub-block; there is no frequency separation between the said sub-blocks. The sub-block bandwidths include any internal guard bands.			

6.5B.2.1.2.5.2 Test requirement for network signalled value "NS_04"

When "NS_04" is indicated in the cell measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in tables 6.2B.3.1.5.2-1, and the power of any UE shall not exceed the described values in table 6.5B.2.1.2.5.2-1. The requirements in the table apply in the frequency ranges immediately adjacent and outside the aggregation of the sub-blocks.

Table 6.5B.2.1.2.5.2-1: Additional requirements for n41 SEM with NS_04

	Spectrum emission limit (dBm)/ measurement bandwidth for each channel bandwidth						
Δf_{OOB} MHz	10 MHz	15 MHz	20 MHz	40 MHz	50 MHz	> 50 MHz	Measurement bandwidth
± 0 - 1	-18+TT	-20+TT	-21+TT	-24+TT	-25+TT		30 kHz
± 1 - 5	-10+TT						1 MHz
± 5 - X	-13+TT						
± X - (BWChannel + 5 MHz)	-25+TT						
NOTE 1: X is defined as the sum of the emission bandwidth of the component carriers plus the guard band between contiguous CCs.							

6.5B.2.1.3 Adjacent channel leakage ratio for intra-band contiguous EN-DC

Editor's note: This test case is not complete. Following aspects are either missing or not yet determined:

- Test point analysis is not done.
- Measurement BW is within brackets (38.101-3)
- Test configuration table has many FFS

6.5B.2.1.3.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to adjacent channels in terms of Adjacent Channel Leakage Power Ratio (ACLR).

6.5B.2.1.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting [intra-band] EN-DC.

6.5B.2.1.3.3 Minimum conformance requirements

For EN-DC operation with an E-UTRA sub-block immediately adjacent to an NR sub-block, the ACLR is defined as the ratio of the filtered mean power centred on the aggregated sub-block bandwidth ENBW to the filtered mean power centred on an adjacent bandwidth of the same size ENBW [at nominal channel spacing]. The UE shall meet the ACLR minimum requirement EN-DC$_{ACLR}$ specified in Table 6.5B.2.1.3-1 with ENBW the sum of the sub-block bandwidths.

Table 6.5B.2.1.3-1: ACLR for intra-band EN-DC (contiguous sub-blocks)

Parameter	Unit	Value
EN-DC$_{ACLR}$	dBc	30
Measurement bandwidth		[0.95] ENBW
Frequency offset of adjacent channel		ENBW / -ENBW
NOTE 1: ENBW is the aggregated bandwidth in MHz of an E-UTRA sub-block and an adjacent NR sub-block; there is no frequency separation between the said sub-blocks. The sub-block bandwidths include any internal guard bands. NOTE 2: The frequency offset is that in between the centre frequencies of the measurement filters		

The normative reference for this requirement is TS 38.101-3 [4] clause 6.5B.2.1.3.

6.5B.2.1.3.4 Test description

6.5B.2.1.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table [TBD]. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.5B.2.1.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes [TBD]. Configurations of PDSCH and PDCCH before measurement are specified in Annex [TBD].

Table 6.5B.2.1.3.4.1-1: Test Configuration Table

Initial Conditions			
Test Environment as specified in TS 38.508-1 [6] subclause [TBD]	FFS		
Test Frequencies as specified in TS 38.508-1 [6] subclause [TBD]	FFS		
Test Channel Bandwidths as specified in TS 38.508-1 [6] subclause [TBD]	FFS		
Test SCS as specified in TS 38.508-1 [6] subclause [TBD]	FFS		
Test Parameters			
Test ID	**Downlink Configuration**	**Uplink Configuration**	
	N/A for ACLR test case	**Modulation**	**NR and E-UTRA RB allocation (NOTE 1)**
FFS		FFS	FFS
NOTE 1: The specific configuration of each RB allocation is defined in Table TBD.			

1. Connect the SS to the UE antenna connectors as shown in [TBD].
2. The parameter settings for the cell are set up according to [TBD].
3. Downlink signals are initially set up according to [TBD], and uplink signals according to [TBD].
4. The NR and E-UTRA UL Reference Measurement Channels are set according to Table 6.5B.2.1.3.4.1-1.
5. Propagation conditions are set according to [TBD].
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.5B.2.1.3.4.3.

6.5B.2.1.3.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to Table 6.5B.2.1.3.4.1-1 on both EN-DC component carriers. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
2. Send continuously uplink power control "up" commands to the UE for NR and E-UTRA carrier until the UE transmits at its P_{UMAX} level; allow at least 200ms for the UE to reach P_{UMAX} level.
3. Measure the mean power over all component carriers for the EN-DC configuration, which shall meet the requirements described in Table TBD or TBD as appropriate. The period of the measurement shall be at least the continuous duration of [one active sub-frame]. For TDD slots with transient periods are not under test.
4. Measure the rectangular filtered mean power over all component carriers for the EN-DC configuration.
5. Measure the rectangular filtered mean power of the first adjacent channel on both lower and upper side of the assigned NR + E-UTRA channel, respectively.
6. Calculate the ratios of the power between the values measured in step 5 over step 6 for lower and upper side respectively.

NOTE 1: When switching to CP-OFDM waveform, as specified in the test configuration table 6.5B.2.1.3.4.1-1, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message according to TS 38.508-1 [x] clause TBD table TBD without [DFT-s-OFDM] condition. When switching to DFT-s-OFDM waveform, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message with [DFT-s-OFDM] condition

6.5B.2.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6.1.

6.5B.2.1.3.5 Test requirement

- The measured UE mean power in the channel bandwidth, derived in step TBD, shall fulfil requirements in Table TBD as appropriate,

and

- the measured adjacent channel power ratio, derived in step 6, shall be less than or equal to 30 + TT dBc.

6.5B.2.2 Out-of-band emissions for Intra-band non-contiguous EN-DC

FFS.

6.5B.2.3 Out-of-band emissions for Inter-band EN-DC within FR1

6.5B.2.3.1 Spectrum emissions mask for Inter-band EN-DC within FR1

Editor´s note: Working assumption: E-UTRA is not tested during test procedure

6.5B.2.3.1.1 Test purpose

Same test purpose as in clause 6.5.2.2 in TS 38.521-1 [8] for the NR carrier.

6.5B.2.3.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC.

6.5B.2.3.1.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 6.5.2.2.3 in TS 38.521-1 [8] for the NR carrier.

The normative reference for this requirement is TS 38.101-3 [4] clause 6.5B.2.3.

6.5B.2.3.1.4 Test description

Same test description as in clause 6.5.2.2.4 in TS 38.521-1 [8] for the NR carrier with the following exception:

Table 6.5B.2.3.1.4-1: E-UTRA Test Configuration Table

E-UTRA Test Parameters				
E-UTRA Channel Bandwidth	**E-UTRA Test Frequency**	**Downlink**	**Uplink**	
		N/A for Occupied bandwidth	**Modulation**	**RB allocation**
5 MHz	MidRange		N/A	0
NOTE 2: E-UTRA Test Frequency as specified in TS 36.508 [11] subclause 4.3.1				

For Initial conditions as in clause 6.5.2.2.4.1 in TS 38.521-1 [8], the following steps will be added to configure E-UTRA component:

2.1. The parameter settings for the cell are set up according to TS 36.508 [11] subclause 4.4.3 with E-UTRA channel bandwidth and test frequencies defined in Table 6.5B.2.3.1.4-1.

3.1. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.

4.1. The UL Reference Measurement channels are set according to Table 6.5B.2.3.1.4-1 with QPSK modulation and full RB allocation for Uplink.

Step 6 of Initial conditions as in clause 6.5.2.2.4.1 in TS 38.521-1 [8] is replaced by:

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG according to TS 38.508 [6] clause 4.5.

Same test procedure as in clause 6.5.2.2.4.2 in TS 38.521-1 [8] with the following steps added for E-UTRA component:

1.1. For E-UTRA component, SS sends uplink scheduling information via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to Table 6.5B.2.3.1.4-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

2.1. For E-UTRA component, send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at P_{UMAX} level.

Step 3 of test procedure as in clause 6.5.2.2.4.2 in TS 38.521-1 [8] is replaced by:

3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration. The period of the measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. For TDD slots with transient periods are not under test.

6.5B.2.3.1.5 Test requirement

Power of any UE emission shall fulfil requirements in Table 6.5.2.2.5-1 defined in TS 38.521-1 [8] for the NR carrier.6.5B.2.3.2

6.5B.2.3.3 Adjacent channel leakage ratio for inter-band EN-DC within FR1

Editor´s note: Working assumption: E-UTRA is not tested during test procedure

6.5B.2.3.3.1 Test purpose

Same test purpose as in clause 6.5.2.4.1.1 in TS 38.521-1 [8].

6.5B.2.3.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC.

6.5B.2.3.3.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 6.5.2.4.1.3 in TS 38.521-1 [8] for the NR carrier.

The normative reference for this requirement is TS 38.101-3 [4] clause 6.5B.2.3.

6.5B.2.3.3.4 Test description

Same test description as in clause 6.5.2.4.1.4 in TS 38.521-1 [TBD] for the NR carrier with the following exception:

Table 6.5B.2.3.3.4-1: E-UTRA Test Configuration Table

E-UTRA Test Parameters				
E-UTRA Channel Bandwidth	**E-UTRA Test Frequency**	**Downlink**	**Uplink**	
		N/A for Occupied bandwidth	**Modulation**	**RB allocation**
5 MHz	MidRange		N/A	0
NOTE 1: E-UTRA Test Frequency as specified in TS 36.508 [11] subclause 4.3.1				

For Initial conditions as in clause 6.5.2.4.1.4.1 in TS 38.521-1 [8], the following steps will be added to configure E-UTRA component:

2.1. The parameter settings for the cell are set up according to TS 36.508 [11] subclause 4.4.3 with E-UTRA channel bandwidth and test frequencies defined in Table 6.5B.2.3.3.4-1.

3.1. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.

4.1. The UL Reference Measurement channels are set according to Table 6.5B.2.3.3.4-1 with QPSK modulation and full RB allocation for Uplink.

Step 6 of Initial conditions as in clause 6.5.2.4.1.4.1 in TS 38.521-1 [8] is replaced by:

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG according to TS 38.508 [6] clause 4.5.

Same test procedure as in clause 6.5.2.4.1.4.2 in TS 38.521-1 [8] with the following steps added for E-UTRA component:

1.1. For E-UTRA component, SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to Table 6.5B.2.3.3.4-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC

2.1. For E-UTRA component, send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at P_{UMAX} level.

Step 3 of test procedure as in clause 6.5.2.4.1.4.2 in TS 38.521-1 [8] is replaced by:

3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration. The period of the measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. For TDD slots with transient periods are not under test.

6.5B.2.3.3.5 Test requirement

If the measured adjacent channel power is greater than –50 dBm then the measured NR ACLR shall be higher than the limits in table 6.5.2.4.1.5-2 defined in clause 6.5.2.4.1.5 in TS 38.521-1 [8] for the NR carrier.

6.5B.2.4 Out-of-band emissions for Inter-band EN-DC including FR2

FFS.

6.5B.3 Spurious emissions for EN-DC

- Editor's note
- Working assumption: E-UTRA is not tested during test procedure.
- Spurious emission for intra-band non-contiguous EN-DC is FFS.
- Spurious emission band UE co-existence is FFS.

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products, but exclude out of band emissions. The spurious emission limits are specified in terms of general requirements inline with SM.329 [3] and *NR* operating band requirement to address UE co-existence.

To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

6.5B.3.1 Spurious Emissions for intra-band contiguous EN-DC

6.5B.3.1.1 General spurious emissions for intra-band contiguous EN-DC

6.5B.3.1.1.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions.

6.5B.3.1.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting intra-band EN-DC.

6.5B.3.1.1.3 Minimum conformance requirements

The general spurious emissions requirements specified in sub-clause 6.6.3.1 of TS36.521-1[TBD] and sub-clause 6.5.3.1 of TS38.521-1[8] apply beyond any frequencies for which the out-of-band emissions requirements in sub-clause 6.5B.2.1apply

The normative reference for this requirement is TS 38.101-3 [4] subclause 6.5B.3.1.1.

6.5B.3.1.1.4 Test description

6.5B.3.1.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the Subscriber Station (SS) to take with the UE to reach the correct measurement state.

The initial test configurations for NR consist of environmental conditions test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.3.5-1 of TS 38.521-1[8]. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 6.5.3.1.4.1-1 of TS 38.521-1[8]. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A2.2 of TS 38.521-1 [8]. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2 of TS 38.521-1 [8].

The initial test configurations for E-UTRA band consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in Table 6.5B.3.1.1.4.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 6.6.3.1.4.1-1 of TS 36.521-1[10]. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2 of TS 36.521-1[10]. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2 of TS 36.521-1[10].

Table 6.5B.3.1.1.4.1-1: E-UTRA Test Configuration Table

Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1	NC					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	Mid range					
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	5MHz					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
5MHz	N/A for Spurious Emissions testing			QPSK	25	25
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.						

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2.1 for UE diagram.
2. The parameter settings for NR cell are set up according to TS 38.508-1 [6] subclause 4.4.3.
3. The parameter settings for E-URA cell are set up according to TS 36.508 [11] subclause 4.4.3.
4. NR downlink signals are initially set up according to Annex C.0, C.1, and C.2 and uplink signals according to Annex G.0, G.1, G.2, and G.3.0 of TS38.521-1[8].
5. E-UTRA downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0 of TS36.521-1[10].
6. The UL Reference Measurement channels for NR are set according to Table 6.5.3.1.4.1-1 of TS38.521-1[8].
7 The UL Reference Measurement channels for E-UTRA are set according to Table 6.5B.3.1.1.4.1-1.
8. NR propagation conditions are set according to B.0 of TS38.521-1[8].
9. E-UTRA propagation conditions are set according to B.0 of TS36.521-1[10].
10. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.5B.3.1.1.4.4.

6.5B.3.1.1.4.2 Test Procedure

1. NR SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format [0_1] for C_RNTI to schedule the UL RMC according to Table 6.5.3.1.4.1-1 of TS38.521-1[8]. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

2. E-UTRA SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to Table 6.6.3.1.4.1-1 of TS36.521-1[10]. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

3. Both NR and E-UTRA SS send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.

4. Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 6.5.3.1.5-1. The centre frequency of the filter shall be stepped in contiguous steps according to table 6.5.3.1.5-1. The measured power shall be verified for each step. The measurement period shall capture the active time slots

6.5B.3.1.1.4.4 Message Contents

Message contents are according to TS 38.508-1 [5] subclause 4.6

6.5B.3.1.1.5 Test Requirement

The measured average power of spurious emission, derived in step 4, shall not exceed the described value in Table 6.5B.3.1.1.5-1.

The spurious emission limits apply for the frequency ranges that are more than Δf_{OOB} (MHz) from the edge of the channel bandwidth shown in Table 6.5.3.1.5-1 of TS38.521-1[8].

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 6.5B.3.1.1.5-1: General spurious emissions test requirements

Frequency Range	Maximum Level	Measurement bandwidth	NOTE
9 kHz ≤ f < 150 kHz	-36 dBm	1 kHz	
150 kHz ≤ f < 30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1000 MHz	-36 dBm	100 kHz	
1 GHz ≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	1
12.75 GHz < f < 26 GHz	-30 dBm	1 MHz	2
NOTE 1: Applies for Band that the upper frequency edge of the UL Band more than [2.69] GHz NOTE 2: Applies for Band that the upper frequency edge of the UL Band more than [5.2] GHz			

6.5B.3.1.2 Spurious emission band UE co-existence for intra-band contiguous EN-DC

FFS

6.5B.3.2 Spurious Emissions for intra-band non-contiguous EN-DC

FFS

6.5B.3.3 Spurious Emissions for Inter-band EN-DC within FR1

6.5B.3.3.1 General spurious emissions for Inter-band EN-DC within FR1

6.5B.3.3.1.1 Test purpose

Same test purpose as in clause 6.5B.3.1.1.1.

6.5B.3.3.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward supporting inter-band EN-DC.

6.5B.3.3.1.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 6.5B.3.1.1.3.

6.5B.3.3.1.4 Test description

Same test description as in clause 6.5B.3.1.1.4

6.5B.3.3.1.5 Test Requirement

Same test requirement as in clause 6.5B.3.1.1.5.

6.5B.3.3.2 Spurious emission band UE co-existence for Inter-band within FR1

FFS

6.5B.3.4 Spurious Emissions for Inter-band including FR2

6.5B.3.4.1 General Spurious Emissions for Inter-band including FR2

6.5B.3.4.2 Spurious emission band UE co-existence for Inter-band including FR2

Editor's Note: Following aspects are missing or under discussion

- Details of the coarse-scan (step 5-a) and max EIRP measurement (step 5-b) is TBD. Depending on the outcome of the study on step 5-a, 5-b, they could be removed.

-Testability issue for 1GHz~ [12.75GHz] is identified. How to treat this frequency range is TBD.

- Dynamic measurement bandwidth is missing as optional method in the test procedure.

- Details about LTE anchor configuration are TBD and will be added later (may be in general section)

6.5B.3.4.2.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions.

6.5B.3.4.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting [intra-band] EN-DC.

6.5B.3.4.2.3 Minimum conformance requirements

Unless otherwise stated, the spurious emission limits apply for the frequency ranges that are more than F_{OOB} (MHz) in Table 6.5B.3.4.2.3-1 starting from the edge of the assigned *NR* channel bandwidth. The spurious emission limits in Table 6.5B.3.4.2.3-2 apply for all transmitter band configurations (NRB) and channel bandwidths.

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 6.5B.3.4.2.3-1: Boundary between *NR* out of band and spurious emission domain

Channel bandwidth	50 MHz	100 MHz	200 MHz	400 MHz
OOB boundary F_{OOB} (MHz)	100	200	400	800

The spurious emission limits in table 6.5B.3.4.2.3-2 apply for all transmitter band configurations (RB) and channel bandwidths.

Table 6.5B.3.4.2.3-1: Boundary between LTE out of band and spurious emission domain

TBD

Table 6.5B.3.4.2.3-2: Spurious emissions limits

Frequency Range	Maximum Level	Measurement bandwidth	NOTE
30 MHz ≤ f < 1000 MHz	-36 dBm	100 kHz	
1 GHz ≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 2nd harmonic of the upper frequency edge of the UL operating band in GHz	-13 dBm	1 MHz	

The normative reference for this requirement is TS 38.101-3 subclause 6.5B.3.4.

6.5B.3.4.2.4 Test description

6.5B.3.4.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the Subscriber Station (SS) to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, ~~and~~ test channel bandwidths and sub-carrier spacing based on *NR* bands specified in Table TBD. All of these configurations shall be tested with applicable test parameters for each test channel bandwidth and sub-carrier spacing and are shown in Table 6.5B.3.4.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex TBD. Configurations of PDSCH and PDCCH before measurement are specified in Annex TBD.

Table 6.5B.3.4.2.4.1-1: Test Configuration Table for *NR*

TBD

1. Connection between SS and UE is shown in TS 38.508-1 [10] Annex [TBD], Figure [TBD].
2. The parameter settings for the cell are set up according to TS 38.508-1 [10] subclause [TBD].
3. Downlink signals are initially set up according to Annex [TBD], and uplink signals according to Annex [TBD].
4. The UL Reference Measurement channels are set according to Table 6.5B.3.4.2.4.1-1
5. Propagation conditions are set according to Annex [TBD].
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 6.5B.3.4.2.4.3.

6.5B.3.4.2.4.2 Test procedure

1. Set the UE in the Tx beam peak direction found with a 3D EIRP scan as performed in clause [TBD].

2. SS sends uplink scheduling information for each UL HARQ process via PDSCH DCI format [0_1] for C_RNTI to schedule the UL RMC according to Table 6.5B.3.4.2.4-1. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

3. Send continuously uplink power control "up" commands to the UE for NR carrier until the UE transmits at its P_{UMAX} level; allow at least [TBD msec] for the UE to reach [maximum output power].

4. Ensure the UE beam towards the SS is locked using ACTIVATE BEAMLOCK for Tx Only according to TS 38.508-1 [10] clause 4.5.

5. Measure the spurious emissions as per steps outlined below:

   (a) Perform coarse TRP measurements to identify spurious emission frequencies and corresponding power level using the procedure in Annex F. The measurement is completed in both polarizations θ and ϕ over frequency range and measurement bandwidth according to Table 6.5.3.1.3-2. Optionally, a larger and non-constant measurement bandwidth than that of Table 6.5.3.1.3-2 may be applied as long as the SNR (ratio of test limit to floor noise of test equipment) $\geq$ [10]dB is guaranteed. The measurement period shall capture the [active time slots.] For each spurious emission frequency with coarse TRP identified to be less than offset dB of the TRP limit according to Table 6.5.3.1.3-2, continue with TRP procedures according to step (b). [It is allowed to repeat step (a) with narrower measurement bandwidth to further narrow down the frequency range to be tested in step (b).]

   The offset value shall be the TRP measurement uncertainty at 95% confidence level including the effect of coarse grid. Different coarse grid and corresponding offset values may be used for different frequencies. The used offset value shall be recorded in the test report.

   (b) Measure TRP according to Annex F for each of the spurious emission frequency identified in step (a). Apply a measurement bandwidth according to Table 6.5.3.1.3-2.

6. Ensure the UE beam towards the SS is locked using DEACTIVATE BEAMLOCK according to TS 38.508-1 [10] clause 4.5.NOTE 1:The frequency range defined in Table 6.5B.3.4.2.3-2 may be split into ranges. For each range a different test system, e.g. antenna and/or chamber, may be used. To pass the test case all verdicts of the frequency ranges must pass.

NOTE 2: When switching to CP-OFDM waveform, as specified in the test configuration table 6.5B.2.1.3.4.1-1, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message according to TS 38.508-1 [x] clause TBD table TBD without [DFT-s-OFDM] condition. When switching to DFT-s-OFDM waveform, send an RRCConnectionReconfiguration message containing NR RRCReconfiguration message with [DFT-s-OFDM] condition

6.5B.3.4.2.4.3 Message contents

Message contents are according to TS 38.508-1 [10] subclause 4.6.

6.5B.3.4.2.5 Test requirement

This clause specifies the requirements for the specified *NR* band for Transmitter Spurious emissions requirement with frequency range as indicated in Table 6.5B.3.4.2.5-1.

The measured maximum EIRP or TRP power of spurious emission, derived in step 3, shall not exceed the described value in Table 6.5B.3.4.2.5-1.

Unless otherwise stated, the spurious emission limits apply for the frequency ranges that are more than F_{OOB} (MHz) in Table 6.5B.3.4.2.3-1 starting from the edge of the assigned *NR* channel bandwidth. The spurious emission limits in Table 6.5B.3.4.2.5-1 apply for all transmitter band configurations (NRB) and channel bandwidths.

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 6.5B.3.4.2.5-1: Spurious emissions test requirements

Frequency Range	Maximum Level	Measurement bandwidth	NOTE
1 GHz ≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 2nd harmonic of the upper frequency edge of the UL operating band in GHz	-13 dBm	1 MHz	
NOTE 1: Applies for Band n257, n258, n260			

7 Receiver characteristics

7.1 General

For Rx test cases the identified beam peak direction can be stored and reused for a device under test in various configurations/environments for the full duration of device testing as long as beam peak direction is the same.7.2 Diversity characteristics

FFS

7.3 Reference sensitivity

7.3A Reference sensitivity for CA without EN-DC

7.3A.1 General

FFS

7.3A.2 Reference sensitivity power level for CA without EN-DC

FFS

7.3A.3 $\Delta R_{IB,c}$ for CA without EN-DC

7.3A.3.1 Reference Sensitivity for Inter-band CA between FR1 and FR2 without EN-DC

FFS

7.3B Reference sensitivity level for DC

7.3B.1 General

For EN-DC, E-UTRA and NR single carrier REFSENS requirements defined in [2], [3] and [5] apply to all downlink bands of EN-DC configurations listed in tables in clause 5.2B unless sensitivity degradation is allowed as defined in TS 38.521-1 clause 7.3.2.3 .

7.3B.2 Reference sensitivity for EN-DC

Editor's Note: Final section structure under further analysis and discussion.

7.3B.2.1 Reference sensitivity for Intra-band Contiguous EN-DC

7.3B.2.1.1 Test purpose

To verify the ability of UE that support intra-band contiguous EN-DC configurations to receive data with a given average throughput for a specified reference measurement channel, under conditions of low signal level, ideal propagation and no added noise. A UE unable to meet the throughput requirement under these conditions will decrease the effective coverage area.

7.3B.2.1.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting intra-band EN-DC.

7.3B.2.1.3 Minimum conformance requirements

For intra-band contiguous EN-DC configurations, the reference sensitivity power level REFSENS is the minimum mean power applied to each one of the UE antenna ports at which the throughput for the carrier(s) of the E-UTRA and NR CGs shall meet or exceed the requirements for the specified E-UTRA and NR reference measurement channels.

For DC configurations of DC bandwidth class B, the throughput on each of the CGs shall be ≥ 95% of the maximum throughput of the respective reference measurement channels as specified in [TBD]. The maximum allowed degradation MSD of the reference sensitivity level, as specified for the applicable carrier bandwidths in accordance with [5] for the E-UTRA CG and [2] for the NR CG, is specified in Table 7.3B.2.1.3-1.

Table 7.3B.2.1.3-1: Reference sensitivity (MSD) for intra-band DC bandwidth class

MSD / DC bandwidth class B							
DC configuration	**E-UTRA/NR band**	**F_C (UL) (MHz)**	**Channel bandwidth (MHz)**	**UL allocation (LCRB)**	**F_C (DL) (MHz)**	**MSD (dB)**	**Duplex mode**
DC_(n)71B	71	665.5	5	5 (RB_{end} =24)	619.5	0	FDD
	n71	675.5	15	15 (RB_{start} = 0)	629.5	1.8	
DC_(n)71B	71	670.5	15	15 (RB_{end} = 74)	624.5	0	
	n71	680.5	5	5 (RB_{start} = 0)	634.5	1.6	
DC_(n)71B	71	668	10	10 (RB_{end} = 49)	622	0	
	n71	678	10	10 (RB_{start} = 0)	632	1.7	
DC_(n)71B	71	668	10	10 (RB_{end} = 0)	622	17.2	
	n71	678	10	10 (RB_{start} = 51)	632	29.4	

The normative reference for this requirement is TS 38.101-3 [4] subclause 7.3B.2.1

7.3B.2.1.4 Test description

7.3B.2.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations for NR consist of environmental conditions test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.3.5-1 of TS 38.521-1[8]. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 7.3.2.4.1-1, Table 7.3.2.4.1-2, and Table 7.3.2.4.1-3 of TS 38.521-1[8]. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A2.2 of TS 38.521-1[8]. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2 of TS 38.521-1[8].

The initial test configurations for E-UTRA band consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in Table 5.4.2.1-1 of TS 36.521-1[10]. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in tables 7.3.4.1-1 and 7.3.4.1-2 of TS36.521-1[10]. The details of the downlink and uplink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 of TS36.521-1[10]. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2 of TS36.521-1[10].

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2.1 for UE diagram.

2. The parameter settings for NR cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. The parameter settings for E-URA cell are set up according to TS 36.508 [11] subclause 4.4.3.

4. NR downlink signals are initially set up according to Annex C.0, C.1, C.2 , C.3.1, and uplink signals according to Annex G.0, G.1, G.2, and G.3.1 of TS38.521-1 [8].

5. E-UTRA downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0 of TS36.521-1[10].

6. The UL Reference Measurement channels for NR are set according to Table 6.5.3.1.4.1-1 of TS38.521-1[8].

7 The UL Reference Measurement channels for E-UTRA are set according to Table 6.6.3.1.4.1-1 of TS36.521-1[10].

8. NR propagation conditions are set according to Annex B.0 of TS38.521-1[8].

9. E-UTRA propagation conditions are set according to B.0 of TS36.521-1[10].

10. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 7.3B.2.1.4.3.

7.3B.2.1.4.2 Test procedure

1. NR SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to Table 7.3B.2.3.4-1 on both EN-DC component carriers. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. E-UTRA SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to Table 6.6.3.1.4.1-1 of TS36.521-1[10]. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

3. Set the Downlink signal level to the appropriate REFSENS value defined in TS 38.521-1 [TBD], Table 7.3.3-1 for NR band and TS 36.521-1[10] Table 7.3.3-1 for E-UTRA band. Send continuously uplink power control "up" commands in the uplink scheduling information to both carriers to ensure the UE transmits PUMAX level for at least the duration of the Throughput measurement.

4. Measure the average throughput of both NR and E-UTRA for a duration sufficient to achieve statistical significance according to Annex H.2 of TS 38.521-1[8] for NR band, and Annex G.2 of TS36.521-1[10] for EUTRA band.

7.3B.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 for NR band. Message contents are according to TS 36.508 [7] subclause 4.6 for EUTRA band.

7.3B.2.1.5 Test requirement

For intra-band contiguous EN-DC configurations, The throughput of each CG shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex [A.3.2] with reference receive power level specified in Tables 7.3.2.5-1 and parameters specified Tables 7.3.2.4.1-1, Tables 7.3.2.4.1-2 and Tables 7.3.2.4.1-3 of TS 38.521-1 for NR band , and reference measurement channels as specified in Annex A.3.2 of TS 36.521-1 [10] with parameters specified in Tables 7.3.5-1 and Table 7.3.5-2 of TS 36.521-1 [10].

The maximum allowed degradation MSD of the reference sensitivity level, as specified for the applicable carrier bandwidths in accordance with [5] for the E-UTRA CG and [2] for the NR CG, is specified in Table 7.3B.2.1.5-1.

Table 7.3B.2.1.5-1: Reference sensitivity (with MSD) for intra-band DC bandwidth class

FFS

7.3B.2.2 Reference sensitivity for Intra-band non-contiguous EN-DC

FFS

7.3B.2.3 Reference sensitivity for Inter-band EN-DC within FR1

Editor's Note:

- Working assumption: E-UTRA is not tested during test procedure.

- Test requirement and configuration tables for EN-DC configurations without exception requirements in 38.101-3 are complete, but EN-DC configurations with exception requirements in 38.101-3 are FFS

7.3B.2.3.1 Test purpose

To verify the ability of UE that support inter-band EN-DC with FR1 NR band configurations to receive data with a given average throughput for a specified reference measurement channel, under conditions of low signal level, ideal propagation and no added noise. A UE unable to meet the throughput requirement under these conditions will decrease the effective coverage area.

7.3B.2.3.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting inter-band EN-DC.

7.3B.2.3.3 Minimum conformance requirements

Reference sensitivity exceptions are specified for the condition when there is uplink transmission only in the aggressor band.

Editor's note: FFS how to clarify the issues of 1Tx may also exist for 2Tx mode, for example harmonic, etc.

7.3B.2.3.3.1 Reference sensitivity exceptions due to UL harmonic interference for EN-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by UL harmonic interference from another band part of the same DC configuration. Reference sensitivity exceptions are specified in Table 7.3B.2.3.3.1-1 with uplink configuration specified in Table 7.3B.2.3.3.1-2.

Table 7.3B.2.3.3.1-1: MSD due to UL harmonic for EN-DC in NR FR1

UL band	DL band	5 MHz (dB)	10 MHz (dB)	15 MHz (dB)	20 MHz (dB)	25 MHz (dB)	30 MHz (dB)	40 MHz (dBm)	50 MHz (dBm)	60 MHz (dBm)	80 MHz (dBm)	90 MHz (dBm)	100 MHz (dBm)
1, 3	n77[1,2]	27.1	23.9	22.1	20.9			17.9					
	n77[3]	1.9	1.1	0.8	0.3								
2	n78[1,2]	27.1	23.9	22.1	20.9			17.9					
	n78[3]	1.9	1.1	0.8	0.3								
3	n78[1,2]	27.1	23.9	22.1	20.9			17.9					
	n78[3]	1.9	1.1	0.8	0.3								
8	n77[6,7] n78[6,7]	NA	10.8	9.1	8	5.1	4.2	3.5	2.3	1.4			
8	n79[4,5]							6.8	6.2	5.6	4.9		4.4
18, 19	n77[4,5]		10.4	8.9	7.8			4.7	3.7	3	1.7		0.7
28	n77[4,5] n78[4,5]		10.4	8.9	7.8			4.7	3.7	3	1.7	1.2	0.7
20	n77[6,7] n78[6,7]		10.8	9.1	8			6					
26	n41	NA	10.3	8.4	7.4			5	4.3	3.9	3.1	2.7	
26	n77[6,7] n78[6,7]		10.8	9.1	8			6					
26	n77[4,5]		10.4	8.9	7.8			4.7	3.7	3	1.7		0.7
n28	1[8,9,10]	10.2	7.6	6.2	5.3								
	n75[1,2]	28.1	25.3	24.0	22.8								
n71	2[11]	4.6	1.0	0.7	0.6								
	2[12]	1.7	1.0	0.7	0.6								
66	n78[1,2]		23.9	22.1	20.9			17.9					
	n78[3]		1.1	0.8	0.3								

NOTE 1: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.

NOTE 2: The requirements should be verified for UL EARFCN or NR ARFCN of the aggressor (lower) band (superscript LB) such that $f_{UL}^{LB} = \lfloor f_{DL}^{HB} / 0.2 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.

NOTE 3: The requirements are only applicable to channel bandwidths with a carrier frequency at $\pm(20 + BW_{Channel}^{HB} / 2)$ MHz offset from $2 f_{UL}^{LB}$ in the victim (higher band) with $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$, where _ and $BW_{Channel}^{HB}$ are the channel bandwidths configured in the aggressor (lower) and victim (higher) bands in MHz, respectively.

NOTE 4: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 5th transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.

NOTE 5: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that $f_{UL}^{LB} = \lfloor f_{DL}^{HB} / 0.5 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.

NOTE 6: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 4th transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.

NOTE 7: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that $f_{UL}^{LB} = \lfloor f_{DL}^{HB} / 0.4 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.

NOTE 8: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of a low band for which the 3rd transmitter harmonic is within the downlink transmission bandwidth of a high band.

NOTE 9: The requirements should be verified for UL EARFCN of a low band (superscript LB) such that in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with the carrier frequency of a high band in MHz and the channel bandwidth configured in the low band.

NOTE 10: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured.

NOTE 11: These requirements apply when the lower edge frequency of the 5 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.

NOTE 12: These requirements apply when the lower edge frequency of the 10 MHz, 15 MHz, or 20 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.

Table 7.3B.2.3.3.1-2: Uplink configuration for reference sensitivity exceptions due to UL harmonic interference for EN-DC in NR FR1

E-UTRA or NR Band / Channel bandwidth of the high band													
UL band	**DL band**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**	**25 MHz**	**30 MHz**	**40 MHz**	**50 MHz**	**60 MHz**	**80 MHz**	**90 MHz**	**100 MHz**
1	n77	12	25	36	50			100					
2	n78	12	26	39	53[1] 100[2]								
3	n77	12	25	36	50			50					
3	n77	12	25	36	50			50					
8	n77 n78		16	25	25			25	25	25	25	25	25
8	n79							25	25	25	25		25
18	n77	8	16	25	25[1], 25[2]								
19	n77		16	25	25			25	25	25	25		25
20	n77	8	16	25	25[1], 25[2]								
20	n78		12	18	20			20					
26	n77 n78	8	16	25	25[1], 25[2]								
n28	1	8	16	25	25								
n28	n75	12	25	36	50								
28	n77 n78		10	-15	20			25	25	25	25	25	25
66	n78		26	39	53			100					
n71	2	8[3]	8[3]	8[3]	8[3]								

NOTE 1: The configuration is used for measurement of MSD for NR channel bandwidth of 20MHz.
NOTE 2: The configuration is used for measurement of MSD for NR channel bandwidth of 40MHz.
NOTE 3: The RB allocation is at the lower edge of the lowest channel of UL band.
NOTE 4: These requirements apply when the lower edge frequency of the 5 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.
NOTE 5: These requirements apply when the lower edge frequency of the 10 MHz, 15 MHz, or 20 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.

7.3B.2.3.3.2 MSD due to receiver harmonic mixing for EN-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by receiver harmonic mixing due to another band part of the same DC configuration. Reference sensitivity exceptions are specified in Table 7.3B.2.3.3.2-1 with uplink configuration specified in Table 7.3B.2.3.3.2-2.

Table 7.3B.2.3.3.2-1: Reference sensitivity exceptions due to receiver harmonic mixing for EN-DC in NR FR1

UL band	DL band	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	25 MHz (dBm)	40 MHz (dBm)	50 MHz (dBm)	60 MHz (dBm)	80 MHz (dBm)	90 MHz (dBm)	100 MHz (dBm)
2	n71[4]	26.8	23.6	21.2	15.6							
26	n41[4]	24.3	24.3	22.5	N/A							
41	n77[7]	N/A	8.3	8.0	6.9	N/A	3.9	3	2.3	1.2	0.4	
41	n78[7]	N/A	8.3	8.0	6.9	N/A	3.9	3	2.3	1.2	0.4	
n71	2[5]	4.6	1	0.7	0.6							
	2[6]	1.7	1	0.7	0.6							
n77	41[8]	10.4	10.4	10.4	10.4	N/A	N/A	N/A	N/A	N/A	N/A	
n77	28[2]	28	25	23.2	22							
n78	41[8]	10.4	10.4	10.4	10.4	N/A	N/A	N/A	N/A	N/A	N/A	
n79	19[2]	29.5	26.5	24.7								
n79	21[3]	39.3	36.3	34.5								
n79	26[2]	27	24	22.2	N/A	N/A	N/A	N/A	N/A	N/A		N/A

NOTE 1: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (higher) band for which the mixing product due to harmonic of victim (lower) band LO with leakage of aggressor (higher) band is within the downlink transmission bandwidth of a victim (lower) band.

NOTE 2: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that $f_{DL}^{LB} = \lfloor f_{UL}^{HB} / 0.5 \rfloor 0.1$ in MHz and $F_{DL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{DL}^{LB} \le F_{DL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with f_{DL}^{LB} carrier frequency in the victim (lower) band in MHz and $BW_{Channel}^{LB}$ the channel bandwidth configured in the lower band.

NOTE 3: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that $f_{DL}^{LB} = \lfloor f_{UL}^{HB} / 0.4 \rfloor 0.1$ in MHz and $F_{DL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{DL}^{LB} \le F_{DL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with f_{DL}^{LB} carrier frequency in the victim (lower) band in MHz and $BW_{Channel}^{LB}$ the channel bandwidth configured in the lower band.

NOTE 4: The requirements should be verified for UL EARFCN of the aggressor (higher) band (superscript HB) such that $f_{DL}^{LB} = \lfloor f_{UL}^{HB} / 0.3 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with the carrier frequency in the victim (lower) band and the channel bandwidth configured in the higher band.

NOTE 5: These requirements apply when the lower edge frequency of the 5 MHz uplink channel in Band n71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.

NOTE 6: These requirements apply when the lower edge frequency of the 10 MHz, 15 MHz, or 20 MHz uplink channel in Band n71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.

NOTE 7: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that $f_{UL}^{LB} = \lfloor f_{DL}^{HB} / 0.15 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.

NOTE 8: The requirements should be verified for UL EARFCN of the aggressor (higher) band (superscript HB) such that $f_{UL}^{LB} = \lfloor 15 * f_{DL}^{HB} \rfloor 0.1$ in MHz and $F_{UL\_low}^{HB} + BW_{Channel}^{HB} / 2 \le f_{UL}^{HB} \le f_{UL\_high}^{HB} - BW_{Channel}^{HB} / 2$ with f_{DL}^{LB} carrier frequency in the victim (lower) band in MHz and $BW_{Channel}^{LB}$ the channel bandwidth configured in the higher band.

Table 7.3B.2.3.3.2-2: Uplink configuration for reference sensitivity exceptions due to receiver harmonic mixing for EN-DC in NR FR1

UL band	DL band	SCS (kHz)	5 MHz	10 MHz	15 MHz	20 MHz	25 MHz	40 MHz	50 MHz	60 MHz	80 MHz	90 MHz	100 MHz
2	n71	15	25	50	50	50							
n41	26	15	25	50	75								
41	n77	15	25	25	25	25	N/A	N/A	N/A	N/A	N/A	N/A	
41	n78	15	25	25	25	25	N/A	N/A	N/A	N/A	N/A	N/A	
n77	28	15	25	50	75	100							
n77	41	30	N/A	50	50	50	N/A	50	50	50	50	50	
n78	41	30	N/A	50	50	50	N/A	50	50	50	50	50	
n79	19	15	25	50	75								
n79	21	15	25	50	75								
n79	26	15	25	50	75								

NOTE 1: These requirements apply when there is at least one individual RE within the downlink transmission bandwidth of the victim (lower) band for which the 3rd harmonic is within the uplink transmission bandwidth or the uplink adjacent channel's transmission bandwidth of an aggressor (higher) band.

NOTE 2: The requirements should be verified for UL EARFCN of the aggressor (higher) band (superscript HB) such that $f_{DL}^{LB} = \lfloor f_{UL}^{HB} / 0.3 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with the carrier frequency in the victim (lower) band and the channel bandwidth configured in the higher band.

7.3B.2.3.3.3 Reference sensitivity exceptions due to close proximity of bands for EN-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by close proximity of an UL of another band part of the same DC configuration. Reference sensitivity exceptions are specified in Table 7.3B.2.3.3.3-1 with uplink configuration specified in Table 7.3B.2.3.3.3-2.

Table 7.3B.2.3.3.3-1: Reference sensitivity exceptions due to close proximity of bands for EN-DC in NR FR1

UL band	DL band	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	25 MHz (dBm)	40 MHz (dBm)	50 MHz (dBm)	60 MHz (dBm)	80 MHz (dBm)	100 MHz (dBm)
X	Y										

Table 7.3B.2.3.3.3-2: Uplink configuration for reference sensitivity exceptions due to close proximity of bands for EN-DC in NR FR1

UL band	DL band	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	25 MHz (dBm)	40 MHz (dBm)	50 MHz (dBm)	60 MHz (dBm)	80 MHz (dBm)	100 MHz (dBm)
X	Y										

7.3B.2.3.3.4 Reference sensitivity exceptions due to cross band isolation for EN-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by UL of another band part of the same DC configuration due to cross band isolation issues. Reference sensitivity exceptions are specified in Table 7.3B.2.3.3.4-1 with uplink configuration specified in Table 7.3B.2.3.3.4-2.

Table 7.3B.2.3.3.4-1: Reference sensitivity exceptions due to cross band isolation for EN-DC in NR FR1

UL band	DL band	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	25 MHz (dBm)	40 MHz (dBm)	50 MHz (dBm)	60 MHz (dBm)	80 MHz (dBm)	90 MHz (dBm)	100 MHz (dBm)
n77	41[1]	-93.5	-90.5	-88.7	-87.5							
n78	41[1]	-93.5	-90.5	-88.7	-87.5							
NOTE 1: Applicable only when harmonic mixing MSD for this combination is not applied.												

Table 7.3B.2.3.3.4-2: Uplink configuration for reference sensitivity exceptions due to cross band isolation for EN-DC in NR FR1

UL band	DL band	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	25 MHz (dBm)	40 MHz (dBm)	50 MHz (dBm)	60 MHz (dBm)	80 MHz (dBm)	90 MHz (dBm)	100 MHz (dBm)
n77	41	30	273	273	273	273	N/A	N/A	N/A	N/A	N/A	N/A
n78	41	30	273	273	273	273	N/A	N/A	N/A	N/A	N/A	N/A

7.3B.2.3.3.5 Reference sensitivity exceptions for intermodulation interference due to dual uplink operation for EN-DC in NR FR1

For EN-DC configurations in NR FR1 the UE may indicate capability of not supporting simultaneous dual uplink operation due to possible intermodulation interference overlapping in frequency with its own downlink transmissions if

- the intermodulation order is 2;
- the intermodulation order is 3 when the operating bands of the configuration are either confined below 1 GHz or confined within the frequency range 1695 MHz – 2690 MHz.

In case for the EN-DC in NR FR1 configurations the intermodulation products caused by dual uplink operation do not interfere with the own downlink transmission as defined in Annex-A the UE is mandated to operate in dual uplink mode.

For EN-DC in NR FR1 with uplink and downlink assigned to E-UTRA and NR FR1 bands given in Table 7.3B.2.3.3.5-1 the reference sensitivity is defined only for the specific uplink and downlink test points specified in Table 7.3B.2.3.3.5-1. For these test points the reference sensitivity levels specified in clause 7.3.1 in [TS 36.101] and 7.3.2.1 of [TS 38.101-1] for the corresponding channel bandwidths or in clause 7.3.1 of TS 36.101 are relaxed by the amount of the parameter MSD given in Table 7.3B.2.3.3.5-1.

The throughput on each of the CGs shall be ≥ 95% of the maximum throughput of the respective reference measurement channels as specified in TS 38.521-1 Annex A3.2 for NR and TS 36.521-1 for EUTRA band with parameters specified in Table 7.3B.2.3.3.5-1 with dual UL transmissions overlapping in time unless otherwise stated.

For EN-DC configurations in Table 7.3B.2.3.3.5-1 with UL/DL channel assignments such that Single UL is allowed, the MSD requirement is verified with non-simultaneous uplink transmissions on the two CGs for UEs only indicating support of Single UL.

7.3B.2.3.3.5.1 Reference sensitivity exceptions for intermodulation interference due to dual uplink operation for EN-DC in NR FR1 involving two bands

Table 7.3B.2.3.3.5.1-1: Reference sensitivity exceptions due to dual uplink operation for EN-DC in NR FR1 (two bands)

NR or E-UTRA Band / Channel bandwidth / N_{RB} / MSD									
EN-DC Configuration	**EUTRA or NR band**	**UL F_c (MHz)**	**UL/DL BW (MHz)**	**UL L_{CRB}**	**DL F_c (MHz)**	**MSD (dB)**	**Duplex mode**	**IMD order**	**Single UL allowed**
DC_1A_n77A	1	1950	5	25	2140	29.8	FDD	IMD2[3]	
						32.5[4]			
	n77	4090	10	25	4090	N/A	TDD	N/A	
DC_1A_n77A	1	1950	5	25	2140	8.0	FDD	IMD4[3]	
						10.7[4]			
	n77	3710	10	25	3710	N/A	TDD	N/A	
DC_1A_n78A, DC_1A_SUL_n78A-n84A	1	1950	5	25	2140	8.0	FDD	IMD4[3]	
						10.7[4]			
	n78	3710	10	25	3710	N/A	TDD		
DC_2A_n66A	2	1855	5	25	1935	20	FDD	IMD3	
	n66	1775	5	25	2175	N/A	TDD	N/A	
DC_2A_n66A	2	1883.3	5	25	1963.3	N/A	FDD	N/A	
	n66	1750	5	25	2150	4	TDD	IMD5	
DC_2A_n78A	2	1855	5	25	1940	26	FDD	IMD2[3]	
						28.7[4]			
	n78	3795	10	25	3795	N/A	TDD	N/A	
DC_2A_n78A	2	1885	5	25	1955	8.0	FDD	IMD4[3]	
						10.7[4]			
	n78	3700	10	25	3700	N/A	TDD	N/A	
DC_3A_n7A	3	1730	5	25	1825	N/A	FDD	N/A	
	n7	2535	10	52	2655	10.2[5]	FDD	IMD4	
DC_3A_n77A DC_3A_n78A	3	1740	5	25	1835	26	FDD	IMD2[3]	
						28.7[4]			
	n77, n78	3575	10	25	3575	N/A	TDD	N/A	
DC_3A_n77A DC_3A_n78A	3	1765	5	25	1860	8.0	FDD	IMD4[3]	
						10.7[4]			
	n77, n78	3435	10	25	3435	N/A	TDD	N/A	
DC_3A_n78A	3	1712.5	5	25	1807.5	TBD[5]	FDD	IMD2	Yes
	n78	3515	10	50	3515	N/A	TDD	N/A	
	3	1762.5	5	25	1857.5	N/A	FDD	N/A	No
	n78	3465	10	50	3465	N/A	TDD	N/A	
DC_3A-SUL_n78A-n80A, DC_66A-SUL_n78A-n86A	3, 66	1740	5	25	1835	26	FDD	IMD2[3]	Yes
						28.7[4]			Yes
	n78	3575	10	25	3575	N/A	TDD	N/A	Yes
DC_3A_SUL_n78A-n80A, DC_66A-SUL_n78A-n86A	3, 66	1765	5	25	1860	8.0	FDD	IMD4[3]	No
						10.7[4]			No
	n78	3435	10	25	3435	N/A	TDD	N/A	No
DC_3C_n78A	3	1740	5	25	1835	26	FDD	IMD2[4]	
						28.7[5]			
	n78	3575	10	25	3575	N/A	TDD	N/A	
	n78	3710	10	25	3710	N/A	TDD	N/A	
DC_3C_n78A	3	1765	5	25	1860	8.0	FDD	IMD4[4]	
						10.7[5]			
	n78	3435	10	25	3435	N/A	TDD	N/A	
DC_5A_n66A	5	838	5	25	883	30	FDD	IMD2[3]	
	n66	1721	5	25	2121	N/A		N/A	
DC_5A_n78A	5	844	5	25	889	8.3	FDD	IMD4	
	n78	3421	10	52	3421	N/A	TDD	N/A	
DC_8A_n77A DC_8A_n78A DC_8A-SUL_n78A-n81A	8	897.5	5	25	942.5	8.3	FDD	IMD4	
	n77, n78	3635	10	52	3635	N/A	TDD	H4	
DC_8A_n79A DC_8A-SUL_n79A-n81A	8	897.5	5	25	942.5	4.8	FDD	IMD5	
	n79	4532.5	40	216	4532.5	N/A	TDD	N/A	
DC_20A_n8A	20	849.5	5	25	808.5	21	FDD	IMD3	Yes

	n8	892.5	5	25	937.5	21	FDD	IMD3	
DC_20A_n77A	20	850	5	25	810	11	FDD	IMD4	
	n77	3360	10	50	3360	N/A	TDD	N/A	
	20	840	5	25	800	6.5	FDD	IMD5	
	n77	4160	10	50	4150	N/A	TDD	N/A	
DC_20A_n78A, DC_20A-SUL_n78A-n82A	20	850	5	25	810	21.7	FDD	IMD4[4]	
	n78	3360	10	50	3360	N/A	TDD	N/A	
DC_21A_n79A	21	1457.5	5	25	1505.5	18.4	FDD	IMD3	
	n79	4420.5	40	216	4420.5	N/A	TDD	N/A	
DC_26A_n41A	26	839	5	25	884	15.6	FDD	IMD3	
	n41	2562	10	52	2562	N/A	TDD	N/A	
DC_28A_n51A	28	725.5	20	25	765.5	5	FDD	IMD 4, 5	Yes
	n51	1429.5	5	25	1429.5	5	TDD	IMD 4, 5	
DC_26A_n77A DC_26A_n78A	26	836.5	5	25	881.5	11.1	FDD	IMD4	
	n77, n78	3390	10	50	3390	N/A	TDD	N/A	
CA_28A_n77A, CA_28A_n78A, DC_28A-SUL_n78A-n83A	28	705.5	5	25	760.5	5.5	FDD	IMD5	
	n77, n78	3582.5	10	25	3582.5	N/A	TDD	N/A	
DC_66A_n5A	n5	838	5	25	883	30	FDD	IMD2[3]	
	66	1721	5	25	2121	N/A		N/A	
DC_66A_n71A	66	1750	5	25	2150	5	FDD	IMD4	
	n71	675	5	25	629	N/A		N/A	
DC_66A_n78A	66	1740	5	25	1835	26	FDD	IMD2[3]	
						28.7[4]			
	n78	3575	10	25	3575	N/A	TDD	N/A	
	66	1765	5	25	1860	8.0	FDD	IMD4[3]	
						10.7[4]			
	n78	3435	10	25	3435	N/A	TDD	N/A	

NOTE 1: Both of the transmitters shall be set min(+20 dBm, $P_{CMAX\_L,c}$) as defined in subclause 6.2.5A. In case Single UL is allowed and the UE only indicates support of "Single UL" the output power of the active UL shall be set at $P_{CMAX\_L,c}$ or set to the maximum output power according to the UE power scaling capability.
NOTE 2: RB_{START} = 0
NOTE 3: This band is subject to IMD5 also which MSD is not specified.
NOTE 4: Applicable only if operation with 4 antenna ports is supported in the band with carrier aggregation configured.
NOTE 5: For UEs only indicating support of Single UL, this requirement is verified with non-simultaneous uplink transmissions on the E-UTRA and NR CGs

7.3B.2.3.3.5.2 Reference sensitivity exceptions for intermodulation interference due to dual uplink operation for EN-DC in NR FR1 involving three bands

Table 7.3B.2.3.3.5.2-1: Reference sensitivity exceptions for intermodulation interference due to dual uplink operation for EN-DC in NR FR1 (three bands)

NR or E-UTRA Band / Channel bandwidth / N_{RB} / MSD									
EN-DC Configuration	**EUTRA/NR band**	**UL F_c (MHz)**	**UL/DL BW (MHz)**	**UL L_{CRB}**	**DL F_c (MHz)**	**MSD (dB)**	**Duplex mode**	**IMD order**	**Single UL allowed**
DC_1A-3A_n28A	1	1975	5	25	2165	N/A	FDD	N/A	
	n28	710.5	5	25	765.5	N/A	FDD	N/A	
	3	1723.5	5	25	1818.5	4.0	FDD	IMD5	
DC_1A-3A_n28A	3	1780	5	25	1875	N/A	FDD	N/A	
	n28	710.5	5	25	765.5	N/A	FDD	N/A	
	1	1949	5	25	2139	11.0	FDD	IMD4	
DC_1A-7A_n28A	1	1935	5	25	2125	N/A	FDD	N/A	
	n28	718	5	25	773	N/A	FDD	N/A	
	7	2533	10	52	2653	30.0	FDD	IMD2	
DC_1A-3A_n77A	1	1950	5	25	2140	N/A	FDD	N/A	
	3	1712.5	5	25	1807.5	31.5		IMD2	
	n77	3757.5	10	52	3757.5	N/A	TDD	N/A	
	1	1950	5	25	2140	N/A	FDD	N/A	
	3	1775	5	25	1870	8.5		IMD4	
	n77	3980	10	52	3980	N/A	TDD	N/A	
	1	1950	5	25	2140	31.0	FDD	IMD2	
	3	1775	5	25	1870	N/A		N/A	
	n77	3915	10	52	3915	N/A	TDD	N/A	
DC_1A-3A_n78A DC_1A-3C_n78A	1	1930	5	25	2120	8.3	FDD	IMD4 $\lvert f_{B78}-3*f_{B1}\rvert$	
	3	1775	5	25	1870	N/A		N/A	
	n78	3670	10	52	3670	N/A	TDD	N/A	
	1	1950	5	25	2140	N/A	FDD	N/A	
	3	1712.5	5	25	1807.5	31.2		IMD2 $\lvert f_{B78}-f_{B1}\rvert$	
	n78	3757.5	10	52	3757.5	N/A	TDD	N/A	
	1	1935	5	25	2125	2.8	FDD	IMD5 $\lvert 2*f_{B78}-3*f_{B3}\rvert$	
	3	1775	5	25	1870	N/A		N/A	
	n78	3725	10	52	3725	N/A	TDD	N/A	
DC_1A-5A_n78A	1	1930	5	25	2120	8.3	FDD	IMD4 $\lvert f_{B78}-3*f_{B1}\rvert$	
	5	844	5	25	889	N/A	FDD	N/A	
	n78	3670	10	52	3670	N/A	TDD	N/A	
	1	1950	5	25	2140	N/A	FDD	N/A	
	5	844	5	25	889	8.3	FDD	IMD4 $\lvert f_{B78}-3*f_{B5}\rvert$	
	n78	3421	10	52	3421	N/A	TDD	N/A	
	1	1932	5	25	2122	18.1	FDD	IMD3 $\lvert f_{B78}-2*f_{B5}\rvert$	
	5	829	5	25	874	N/A	FDD	N/A	
	n78	3780	10	52	3780	N/A	TDD	N/A	
	1	1975	5	25	2165	N/A	FDD	N/A	
	5	840	5	25	885	3.1	FDD	IMD5 $\lvert 2*f_{B78}-3*f_{B1}\rvert$	
	n78	3405	10	52	3405	N/A	TDD	N/A	
DC_1A-7A_n78A	1	1930	5	25	2120	8.3	FDD	IMD4 $\lvert f_{B78}-3*f_{B1}\rvert$	
	7	2550	5	25	2670	N/A	FDD	N/A	
	n78	3670	10	52	3670	N/A	TDD	N/A	
	1	1977.5	5	25	2167.5	N/A	FDD	N/A	

NR or E-UTRA Band / Channel bandwidth / N_{RB} / MSD									
EN-DC Configuration	**EUTRA/NR band**	**UL F_c (MHz)**	**UL/DL BW (MHz)**	**UL L_{CRB}**	**DL F_c (MHz)**	**MSD (dB)**	**Duplex mode**	**IMD order**	**Single UL allowed**
	7	2507.5	5	25	2627.5	9.1	FDD	IMD4 $\|f_{B78}-3*f_{B1}\|$	
	n78	3305	10	52	3305	N/A	TDD	N/A	
	1	1950	5	25	2140	8.7	FDD	IMD4 $\|2*f_{B78}-2*f_{B7}\|$	
	7	2510	10	50	2630	N/A	FDD	N/A	
	n78	3310	10	52	3310	N/A	TDD	N/A	
DC_1A-3A_n79A	1	1950	5	25	2140	3.6	FDD	IMD5	
	3	1750	5	25	1845	N/A		N/A	
	n79	4860	40	216	4860	N/A	TDD	N/A	
DC_1A-18A_n77A	1	1930	5	25	2120	16.4	FDD	IMD3	
	18	825	5	25	870	N/A		N/A	
	n77	3770	10	52	3770	N/A	TDD	N/A	
DC_1A-18A_n78A	1	1930	5	25	2120	16.4	FDD	IMD3	
	18	819	5	25	864	N/A		N/A	
	n78	3758	10	52	3758	N/A	TDD	N/A	
DC_1A-18A_n79A	1	1935	5	25	2125	N/A	FDD	N/A	
	18	822.5	5	25	867.5	18.3	FDD	IMD3	
	n79	4782.5	40	216	4782.5	N/A	TDD	N/A	
	1	1930	5	25	2120	N/A	FDD	N/A	
	18	820	5	25	865	8.9	FDD	IMD4	
	n79	4925	40	216	4925	N/A	TDD	N/A	
	1	1935	5	25	2125	8.1	FDD	IMD4	
	18	822.5	5	25	867.5	N/A	FDD	N/A	
	n79	4782.5	40	216	4782.5	N/A	TDD	N/A	
DC_1A-19A_n77A	1	1940	5	25	2130	17.8	FDD	IMD3	
	19	832.5	5	25	877.5	N/A		N/A	
DC_1A-19A_n78A	n77, n78	3795	10	52	3795	N/A	TDD	N/A	
DC_1A-19A_n79A	1	1950	5	25	2140	N/A	FDD	N/A	
	19	837.5	5	25	882.5	18.3		IMD3	
	n79	4782.5	40	216	4782.5	N/A	TDD	N/A	
	1	1950	5	25	2140	8.1	FDD	IMD4	
	19	837.5	5	25	882.5	N/A		N/A	
	n79	4652.5	40	216	4652.5	N/A	TDD	N/A	
DC_1A-20A_n78A	1	1930	5	25	2120	20.3	FDD	IMD3	
	20	835	5	25	794	N/A	FDD	N/A	
	n78	3790	10	52	3790	N/A	TDD	N/A	
DC_1A-20A_n78A	1	1950	5	25	2140	N/A	FDD	N/A	
	20	851	5	25	810	3.0	FDD	IMD5	
	n78	3330	10	52	3330	N/A	TDD	N/A	
DC_1A-21A_n77A	1	1964.6	5	25	2154.6	30.6	FDD	IMD2	
	21	1450.4	5	25	1498.4	N/A		N/A	
	n77, n78	3605	10	52	3605	N/A	TDD	N/A	
DC_1A-21A_n78A	1	1950	5	25	2140	N/A	FDD	N/A	
	21	1452	5	25	1500	2.9		IMD5	
	n77, n78	3675	10	52	3675	N/A	TDD	N/A	
DC_2A-66A-(n)71B	66	1750	5	25	2150	5.0	FDD	IMD4	
	n71	675	5	25	629	N/A		N/A	
DC_1A-28A_n77A	1	1960	5	25	2150	15.8	FDD	IMD3	
	28	740	5	25	795	N/A		N/A	
	n77	3630	10	52	3630	N/A	TDD	N/A	
DC_1A-28A_n77A	1	1960	5	25	2150	N/A	FDD	N/A	
	28	725	5	25	780	4.3		IMD5	
	n77	3330	10	52	3330	N/A	TDD	N/A	
DC_1A-28A_n78A	1	1960	5	25	2150	15.7	FDD	IMD3	
	28	740	5	25	795	N/A		N/A	
	n78	3630	10	52	3630	N/A	TDD	N/A	
	1	1970	5	25	2160	N/A	FDD	N/A	

NR or E-UTRA Band / Channel bandwidth / N_{RB} / MSD									
EN-DC Configuration	**EUTRA/NR band**	**UL F_c (MHz)**	**UL/DL BW (MHz)**	**UL L_{CRB}**	**DL F_c (MHz)**	**MSD (dB)**	**Duplex mode**	**IMD order**	**Single UL allowed**
DC_1A-28A_n78A	28	739	5	25	794	4.2		IMD5	
	n78	3352	10	52	3352	N/A	TDD	N/A	
DC_1A_n28A-n78A	1	1950	5	25	2140	N/A	FDD	N/A	
	n28	733	5	25	788	N/A		N/A	
	n78	3416	10	52	3416	15.7	TDD	IMD3	
	1	1950	5	25	2140	N/A	FDD	N/A	
	n78	3320	10	52	3320	N/A	TDD	N/A	
	n28	735	5	25	790	3.3	FDD	IMD5	
DC_1A-28A_n79A	1	1930	5	25	2120	N/A	FDD	N/A	
	28	733	5	25	788	15.2	FDD	IMD3	
	n79	4648	40	216	4648	N/A	TDD	N/A	
	1	1925	5	25	2115	N/A	FDD	N/A	
	28	740	5	25	795	10.0	FDD	IMD4	
	n79	4980	40	216	4980	N/A	TDD	N/A	
	1	1977.5	5	25	2167.5	1.2	FDD	IMD4	
	28	745.5	5	25	800.5	N/A	FDD	N/A	
	n79	4420	40	216	4420	N/A	TDD	N/A	
	1	1935	5	25	2125	4.5	FDD	IMD5	
	28	718	5	25	773	N/A	FDD	N/A	
	n79	4807	40	216	4807	N/A	TDD	N/A	
DC_1A-41A_n77A	1	1970	5	25	2160	N/A	FDD	N/A	
	n77	3400	10	52	3400		TDD		
	41	2510	5	25	2510	11.0	TDD	IMD4	
	1	1930	5	25	2120	N/A	FDD	N/A	
	n77	4150	10	52	4150		TDD		
	41	2510	5	25	2510	3.6	TDD	IMD5	
DC_1A-41A_n78A	1	1975	5	25	2165	N/A	FDD	N/A	
	41		5	25	2515	12	TDD	IMD4	
	n78	3410	10	52	3410	N/A	TDD	N/A	
DC_1A-41A_n79A	1	1970	5	25	2160	N/A	FDD	N/A	
	n79	4500	40	216	4500		TDD		
	41	2530	5	25	2530	29.4	TDD	IMD2	
	1	1922.5	5	25	2112.5	N/A	FDD	N/A	
	n79	4980	40	216	4980		TDD		
	41	2687.5	5	25	2687.5	0.0	TDD	IMD5	
DC_1A-42A_n79A	1	1977.5	5	25	2167.5	N/A	FDD	N/A	
	n79	4420	40	216	4420		TDD		
	42	3490	5	25	3490	4.8	TDD	IMD5	
	42	3402.5	5	25	3402.5	N/A	TDD	N/A	
	n79	4640	40	216	4640		TDD		
	1	1975	5	25	2165	15.5	FDD	IMD3	
	42	3450	5	25	3450	N/A	TDD	N/A	
	n79	4520	40	216	4520		TDD		
	1	1950	5	25	2140	9.3	FDD	IMD4	
DC_1A_n78A-n79A	1	1950	5	25	2140	N/A	FDD	N/A	
	n78	3410	10	52	3410	N/A	TDD	N/A	
	n79	4870	40	216	4870	15.9	TDD	IMD3	
	1	1950	5	25	2140	N/A	FDD	N/A	
	n79	4670	40	216	4670	N/A	TDD	N/A	
	n78	3490	10	52	3490	4.6	TDD	IMD5	
DC_2A-66A_n71A	66	1750	5	25	2150	5.0	FDD	IMD4	
	n71	675	5	25	629	N/A		N/A	
DC_3A-5A_n78A	3	1730	5	25	1825	N/A	FDD	N/A	
	5	844	5	25	889	8.3	FDD	IMD4 $\lvert f_{B78}-3*f_{B5}\rvert^4$	
	n78	3421	10	52	3421	N/A	TDD	N/A	
	3	1740	5	25	1835	26.0	FDD	IMD2 $\lvert f_{B78}-f_{B3}\rvert$	

NR or E-UTRA Band / Channel bandwidth / N_{RB} / MSD									
EN-DC Configuration	**EUTRA/NR band**	**UL F_c (MHz)**	**UL/DL BW (MHz)**	**UL L_{CRB}**	**DL F_c (MHz)**	**MSD (dB)**	**Duplex mode**	**IMD order**	**Single UL allowed**
						28.7 [5]			
	5	840	5	25	885	N/A	FDD	N/A	
	n78	3575	10	25	3575	N/A	TDD	N/A	
	n78	3710	10	25	3710	N/A	TDD	N/A	
	3	1770	5	25	1865	8.0	FDD	IMD4 $\lvert f_{B78}-3*f_{B3}\rvert$ [4]	
						10.7 [5]			
DC_3A-7A_n28A	3	1712.5	5	25	1807.5	N/A	FDD	N/A	
	n28	743	5	25	798	N/A	FDD	N/A	
	7	2562	10	52	2682	16.9	FDD	IMD3	
	7	2543	10	52	2663	N/A	FDD	N/A	
	n28	710.5	5	25	765.5	N/A	FDD	N/A	
	3	1737.5	5	25	1832.5	26.0	FDD	IMD2	
DC_3C-7C_n78A	3	1725	5	25	1820	17.6	FDD	IMD3 $\lvert f_{B78}-2*f_{B7}\rvert$	
	7	2565	5	25	2685	N/A	FDD	N/A	
	n78	3310	10	52	3310	N/A	TDD	N/A	
	3	1725	5	25	1820	8.6	FDD	IMD4 $\lvert 2*f_{B78}-2*f_{B7}\rvert$	
	7	2565	5	25	2685	N/A	FDD	N/A	
	n78	3475	10	52	3475	N/A	TDD	N/A	
DC_3A-20A_n28A	20	852	5	25	811	N/A	FDD	N/A	
	n28	738	5	25	793	N/A	FDD	N/A	
	3	1723	5	25	1818	9.4	FDD	IMD4	
DC_3A-28A_n77A	3	1712.5	5	25	1807.5	N/A	FDD	N/A	
	28	715	5	25	770	15.3	FDD	IMD3	
	n77	4195	10	52	4195	N/A	TDD	N/A	
	3	1755	5	25	1850	17.0	FDD	IMD3	
	28	735	5	25	790	N/A	FDD	N/A	
	n77	3320	10	52	3320	N/A	TDD	N/A	
DC_3A-28A_n78A	3	1750	5	25	1850	26.0	FDD	IMD2	
	28	760	5	25	760	N/A		N/A	
	n78	3600	10	25	3600	N/A	TDD	N/A	
	3	1775	5	25	1870	17.3	FDD	IMD3	
	28	740	5	25	760	N/A		N/A	
	n78	3350	10	25	3350	N/A	TDD	N/A	
	3	1775	5	25	1845	8.0	FDD	IMD4	
	28	740	5	25	760	N/A		N/A	
	n78	3480	10	25	3480	N/A	TDD	N/A	
	3	1775	5	25	1875	8.0	FDD	IMD5	
	28	740	5	25	760.5	N/A		N/A	
	n78	3600	10	25	3600	N/A	TDD	N/A	
	3	1775	5	25	1870	N/A	FDD	N/A	
	28	705	5	25	780	8.3		IMD5	
	n78	3600	10	25	3600	N/A	TDD	N/A	
DC_3A-28A_n79A	3	1770	5	25	1865	N/A	FDD	N/A	
	28	725	5	25	780	10.3	FDD	IMD4	
	n79	4530	40	216	4530	N/A	TDD	N/A	
	3	1775	5	25	1870	5.7	FDD	IMD5	
	28	725	5	25	780	N/A	FDD	N/A	
	n79	4770	40	216	4770	N/A	TDD	N/A	
DC_3A_n28A-n78A	3	1750	5	25	1845	N/A	FDD	N/A	
	n28	743	5	25	798	N/A		N/A	
	n78	3764	10	52	3764	4.5	TDD	IMD5	
DC_3A_n78A-n79A	3	1770	5	25	1865	N/A	FDD	N/A	
	n78	3340	10	52	3340	N/A	TDD	N/A	

NR or E-UTRA Band / Channel bandwidth / N_{RB} / MSD									
EN-DC Configuration	**EUTRA/NR band**	**UL F_c (MHz)**	**UL/DL BW (MHz)**	**UL L_{CRB}**	**DL F_c (MHz)**	**MSD (dB)**	**Duplex mode**	**IMD order**	**Single UL allowed**
	n79	4910	40	216	4910	16.3	TDD	IMD3	
	3	1770	5	25	1865	N/A	FDD	N/A	
	n79	4510	40	216	4510	N/A	TDD	N/A	
	n78	3710	10	52	3710	4.2	TDD	IMD5	
DC_3A-7A_n78A DC_3C-7A_n78A	3	1725	5	25	1820	17.6	FDD	IMD3 $\lvert f_{B78}-2*f_{B7}\rvert$	
	7	2565	5	25	2685	N/A	FDD	N/A	
	n78	3310	10	52	3310	N/A	TDD	N/A	
DC_3A-7A_n78A DC_3C-7A_n78A	3	1725	5	25	1820	8.6	FDD	IMD4 $\lvert 2*f_{B78}-2*f_{B7}\rvert$	
	7	2565	5	25	2685	N/A	FDD	N/A	
	n78	3475	10	52	3475	N/A	TDD	N/A	
DC_3A-19A_n79A	5	840	5	25	885	N/A	FDD	N/A	
	n78	3445	10	52	3445	N/A	TDD	N/A	
	n79	4435	40	216	4435	N/A	TDD	N/A	
	3	1782.5	5	25	1877.5	0.2	FDD	IMD4	
	19	842.5	5	25	887.5	N/A		N/A	
	n79	4420	40	216	4420	N/A	TDD	N/A	
DC_3A-20A_n78A DC_3C-20A_n78A	3	1725	5	25	1820	17.3	FDD	IMD3 $\lvert f_{B78}-2*f_{B20}\rvert$	
	20	845	5	25	804	N/A	FDD	N/A	
	n78	3510	10	52	3510	N/A	TDD	N/A	
DC_3A-21A_n77A DC_3A-21A_n78A	3	1767.5	5	25	1862.5	N/A	FDD	N/A	
	21	1459.5	5	25	1507.5	8.8		IMD4	
	n77, n78	3795	10	52	3795	N/A	TDD	N/A	
DC_3A-21A_n77A	3	1771.6	5	25	1866.6	3.4	FDD	IMD5	
	21	1450.4	5	25	1498.4	N/A		N/A	
	n77	3935	10	52	3935	N/A	TDD	N/A	
DC_3A-21A_n79A	3	1774.2	5	25	1869.2	17.8	FDD	IMD3	
	21	1450.4	5	25	1498.4	N/A		N/A	
	n79	4770	40	216	4770	N/A	TDD	N/A	
DC_5A-7A_n78A	5	844	5	25	889	8.3	FDD	IMD4 $\lvert f_{B78}-3*f_{B5}\rvert$	
	7	2550	5	25	2670	N/A	FDD	N/A	
	n78	3421	10	52	3421	N/A	TDD	N/A	
	5	844	5	25	889	N/A	FDD	N/A	
	7	2525	5	25	2645	30.1	FDD	N/A	
	n78	3489	10	52	3489	N/A	TDD	N/A	
	5	834	5	25	879	30.2	FDD	IMD2 $\lvert f_{B78}-f_{B7}\rvert$	
	7	2550	5	25	2670	N/A	FDD	N/A	
	n78	3429	10	52	3429	N/A	TDD	N/A	
	5	830	5	25	875	3.3	FDD	IMD5 $\lvert 2*f_{B78}-3f_{B7}\rvert$	
	7	2525	5	25	2645	N/A	FDD	N/A	
	n78	3350	10	52	3350	N/A	TDD	N/A	
DC_5A_41A_n78A	5	860	5	25	885	30.2	FDD	IMD2	
	41	2615	5	25	2615	N/A	TDD	N/A	
	n78	3500	10	52	3500	N/A	TDD	N/A	
	5	856.5	5	25	881.5	3.1	FDD	IMD5	
	41	2620.5	5	25	2620.5	N/A	TDD	N/A	
	n78	3490	10	52	3490	N/A	TDD	N/A	
DC_7A-20A_n28A	20	852	5	25	811	N/A	FDD	N/A	
	n28	738	5	25	793	N/A	FDD	N/A	

NR or E-UTRA Band / Channel bandwidth / N_{RB} / MSD									
EN-DC Configuration	**EUTRA/NR band**	**UL F_c (MHz)**	**UL/DL BW (MHz)**	**UL L_{CRB}**	**DL F_c (MHz)**	**MSD (dB)**	**Duplex mode**	**IMD order**	**Single UL allowed**
	7	2550	10	52	2670	5.9	FDD	IMD5	
DC_7A-20A_n78A	7	2560	5	25	2680	N/A	FDD	N/A	
	20	851	5	25	810	30.5	FDD	IMD2 $\lvert f_{B78}-f_{B7}\rvert$	
	n78	3370	10	52	3370	N/A	TDD	N/A	
DC_7A-20A_n78A	7	2560	5	25	2680	N/A	FDD	N/A	
	20	851	5	25	810	3.0	FDD	IMD5 $\lvert 2*f_{B78}-3*f_{B7}\rvert$	
	n78	3435	10	52	3435	N/A	TDD	N/A	
DC_7A-20A_n78A	7	2555	5	25	2675	30.8	FDD	IMD2 $\lvert f_{B78}-f_{B20}\rvert$	
	20	845	5	25	804	N/A	FDD	N/A	
	n78	3520	10	52	3520	N/A	TDD	N/A	
DC_7A-28A_n78A	7	2570	5	25	2670	N/A	FDD	N/A	
	28	720	5	25	780	8.3		IMD2	
	n78	3350	10	52	3421	N/A	TDD	N/A	
	7	2570	5	25	2670	N/A	FDD	N/A	
	28	720	5	25	790	3.0		IMD5	
	n78	3460	10	52	3421	N/A	TDD	N/A	
	7	2570	5	25	2650	30.5	FDD	IMD2	
	28	740	5	25	768	N/A		N/A	
	n78	3390	10	52	3421	N/A	TDD	N/A	
DC_7A_n28A-n78A	7	2565	5	25	2685	N/A	FDD	N/A	
	n28	745	5	25	800	N/A		N/A	
	n78	3310	10	52	3310	29.7	TDD	IMD2	
	7	2565	5	25	2685	N/A	FDD	N/A	
	n78	3365	10	52	3365	N/A	TDD	N/A	
	n28	745	5	25	800	28.8	FDD	IMD2	
DC_7A-46A_n78A[6]	7	N/A	N/A	N/A	N/A	N/A	FDD	N/A	
	46	N/A	N/A	N/A	N/A	N/A	TDD	IMD2, IMD5	
	n78	N/A	N/A	N/A	N/A	N/A	TDD	N/A	
DC_18A-28A_n77A	18	820	5	25	865	N/A	FDD	N/A	
	28	723	5	25	778	4.4		IMD5	
	n77	4058	10	52	4058	N/A	TDD	N/A	
DC_18A-28A_n77A	18	820	5	25	865	3.9	FDD	IMD5	
	28	723	5	25	778	N/A		N/A	
	n77	3757	10	52	3757	N/A	TDD	N/A	
DC_18A-28A_n78A	18	819	5	25	864	3.8	FDD	IMD5	
	28	723	5	25	778	N/A		N/A	
	n78	3756	10	52	3756	N/A	TDD	N/A	
DC_19A-21A_n77A	19	837.5	5	25	882.5	18.7	FDD	IMD3	
	21	1450.4	5	25	1498.4	N/A		N/A	
DC_19A-21A_n78A	n77, n78	3783.3	10	52	3783.3	N/A	TDD	N/A	
DC_19A-21A_n77A	19	837.5	5	25	882.5	N/A	FDD	N/A	
	21	1454.5	5	25	1502.5	9.0		IMD4	
	n77	4015	10	52	4015	N/A	TDD	N/A	
DC_19A-21A_n79A	19	837.5	5	25	882.2	N/A	FDD	N/A	
	21	1452	5	25	1500	3.8		IMD5	
	n79	4850	40	216	4850	N/A	TDD	N/A	
DC_21A-28A_n77A	21	1452	5	25	1500	N/A	FDD	N/A	
	28	730.5	5	25	785.5	16.9	FDD	IMD3	
	n77	3689.5	10	52	3689.5	N/A	TDD	N/A	
	21	1450.5	5	25	1498.5	9.9	FDD	IMD4	
	28	730.5	5	25	785.5	N/A	FDD	N/A	
	n77	3690	10	52	3690	N/A	TDD	N/A	
	21	1450	5	25	1498	5.2	FDD	IMD5	

NR or E-UTRA Band / Channel bandwidth / N_{RB} / MSD									
EN-DC Configuration	**EUTRA/NR band**	**UL F_c (MHz)**	**UL/DL BW (MHz)**	**UL L_{CRB}**	**DL F_c (MHz)**	**MSD (dB)**	**Duplex mode**	**IMD order**	**Single UL allowed**
DC_28A-42A_n79A	28	730.5	5	25	785.5	N/A	TDD	N/A	
	n79	4420	40	216	4420	N/A	TDD	N/A	
DC_66A_(n)71B	66	1750	5	25	2150	5	FDD	IMD4	
	n71	678	10	10 (RB_{start} =0)	632	N/A		N/A	
DC_19A_n78A-n79A	19	835	5	25	880	N/A	FDD	N/A	
	n78	3680	10	52	3680	N/A	TDD	N/A	
	n79	4515	40	216	4515	29.3	TDD	IMD2	
	19	835	5	25	880	N/A	FDD	N/A	
	n79	4550	40	216	4550	N/A	TDD	N/A	
	n78	3715	10	52	3715	28.8	TDD	IMD2	
DC_20A_n28A-n78A	20	857	5	25	816	N/A	FDD	N/A	
	n28	743	5	25	798	N/A	FDD	N/A	
	n78	3314	10	52	3314	8.7	TDD	IMD4	
	20	837	5	25	796	N/A	FDD	N/A	
	n78	3310	10	52	3310	N/A	TDD	N/A	
	n28	744	5	25	799	9.4	FDD	IMD4	
DC_21A_n78A-n79A	21	1453	5	25	1501	N/A	FDD	N/A	
	n78	3420	10	52	3420	N/A	TDD	N/A	
	n79	4873	40	216	4873	30.1	TDD	IMD2	
	21	1453	5	25	1501	N/A	FDD	N/A	
	n79	4940	40	216	4940	N/A	TDD	N/A	
	n78	3487	10	52	3487	29.8	TDD	IMD2	

NOTE 1: Both of the transmitters shall be set min (+20 dBm, $P_{CMAX\_L,c}$) as defined in subclause 6.2.5A. In case Single UL is allowed and the UE only indicates support of "Single UL" the output power of the active UL shall be set at $P_{CMAX\_L,c}$ or set to the maximum output power according to the UE power scaling capability.
NOTE 2: RB_{START} = 0
NOTE 3: For UEs only indicating support of Single UL, this requirement is verified with non-simultaneous uplink transmissions on the E-UTRA and NR CGs.
NOTE 4: This band is subject to IMD5 also which MSD is not specified.
NOTE 5: Applicable only if operation with 4 antenna ports is supported in the band with carrier aggregation configured.
NOTE 6: No requirements apply when there is at least one individual RE within the intermodulation generated by the dual uplink is within the downlink transmission bandwidth of the Band 46. The reference sensitivity should only be verified when this is not the case (the requirements for Band 46 specified in the CA_7A-46A in clause 7.3.1 of 36.101 apply).

7.3B.2.3.3.5.3 MSD exceptions due to Tx leakage issue

Table 7.3B.2.3.3.5.3-1: MSD exceptions due to Tx leakage issue (three bands)

MSD due to Tx leakage issue exception for the DL band							
EUTRA and NR DC Configuration	**E-UTRA and NR band**	**UL Fc (MHz)**	**UL/DL BW (MHz)**	**UL C_{LRB}**	**DL F_C (MHz)**	**MSD (dB)**	**Duplex mode**
DC_2A-66A-(n)71B	71	665.5	5	5 (RB_{end} =24)	619.5	0	FDD
	n71	675.5	15	15 (RB_{start} = 0)	629.5	1.8	
	71	670.5	15	15 (RB_{end} = 74)	624.5	0	
	n71	680.5	5	5 (RB_{start} = 0)	634.5	1.6	
	71	668	10	10 (RB_{end} = 49)	622	0	
	n71	678	10	10 (RB_{start} = 0)	632	1.7	
	71	668	10	10 (RB_{start} = 0)	622	17.2	
	n71	678	10	10 (RB_{end} = 51)	632	29.4	

The normative reference for this requirement is TS 38.101-3 [4] subclause 7.3B.2.3.

7.3B.2.3.4 Test description

7.3B.2.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations for NR consist of environmental conditions test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.3.5-1 of TS 38.521-1[8]. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 7.3.2.4.1-1, Table 7.3.2.4.1-2, and Table 7.3.2.4.1-3 of TS 38.521-1[8]. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A2.2 of TS 38.521-1[8]. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2 of TS 38.521-1[8].

The initial test configurations for E-UTRA band consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in Table 5.4.2.1-1 of TS 36.521-1[10]. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 7.3B.2.3.4.1-1. The details of the downlink and uplink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 of TS36.521-1[10]. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2 of TS36.521-1[10].

Table 7.3B.2.3.4.1-1: E-UTRA Test Configuration Table

Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1	NC, TL/VL, TL/VH, TH/VL, TH/VH					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	Mid range					
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	5MHz					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
5MHz	QPSK	25	N/A	QPSK	25	25
5MHz	QPSK	25	N/A	QPSK	5[3]	N/A
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.						
Note 2: For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.						
Note 3: Applicable only to E-UTRA FDD Bands 31 and 72. The UL resource blocks shall be located at RBstart 10 (according to Table 7.3.3-2).						

Table 7.3B.2.3.4.1-2: NR Uplink configuration for reference sensitivity exceptions due to UL harmonic interference for EN-DC in NR FR1

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1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2.1 for UE diagram.

2. The parameter settings for NR cell are set up according to TS 38.508-1 [5] subclause 4.4.3. The parameter settings for E-URA cell are set up according to TS 36.508 [11] subclause 4.4.3

3. NR downlink signals are initially set up according to Annex C.0, C.1, C.2, C.3.1, and uplink signals according to Annex G.0, G.1, G.2, and G.3.1 of TS38.521-1 [8].

4. E-UTRA downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0 of TS36.521-1[10].

5. The UL Reference Measurement channels for NR are set according to Table 6.5.3.1.4.1-1 of TS38.521-1[8]. The UL Reference Measurement channels for E-UTRA are set according to Table 7.3B.2.3.4.1-1. The UL Reference Measurement channels configurations for exceptional cases are set according to Table 7.3B.2.3.4.1-2 to Table [TBD].

6. NR propagation conditions are set according to Annex B.0. E-UTRA propagation conditions are set according to Annex B.0 of TS 36.521-1 [10]

7. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG are set according to TS 38.508-1[6] clause 4.5. Message contents are defined in clause 7.3B.2.1.4.3.

7.3B.2.3.4.2 Test procedure

1. NR SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 and DCI format [0_1] for C_RNTI to schedule the UL RMC according to Table 7.3B.2.3.4-1 on both EN-DC component carriers. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. E-UTRA SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to Table 6.6.3.1.4.1-1 of TS36.521-1[TBD]. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

3. Set the Downlink signal level to the appropriate REFSENS value defined in TS 38.521-1 [TBD], Table 7.3.3-1 for NR band and TS 36.521-1[10] Table 7.3.3-1 for E-UTRA band. Send continuously uplink power control "up" commands in the uplink scheduling information to both carriers to ensure the UE transmits PUMAX level for at least the duration of the Throughput measurement.

4. Measure the average throughput of both NR and E-UTRA for a duration sufficient to achieve statistical significance according to Annex H.2 of TS 38.521-1[8] for NR band, and Annex G.2 of TS36.521-1[10] for EUTRA band.

7.3B.2.3.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 for NR band. Message contents are according to TS 36.508 [7] subclause 4.6 for EUTRA band.

7.3B.2.3.5 Test requirement

For inter-band non-contiguous EN-DC configurations, The throughput of each CG shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with reference receive power level specified in Tables 7.3.2.5-1 and parameters specified Tables 7.3.2.4.1-1, Tables 7.3.2.4.1-2 and Tables 7.3.2.4.1-3 in TS 38.521-1 [8] for NR band, and reference measurement channels as specified in Annex A.3.2 of TS 36.521-1 [10] with parameters specified in Tables 7.3.5-1 and Table 7.3.5-2 of TS 36.521-1 [10].

For inter-band EN-DC within FR1, the reference sensitivity exceptions are allowed and are specified for below test scenarios:

7.3B.2.3.5.1 Reference sensitivity test requirement exceptions due to UL harmonic interference for EN-DC in NR FR1

Reference sensitivity exceptions due to UL harmonic interference for EN-DC in NR FR1, are specified in Table 7.3B.2.3.5.1-1 with uplink configuration specified in Table 7.3B.2.3.5.1-2.

Table 7.3B.2.3.5.1-1: Reference sensitivity due to UL harmonic for EN-DC in NR FR1

UL band	DL band	5 MHz (dB)	10 MHz (dB)	15 MHz (dB)	20 MHz (dB)	25 MHz (dB)	30 MHz (dB)	40 MHz (dBm)	50 MHz (dBm)	60 MHz (dBm)	80 MHz (dBm)	90 MHz (dBm)	100 MHz (dBm)
1, 3	n77[1,2]	27.1	23.9	22.1	20.9			17.9					
	n77[3]	1.9	1.1	0.8	0.3								
2	n78[1,2]	27.1	23.9	22.1	20.9			17.9					
	n78[3]	1.9	1.1	0.8	0.3								
3	n78[1,2]	27.1	23.9	22.1	20.9			17.9					
	n78[3]	1.9	1.1	0.8	0.3								
8	n77[6,7] n78[6,7]	NA	10.8	9.1	8	5.1	4.2	3.5	2.3	1.4			
8	n79[4,5]							6.8	6.2	5.6	4.9		4.4
18, 19	n77[4,5]		10.4	8.9	7.8			4.7	3.7	3	1.7		0.7
28	n77[4,5] n78[4,5]		10.4	8.9	7.8			4.7	3.7	3	1.7	1.2	0.7
20	n77[6,7] n78[6,7]		10.8	9.1	8			6					
26	n41	NA	10.3	8.4	7.4			5	4.3	3.9	3.1	2.7	
26	n77[6,7] n78[6,7]		10.8	9.1	8			6					
26	n77[4,5]		10.4	8.9	7.8			4.7	3.7	3	1.7		0.7
n28	1[8,9,10]	10.2	7.6	6.2	5.3								
	n75[1,2]	28.1	25.3	24.0	22.8								
n71	2[11]	4.6	1.0	0.7	0.6								
	2[12]	1.7	1.0	0.7	0.6								
66	n78[1,2]		23.9	22.1	20.9			17.9					
	n78[3]		1.1	0.8	0.3								

NOTE 1: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.
NOTE 2: The requirements should be verified for UL EARFCN or NR ARFCN of the aggressor (lower) band (superscript LB) such that $f_{UL}^{LB} = \lfloor f_{DL}^{HB} / 0.2 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.
NOTE 3: The requirements are only applicable to channel bandwidths with a carrier frequency at $\pm(20 + BW_{Channel}^{HB} / 2)$ MHz offset from $2 f_{UL}^{LB}$ in the victim (higher band) with $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$, where _ and $BW_{Channel}^{HB}$ are the channel bandwidths configured in the aggressor (lower) and victim (higher) bands in MHz, respectively.
NOTE 4: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 5th transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.
NOTE 5: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that $f_{UL}^{LB} = \lfloor f_{DL}^{HB} / 0.5 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.
NOTE 6: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 4th transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.
NOTE 7: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that $f_{UL}^{LB} = \lfloor f_{DL}^{HB} / 0.4 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.
NOTE 8: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of a low band for which the 3rd transmitter harmonic is within the downlink transmission bandwidth of a high band.
NOTE 9 The requirements should be verified for UL EARFCN of a low band (superscript LB) such that in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB} / 2 \le f_{UL}^{LB} \le F_{UL\_high}^{LB} - BW_{Channel}^{LB} / 2$ with the carrier frequency of a high band in MHz and the channel bandwidth configured in the low band.
NOTE 10: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured.
NOTE 11: These requirements apply when the lower edge frequency of the 5 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.
NOTE 12: These requirements apply when the lower edge frequency of the 10 MHz, 15 MHz, or 20 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.

7.3B.2.3.5.2 Reference sensitivity test requirement exceptions due to receiver harmonic mixing for EN-DC in NR FR1Reference sensitivity

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7.3B.2.3.5.3 Reference sensitivity test requirement exceptions due to close proximity of bands for EN-DC in NR FR1

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7.3B.2.3.5.5 Reference sensitivity test requirement for intermodulation interference due to dual uplink operation for EN-DC in NR FR1

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For the UE which supports inter-band EN-DC, the minimum requirement for reference sensitivity in Table 7.3.2.5-1 of TS 38.521-1 [TBD] for NR band and Table 7.3.5-1 of TS 36.521-1 [TBD] for EUTRA band, shall be increased by the amount given in $\Delta R_{IB,c}$ defined in subclause 7.3B.3.3 for the applicable for two, three, four and five bands operation.

7.3B.2.4 Reference sensitivity for Inter-band EN-DC including FR2

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7.3B.3 $\Delta R_{IB,c}$ for EN-DC

For the UE which supports inter-band EN-DC configuration, the minimum requirement for reference sensitivity in Table 7.3.5-1 in TS 36.521-1, Tables 7.3.2.5-1 in TS 38.521-1 [TBD] for NR band shall be increased by the amount given in $\Delta R_{IB,c}$ in Tables below where unless otherwise stated, the same $\Delta R_{IB,c}$ is applicable to NR band(s) part for DC configurations which have the same NR operating band combination. Unless otherwise stated, $\Delta R_{IB,c}$ is set to zero.

7.3B.3.1 Reference sensitivity $\Delta R_{IB,c}$ for Intra-band Contiguous EN-DC

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7.3B.3.2 Reference sensitivity $\Delta R_{IB,c}$ for Intra-band non-contiguous EN-DC

Table 7.3B.3.2-1: Intra-band non-contiguous EN-DC with one uplink configuration for reference sensitivity

DC configuration	Aggregated channel bandwidth (LTE+NR)	W_{gap} / (MHz)	UL LTE allocation	ΔR_{IBNC} (dB)	Duplex mode
DC_3A_n3A	5MHz+5MHz	$45.0 < W_{gap} \le 65.0$	12[1]	4.7	FDD
		$0.0 < W_{gap} \le 45.0$	25[1]	0	
	5MHz+10MHz	$40.0 < W_{gap} \le 60.0$	12[1]	3.8	
		$0.0 < W_{gap} \le 40.0$	25[1]	0	
	5MHz+15MHz	$35.0 < W_{gap} \le 55.0$	12[1]	3.6	
		$0.0 < W_{gap} \le 35.0$	25[1]	0	
	5MHz+20MHz	$30.0 < W_{gap} \le 50.0$	12[1]	3.4	
		$0.0 < W_{gap} \le 30.0$	25[1]	0	
	5MHz+25MHz	$25.0 < W_{gap} \le 45.0$	12[1]	3.2	
		$0.0 < W_{gap} \le 25.0$	25[1]	0	
	5MHz+30MHz	$20.0 < W_{gap} \le 40.0$	12[1]	3.0	
		$0.0 < W_{gap} \le 20.0$	25[1]	0	
	10MHz+5MHz	$30.0 < W_{gap} \le 60.0$	12[5]	5.1	
		$0.0 < W_{gap} \le 30.0$	32[1]	0	
	10MHz+10MHz	$25.0 < W_{gap} \le 55.0$	12[5]	4.3	
		$0.0 < W_{gap} \le 25.0$	32[1]	0	
	10MHz+15MHz	$20.0 < W_{gap} \le 50.0$	12[5]	3.8	
		$0.0 < W_{gap} \le 20.0$	32[1]	0	
	10MHz+20MHz	$15.0 < W_{gap} \le 45.0$	12[5]	3.5	
		$0.0 < W_{gap} \le 15.0$	32[1]	0	
	10MHz+25MHz	$10.0 < W_{gap} \le 40.0$	12[5]	3.2	
		$0.0 < W_{gap} \le 10.0$	32[1]	0	
	10MHz+30MHz	$5.0 < W_{gap} \le 35.0$	12[5]	2.8	
		$0.0 < W_{gap} \le 5.0$	32[1]	0	
	15MHz+5MHz	$25.0 < W_{gap} \le 55.0$	12[6]	6.0	
		$0.0 < W_{gap} \le 25.0$	32[1]	0	
	15MHz+10MHz	$20.0 < W_{gap} \le 50.0$	12[6]	4.7	
		$0.0 < W_{gap} \le 20.0$	32[1]	0	
	15MHz+15MHz	$15.0 < W_{gap} \le 45.0$	12[6]	4.2	
		$0.0 < W_{gap} \le 15.0$	32[1]	0	
	15MHz+20MHz	$10.0 < W_{gap} \le 40.0$	12[6]	3.8	
		$0.0 < W_{gap} \le 10.0$	32[1]	0	
	15MHz+25MHz	$5.0 < W_{gap} \le 35.0$	12[6]	3.5	
		$0.0 < W_{gap} \le 5.0$	32[1]	0	
	15MHz+30MHz	$0.0 < W_{gap} \le 30.0$	12[6]	3.3	
	20MHz+5MHz	$15.0 < W_{gap} \le 50.0$	16[7]	6.5	
		$0.0 < W_{gap} \le 15.0$	32[1]	0	
	20MHz+10MHz	$10.0 < W_{gap} \le 45.0$	16[7]	5.1	
		$0.0 < W_{gap} \le 10.0$	32[1]	0	
	20MHz+15MHz	$5.0 < W_{gap} \le 40.0$	16[7]	4.5	
		$0.0 < W_{gap} \le 5.0$	32[1]	0	
	20MHz+20MHz	$0.0 < W_{gap} \le 35.0$	16[7]	4.1	
	20MHz+25MHz	$0.0 < W_{gap} \le 30.0$	16[7]	3.8	
	20MHz+30MHz	$0.0 < W_{gap} \le 25.0$	16[7]	3.6	

NOTE 1: [1] refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission.
NOTE 2: W_{gap} is the sub-block gap between the two sub-blocks.
NOTE 3: The carrier centre frequency of PCC in the UL operating band is configured closer to the DL operating band.
NOTE 4: All combinations of channel bandwidths defined in Table 5.3B.1.3-1.
NOTE 5: [5] refers to the UL resource blocks shall be located at RB_{start}=25.
NOTE 6: [6] refers to the UL resource blocks shall be located at RB_{start}=35.
NOTE 7: [7] refers to the UL resource blocks shall be located at RB_{start}=50.

7.3B.3.3 $\Delta R_{IB,c}$ for Inter-band EN-DC within FR1

7.3B.3.3.1 $\Delta R_{IB,c}$ for Inter-band EN-DC in two bands within FR1

Table 7.3B.3.3.1-1: $\Delta R_{IB,c}$ due to EN-DC(two bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta R_{IB,c}$ (dB)
DC_1A_n28A	n28	0.2
DC_1_n51	n51	0.1
DC_1A_n77A	1	0.2
	n77	0.5
DC_1A_n78A	n78	0.5
DC_2_n66	2	0.3
	n66	0.3
DC_2_n78	2	0.2
	n78	0.5
DC_3_n51	3	0.2
	n51	0.2
DC_3A_n77A	3	0.2
	n77	0.5
DC_3A_n78A	3	0.2
	n78	0.5
DC_5A_n78A	5	0.2
	n78	0.5
DC_7_n51	n51	0.2
DC_7A_n77A	n78	0.5
DC_7_n78	n78	0.5
DC_8_n77	3	0.2
	n77	0.5
DC_8_n78	3	0.2
	n78	0.5
DC_11A_n77A	n77	0.5
DC_11A_n78A	n78	0.5
DC_12A_n5A	12	0.3
	n5	0.5
DC_12A_n66A	12	0.5
DC_18_n77	n77	0.5
DC_19A_n77A	n77	0.5
DC_19A_n78A	n78	0.5
DC_20_n51	n51	0.2
DC_20_n77	n77	0.5
DC_20A_n78A	n78	0.5
DC_21A_n77A	n77	0.5
DC_21A_n78A	n78	0.5
DC_25A_n41A	n41	0[f]
		0.5[2]
DC_26A_n77A	n77	0.5
DC_26A_n78A	n78	0.5
DC_28A_n51	n51	0.2
DC_28A_n77A	28	0.2
	n77	0.5
DC_28A_n78A	28	0.2
	n78	0.5
DC_28_n78	28	0.2
	n78	0.5
DC_30_n66	30	0.5
	n66	0.4
DC_38_n78	38	0.4
	n78	0.5
DC_39_n78	n78	0.5
DC_39_n79	n79	0.5
DC_40_n77	40	0.4
	n77	0.5
DC_41_n77	n77	0.5
DC_41_n78	n78	0.5
DC_41_n79	n79	0.5
DC_42_n51	n51	0.2
DC_66A_n78A	66	0.2
	n78	0.5

NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545-2690MHz.
NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496-2545MHz.

7.3B.3.3.2 $\Delta R_{IB,c}$ for Inter-band EN-DC in three bands within FR1

Table 7.3B.3.3.2-1: $\Delta R_{IB,c}$ due to EN-DC (three bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta R_{IB,c}$ (dB)
DC_1-3_n28	n28	0.2
DC_1A-3A_n77	1	0.2
	3	0.2
	n77	0.5
DC_1A-3A_n78	1	0.2
	3	0.2
	n78	0.5
DC_1A-5A_n78	1	0.2
	5	0.2
	n78	0.5
DC_1-7_n28	n28	0.2
DC_1A-7A_n78	1	0.2
	7	0.2
	n78	0.5
DC_1-8_n78	8	0.2
	n78	0.5
DC_1-18_n77	n77	0.5
DC_1-18_n78	n78	0.5
DC_1A-19A_n77	n77	0.5
DC_1A-19A_n78	n78	0.5
DC_1A-19A_n79	1	0.3
	19	0.3
DC_1-20_n28	1	0.0
	20	0.2
	n28	0.2
DC_1-20_n78	n78	0.5
DC_1-21_n77	n77	0.5
DC_1A-21A_n78	1	0.2
	n78	0.5
DC_1-28_n77	28	0.2
	n77	0.5
DC_1-28_n78	28	0.2
	n78	0.5
DC_1_n28-n78	1	0
	n28	0.2
	n78	0.5
DC_1_n28-n79	1	0.3
	28	0.3
DC_1A-42A_n77	1	0.2
	42	0.5
	n77	0.5
DC_1-41_n77	n77	0.5
DC_1-41_n78	n78	0.5
DC_1A-42A_n78	1	0.2
	42	0.5
	n78	0.5
DC_1A-42A_n79	42	0.5
DC_1_n77-n79	1	0.2
	n77	0.5
	n79	0.0
DC_1_n78-n79	1	0.0
	n78	0.5
	n79	0.0
DC_1-SUL_n78-n84	n78	0.5
DC_2_5_n66	2	0.3
	n66	0.3
DC_2_30_n66	2	0.4
	30	0.5
	n66	0.4
DC_2-66_n71B	2	0.3
	66	0.3
DC_3_n3-n77	3	0.2
	n3	0.2

	n77	0.5
DC_3_n3-n78	3	0.2
	n3	0.2
	n78	0.5
DC_3-5_n78	3	0.2
	5	0.2
	n78	0.5
DC_3-7_n78, DC_3-7-7_n78	3	0.2
	7	0.2
	n78	0.5
DC_3-8_n78	3	0.2
	8	0.2
	n78	0.5
DC_3A-19A_n77	3	0.2
	n77	0.5
DC_3A-19A_n78A	3	0.2
	n78	0.5
DC_3A-19A_n79A	3	0
	19	0
	n79	0
DC_3-20_n28	20	0.1
	n28	0.1
DC_3A-20A_n78	3	0.2
	n78	0.5
DC_3A-21A_n77	3	0.3
	21	0.5
	n77	0.5
DC_3A-21A_n78	3	0.3
	21	0.5
	n78	0.5
DC_3A-21A_n79	3	0.3
	21	0.5
DC_3-28_n78	3	0.2
	n78	0.5
DC_3_n28-n78	3	0.2
	n28	0
	n78	0.5
DC_3-38_n78	3	0.2
	38	0.4
	n78	0.5
DC_3-41_n78	3	0.2
	41	0[1]
		0.5[2]
	n78	0.5
DC_3-42_n77	3	0.2
	42	0.5
	n77	0.5
DC_3-42_n78	3	0.2
	42	0.5
	n78	0.5
DC_3-42_n79	3	0.2
	42	0.5
	n79	0
DC_3_n77-n79	3	0.2
	n77	0.5
	n79	0.0
DC_3_n78-n79	3	0.2
	n78	0.5
	n79	0.0
DC_3-SUL_n78-n80	3	0.2
	n78	0.5
	n80	0.2
DC_3-SUL_n78-n82	3	0.2
	n78	0.5
DC_5-7_n78	5	0.2

	7	0.2
	n78	0.5
DC_5_30_n66	30	0.5
	n66	0.4
DC_7-7_n78	7	0.0
	n78	0.5
DC_7-20_n28	20	0.2
	n28	0.2
DC_7-20_n78	n78	0.5
DC_7-28_n78	n78	0.5
DC_7_n28-n78	n78	0.5
DC_7-46_n78	n78	0.5
DC_18-28_n77	n77	0.5
DC_18-28_n78	n78	0.5
DC_19-21_n77	n77	0.5
DC_19-21_n78	n78	0.5
DC_19-42_n77	42	0.5
	n77	0.5
DC_19-42_n78	42	0.5
	n78	0.5
DC_19-42_n79	42	0.5
DC_19_n77-n79	19	0.0
	n77	0.5
DDC_19_n78-n79	n79	0.0
	19	0.0
	n78	0.5
DC_20_n8-n75	20	0.0
	n8	0.0
	n75	0.0
DC_20_n28-n75	20	0.0
	n28	0.2
	n75	0.0
DC_20_n28-n78	20	0.2
	n28	0.2
	n78	0.5
DC_20_n75-n78	20	0.0
	n75	0.0
	n78	0.5
DC_20_n76-n78	20	0.0
	n76	0.0
	n78	0.5
DC_20-SUL_n78-n82	n78	0.5
DC_20-SUL_n78-n83	20	0.2
	n78	0.5
	n83	0.2
DC_21-42_n77	42	0.5
	n77	0.5
DC_21-42_n78	42	0.5
	n78	0.5
DC_21-42_n79	42	0.5
DC_21_n77-n79	21	0.0
	n77	0.5
	n79	0.0
DC_21_n78-n79	21	0.0
	n78	0.5
	n79	0.0
DC_28-SUL_n78-n83	28	0.2
	n78	0.5
	n83	0.2
DC_28-42_n77	28	0.2
	42	0.5
	n77	0.5
DC_28-42_n78	28	0.2
	42	0.5
	n78	0.5

DC_28-42_n79	28	0.2
	42	0.5
DC_41-42_n77	42	0.5
	n77	0.5
DC_41-42_n78	42	0.5
	n78	0.5
DC_41-42_n79	42	0.5
DC_41_n77	n77	0.5
DC_41_n78	n78	0.5
DC_41_n79	n79	0.5
DC_66-SUL_n78-n86	66	0.2
	n78	0.5
	n86	0.2
NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545-2690MHz. The requirement is applied for UE transmitting on the frequency range of 2496-2545MHz.0.5		

7.3B.3.3.3 $\Delta R_{IB,c}$ for Inter-band EN-DC in four bands within FR1

Table 7.3B.3.3.3-1: ΔRIB,c due to EN-DC (four bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta R_{IB,c}$ [dB]
DC_1-3-5_n78	1	0.2
	3	0.2
	n78	0.5
DC_1-3-7_n28	n28	0.2
DC_1-3-7_n78 DC_1-3-7-7_n78	1	0.3
	3	0.3
	7	0.3
	n78	0.5
DC_1-3-8_n78	1	0.2
	3	0.2
	8	0.2
	n78	0.5
DC_1-3-28_n77	1	0.2
	3	0.2
	28	0.2
	n77	0.5
DC_1-3-28_n78 DC_1-3_n28-n78	1	0.2
	3	0.2
	28 or n28	0.2
	n78	0.5
DC_1-3-28_n79	1	0.2
	3	0.2
	28	0.2
DC_1-3-19_n78	1	0.2
	3	0.2
	n78	0.5
DC_1-3-20_n28	20	0.2
	n28	0.2
DC_1-3-20_n78	1	0.2
	3	0.2
	n78	0.5
DC_1-3-21_n77	1	0.2
	3	0.3
	21	0.5
	n77	0.5
DC_1-3-21_n78	1	0.2
	3	0.3
	21	0.5
	n78	0.5
DC_1-3-21_n79	3	0.3
	21	0.5
DC_1-3-42_n77	1	0.2
	3	0.2
	42	0.5
	n77	0.5
DC_1-3-42_n78	1	0.2
	3	0.2
	42	0.5
	n78	0.5
DC_1-3-42_n79	1	0.2
	3	0.2
	42	0.5
DC_1-5-7_n78 DC_1-5-7-7_n78	1	0.2
	5	0.2
	7	0.2
	n78	0.5
DC_1-7-20_n28	20	0.2
	n28	0.2
DC_1-7-20_n78	1	0.2
	7	0.2
	20	0.2
	n78	0.5
DC_1-7_n28-n78	1	0.2

	7	0.2
	n28	0.2
	n78	0.5
DC_1-18-28_n77	n77	0.5
DC_1-18-28_n78	n78	0.5
DC_1-19-42_n77	1	0.2
	42	0.5
	n77	0.5
DC_1-19-42_n78	42	0.5
	n78	0.5
DC_1-19-42_n79	42	0.5
DC_1-20_n28-n78	1	0.0
	20	0.2
	n28	0.2
	n78	0.5
DC_1-21-42_n77	1	0.2
	42	0.5
	n77	0.5
DC_1-21-42_n78	42	0.5
	n78	0.5
DC_1-21-42_n79	42	0.5
DC_1-28-42_n77	1	0.2
	28	0.2
	42	0.5
	n77	0.5
DC_1-28-42_n78	28	0.2
	42	0.5
	n78	0.5
DC_1-28-42_n79	28	0.2
	42	0.5
DC_1-41-42_n78	42	0.5
	n78	0.5
DC_1-41-42_n79	42	0.5
DC_1-41-42_n79	42	0.5
DC_2-66-(n)71B	2	0.3
	66	0.3
DC_3-5-7_n78, DC_3-5-7-7_n78	3	0.2
	5	0.2
	7	0.2
	n78	0.5
DC_3-7-7_n78	3	0.2
	7	0.2
	n78	0.5
DC_3-7-20_n28	20	0.2
	n28	0.1
DC_3-7-20_n78	3	0.2
	7	0.2
	n78	0.5
DC_3-7-28_n78 DC_3-7_n28-n78	3	0.2
	7	0.2
	28 or n28	0.2
	n78	0.5
DC_3-19-21_n77	3	0.3
	21	0.5
	n77	0.5
DC_3-19-21_n78	3	0.3
	21	0.5
	n78	0.5
DC_3-19-21_n79	3	0.3
	21	0.5
DC_3-19-42_n77	3	0.2
	42	0.5
	n77	0.5
DC_3-19-42_n78	0.2	0.2
	0.5	0.5

	0.5	0.5
DC_3-19-42_n79	3	0.2
	42	0.5
DC_3-20_n28-n78	3	0.2
	20	0.2
	n28	0.2
	n78	0.5
DC_3-21-42_n77	3	0.3
	21	0.5
	42	0.5
	n77	0.5
DC_3-21-42_n78	3	0.3
	21	0.5
	42	0.5
	n78	0.5
DC_3-21-42_n79	3	0.3
	21	0.5
	42	0.5
DC_3-28-42_n77	3	0.2
	28	0.2
	42	0.5
	n77	0.5
DC_3-28-42_n78	3	0.2
	28	0.2
	42	0.5
	n78	0.5
DC_3-28-42_n79	3	0.2
	28	0.2
	42	0.5
DC_5-7-7_n78	5	0.2
	7	0.2
	n78	0.5
DC_7-20_n28-n78	7	0.0
	20	0.2
	n28	0.2
	n78	0.5
DC_19-21-42_n77	42	0.5
	n77	0.5
DC_19-21-42_n78	42	0.5
	n78	0.5
DC_19-21-42_n79	42	0.5
DC_21-28-42_n77	28	0.2
	42	0.5
	n77	0.5
DC_21-28-42_n78	28	0.2
	42	0.5
	n78	0.5
DC_21-28-42_n79	28	0.2
	42	0.5

7.3B.3.3.4 $\Delta R_{IB,c}$ for Inter-band EN-DC in five bands within FR1

Table 7.3B.3.3.4-1: $\Delta R_{IB,c}$ due to EN-DC (five bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta R_{IB,c}$ [dB]
DC_1-3-5-7_n78, DC_1-3-5-7-7_n78	1	0.2
	3	0.2
	5	0.2
	7	0.2
	n78	0.5
DC_1-3-7-20_n28	20	0.2
	n28	0.2
DC_1-3-7-20_n78	1	0.2
	3	0.2
	7	0.2
	n78	0.5
DC_1-3-7_n28-n78	1	0.2
	3	0.2
	7	0.2
	n28	0.2
	n78	0.5
DC_1-3-19-21-n77	1	0.2
	3	0.3
	21	0.5
	n77	0.5
DC_1-3-19-21_n78	1	0.2
	3	0.3
	21	0.5
	n78	0.5
DC_1-3-19-21_n79	3	0.3
	21	0.5
DC_1-3-19-42_n77	1	0.2
	3	0.2
	42	0.5
	n77	0.5
DC_1-3-19-42_n79	1	0.2
	3	0.2
	42	0.5
DC_1-3-28-42_n77	1	0.2
	3	0.2
	28	0.2
	42	0.5
	n77	0.5
DC_1-3-28-42_n78	1	0.2
	3	0.2
	28	0.2
	42	0.5
	n78	0.5
DC_1-3-28-42_n79	1	0.2
	3	0.2
	28	0.2
	42	0.5
DC_1-3-20_n28-n78	1	0.2
	3	0.2
	20	0.2
	n28	0.2
	n78	0.5
DC_1-3-21-42_n77	1	0.2
	3	0.3
	21	0.5
	42	0.5
	n77	0.2
DC_1-3-21-42_n78	1	0.2
	3	0.3
	21	0.5
	42	0.5
	n78	0.2
DC_1-3-21-42_n79	1	0.2
	3	0.3

	21	0.5
	42	0.5
	n79	0.0
DC_1-7-20_n28-n78 DC	1	0.2
	7	0.2
	20	0.2
	n28	0.2
	n78	0.5
DC_1-19-21-42_n77	1	0.2
	42	0.5
	n77	0.5
DC_1-19-21-42_n78	42	0.5
	n78	0.5
DC_1-19-21-42_n79	42	0.5
DC_1-21-28-42_n77	1	0.2
	28	0.2
	42	0.5
	n77	0.5
DC_1-21-28-42_n78	28	0.2
	42	0.5
	n78	0.5
DC_1-21-28-42_n79 DC	28	0.2
	42	0.5
DC_3-7-20_n28-n78	3	0.2
	7	0.2
	20	0.2
	n28	0.2

7.3B.3.3.5 $\Delta R_{IB,c}$ for EN-DC six bands

Table 7.3B.3.3.5-1: $\Delta R_{IB,c}$ due to EN-DC (six bands)

Inter-band EN-DC configuration	E-UTRA or NR Band	$\Delta R_{IB,c}$ (dB)
DC_1-3-7-20_n28-n78	1	0.2
	3	0.2
	7	0.2
	20	0.2
	n28	0.2
	n78	0.5

7.3B.3.4 Reference sensitivity for $\Delta R_{IB,c}$ Inter-band EN-DC including FR2

FFS

7.3B.3.4.1 Reference sensitivity for $\Delta R_{IB,c}$ Inter-band EN-DC in two bands including FR2

FFS

7.3B.3.4.2 Reference sensitivity for $\Delta R_{IB,c}$ Inter-band EN-DC in three bands including FR2

FFS

7.3B.3.4.3 Reference sensitivity for $\Delta R_{IB,c}$ Inter-band EN-DC in four bands including FR2

FFS

7.3B.3.4.4 Reference sensitivity for $\Delta R_{IB,c}$ Inter-band EN-DC in five bands including FR2

FFS

7.4 Maximum Input Level

7.4B Maximum Input Level for EN-DC

7.4B.1 Maximum Input Level for Intra-Band Contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- The test point selection analysis is incomplete:
- Working assumption: E-UTRA is not tested during test procedure
- The MaxI/L test case in 38.521-1 is TBD, so that the relevant reference is in [TBD].
- Test configuration needs further investigation
- Test tolerance analysis is incomplete

7.4B.1.1 Test purpose

Maximum input level for intra-band contiguous EN-DC tests the UE's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of high signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area near to an e-NodeB or a gNB.

7.4B.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting intra-band contiguous EN-DC.

7.4B.1.3 Minimum conformance requirements

For intra-band contiguous EN-DC maximum input level is defined as the powers received at the UE antenna port over the Transmission bandwidth configuration of each CC, at which the specified relative throughput shall meet or exceed the minimum requirements for the specified reference measurement channel over each CC.

The minimum conformance requirements for NR CC is specified in TS 38.101-1[2] clause 7.4, and reference measurement channels are the same with the configurations in TS 36.101[5] and TS 38.101-1[2].

The normative reference for this requirement is TS 38.101-3 [4] Clause 7.4B.1

7.4B.1.4 Test Description

7.4B.1.4.1 Initial Condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies and channel bandwidths based on EN-DC operating bands specified in clause 5.2B.2, channel bandwidths and sub-carrier spacings for the NR cell specified in TS 38.521-1 [8] clause 5.3 and channel bandwidth for the E-UTRA cell are specified in TS 36.521-1 [10] clause 5.4.2.All of these configurations shall be tested with applicable test parameters for each intra-band contiguous EN-DC configuration specified in clause 5.3B.1.2, and are shown in table 7.4B.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 7.4B.1.4.1-1: Test configuration table [TBD]

Initial Conditions	
Test Environment as specified in TS 38.508-1 [6] subclause 4.1	TBD
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test SCS for the NR cell as specified in 38.521-1 [8] Table 5.3.5-1	TBD
Test Parameters for EN-DC Configuration	
FFS	

1. Connect the SS to the UE antenna connectors as shown in [TBD].
2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.
3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0, C.1,C.2,C3.1 and TS 38.521-1 [8] Annex C.0,C.1,C.2,C3.1for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H.0,H.1,H.2,H.3.1 and TS 38.521-1 [8] Annex G.0,G.1,G.2,G.3.1 for E-UTRA CG and NR CG respectively.
4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.
5. Propagation conditions are set according to TS 36.521-1 [10] Annex B.0 and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 7.4B.1.4.3.

7.4B.1.4.2 Test Procedure

1. SS transmits PDSCH via PDCCH DCI format 1_1 for C_RNTI to transmit the DL RMC according to Tables 7.4B.1.4.1 on the NR CC, The SS sends downlink MAC padding bits on the DL RMC.
2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0_1 for C_RNTI to schedule the UL RMC according to Table 7.4B.1.4.1-1on the NR CC. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
3. SS sets the Downlink signal level for the NR CC to the value defined in [TBD] in TS 38.521-1 [8]. SS sends continuously uplink power control "up" commands to the UE for the NR CC until the UE transmits at its P_{UMAX} level; allow at least 200 ms from the first TPC command for the UE to reach P_{UMAX} level.
   The NR CC output power is within [TBD] of target level in [TBD]
4. Measure the average throughput for each component carrier for duration sufficient to achieve statistical significance according to Annex H in TS 38.521-1 [8].

7.4B.1.4.3 Message Contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

7.4B.1.5 Test Requirement

For the NR CC, the throughput measurement of the carrier derived in test procedure shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex [TBD] with parameters specified in Table [TBD]

7.4B.2 Maximum Input Level for Intra-Band Non-Contiguous EN-DC

Editor's note: The following aspects are either missing or not yet determined:

- The test point selection analysis is incomplete: LTE CC testing is waiting for RAN4 decision;

- The MaxI/L test case in 38.521-1 is TBD, so that the relevant reference is in [TBD].
- Test configuration needs further investigation
- Test tolerance analysis is incomplete

7.4B.2.1 Test purpose

Maximum input level for intra-band non-contiguous EN-DC tests the UE's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of high signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area near to an e-NodeB or a gNB.

7.4B.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting intra-band non contiguous EN-DC.

7.4B.2.3 Minimum conformance requirements

For intra-band non-contiguous EN-DC maximum input level is defined as the powers received at the UE antenna port over the Transmission bandwidth configuration of each CC in each CG, at which the specified relative throughput shall meet or exceed the minimum requirements for the specified reference measurement channel over each CC in each CG.

The minimum conformance requirements for NR CG is specified in TS 38.101-1 clause 7.4, and reference measurement channels are the same with the configurations in TS 36.101 and TS 38.101-1.

The normative reference for this requirement is TS 38.101-3 [4] Clause 7.4B.2

7.4B.2.4 Test Description

7.4B.2.4.1 Initial Condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies and channel bandwidths based on EN-DC operating bands specified in clause 5.2B.3, channel bandwidths and sub-carrier spacings for the NR cell specified in TS 38.521-1 [8] clause 5.3 and channel bandwidth for the E-UTRA cell are specified in TS 36.521-1 [10] clause 5.4.2.All of these configurations shall be tested with applicable test parameters for each intra-band non-contiguous EN-DC configuration specified in clause 5.3B.1.3, and are shown in table 7.4B.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 7.4B.2.4.1-1: Test configuration table

Initial Conditions	
Test Environment as specified in TS 38.508-1 [6] subclause 4.1	TBD
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test SCS for the NR cell as specified in 38.521-1 [8] Table 5.3.5-1	TBD
Test Parameters for EN-DC Configuration	
FFS	

1. Connect the SS to the UE antenna connectors as shown in [TBD].
2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.

3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0, C.1,C.2,C3.1 and TS 38.521-1 [8] Annex C.0,C.1,C.2,C3.1for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H.0,H.1,H.2,H.3.1 and TS 38.521-1 [8] Annex G.0,G.1,G.2,G.3.1 for E-UTRA CG and NR CG respectively.

4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.

5. Propagation conditions are set according to TS 36.521-1 [10] Annex B.0 and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.

6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 7.4B.2.4.3.

7.4B.2.4.2 Test Procedure

1. SS transmits PDSCH via PDCCH DCI format 1_1 for C_RNTI to transmit the DL RMC according to Tables 7.4B.2.4.1 on the NR CC, The SS sends downlink MAC padding bits on the DL RMC.

2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0_1 for C_RNTI to schedule the UL RMC according to Table 7.4B.2.4.1-1on the NR CC. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

3. SS sets the Downlink signal level for the NR CC to the value defined in [TBD] in TS 38.521-1 [8]. SS sends continuously uplink power control "up" commands to the UE for the NR CC until the UE transmits at its P_{UMAX} level; allow at least 200 ms from the first TPC command for the UE to reach P_{UMAX} level.
The NR CC output power is within [TBD] of target level in [TBD]

3. Measure the average throughput for each component carrier for duration sufficient to achieve statistical significance according to Annex H

7.4B.2.4.3 Message Contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

7.4B.2.5 Test Requirement

For the NR CC, the throughput measurement of the carrier derived in test procedure shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex [TBD] with parameters specified in Table [TBD].

7.4B.3 Maximum Input Level for Inter-band EN-DC within FR1

Editor's note: The following aspects are either missing or not yet determined:

- The test point selection analysis is incomplete: LTE CC testing is waiting for RAN4 decision;
- The MaxI/L test case in 38.521-1 is TBD, so that the relevant reference is in [TBD].
- Test configuration needs further investigation
- Test tolerance analysis is incomplete
- Bandwidth combination configuration for inter band EN-DC is TBD in RAN4

7.4B.3.1 Test purpose

Maximum input level for inter-band EN-DC tests the UE's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of high signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area near to an e-NodeB or a gNB.

7.4B.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC.

7.4B.3.3 Minimum conformance requirements

For inter-band EN-DC maximum input level is defined as the powers received at the UE antenna port over the Transmission bandwidth configuration of each CC in each CG, at which the specified relative throughput shall meet or exceed the minimum requirements for the specified reference measurement channel over each CC in each CG.

The minimum conformance requirements for NR CG is specified in TS 38.101-1 clause 7.4, and reference measurement channels are the same with the configurations in TS 36.101 and TS 38.101-1.

The normative reference for this requirement is TS 38.101-3 [4] [clause 7.4B.3]

7.4B.3.4 Test Description

7.4B.3.4.1 Initial Condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies and channel bandwidths based on EN-DC operating bands specified in clause 5.2B.4, channel bandwidths and sub-carrier spacings for the NR cell specified in TS 38.521-1 [8] clause 5.3 and channel bandwidth for the E-UTRA cell are specified in TS 36.521-1 [10] clause 5.4.2.All of these configurations shall be tested with applicable test parameters for each inter-band EN-DC configuration specified in clause [5.3B.X], and are shown in table 7.4B.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 7.4B.3.4.1-1: Test configuration table

Initial Conditions	
Test Environment as specified in TS 38.508-1 [6] subclause 4.1	TBD
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test SCS for the NR cell as specified in 38.521-1 [8] Table 5.3.5-1	TBD
Test Parameters for EN-DC Configuration	
FFS	

1. Connect the SS to the UE antenna connectors as shown in [TBD].
2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.
3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0, C.1,C.2,C3.1 and TS 38.521-1 [8] Annex C.0,C.1,C.2,C3.1for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H.0,H.1,H.2,H.3.1 and TS 38.521-1 [8] Annex G.0,G.1,G.2,G.3.1 for E-UTRA CG and NR CG respectively.
4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.
5. Propagation conditions are set according to TS 36.521-1 [10] Annex B.0 and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 7.4B.3.4.3.

7.4B.3.4.2 Test Procedure

1. SS transmits PDSCH via PDCCH DCI format 1_1 for C_RNTI to transmit the DL RMC according to Tables 7.4B.3.4.1 on the NR CC, The SS sends downlink MAC padding bits on the DL RMC.

2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0_1 for C_RNTI to schedule the UL RMC according to Table 7.4B.3.4.1-1on the NR CC. Since the UL has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

3. SS sets the Downlink signal level for the NR CC to the value defined in [TBD] in TS 38.521-1 [8]. SS sends continuously uplink power control "up" commands to the UE for the NR CC until the UE transmits at its P_{UMAX} level; allow at least 200 ms from the first TPC command for the UE to reach P_{UMAX} level.
The NR CC output power is within [TBD] of target level in [TBD]

4. Measure the average throughput for each component carrier for duration sufficient to achieve statistical significance according to Annex H

7.4B.3.4.3 Message Contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

7.4B.3.5 Test Requirement

For the NR CC, the throughput measurement of the carrier derived in test procedure shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex [TBD] with parameters specified in Table [TBD].

7.5 Adjacent channel selectivity

7.5B Adjacent channel selectivity for EN-DC

7.5B.1 Adjacent Channel Selectivity for intra-band contiguous EN-DC

Editor's note: this clause is incomplete. The following aspects are either missing or not yet determined:

- The test point selection analysis is incomplete: LTE CC testing is waiting for RAN4 decision;
- Test configuration needs further investigation
- Test tolerance analysis is incomplete
- Connection diagram is TBD: the interferer requirement is not defined in RAN4

7.5B.1.1 Test purpose

Adjacent channel selectivity (ACS) is a measure of a receiver's ability to receive an NR and E-UTRA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

7.5B.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting intra-band contiguous EN-DC.

7.5B.1.3 Minimum conformance requirements

The minimum conformance requirements for NR CC is specified in TS 38.101-1[2] clause 7.5.

7.5B.1.4 Test description

7.5B.1.4.1 Initial Condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies and channel bandwidths based on EN-DC operating bands specified in clause 5.2B.2, channel bandwidths and sub-carrier spacings for the NR cell specified in TS 38.521-1 [8] clause 5.3 and channel bandwidth for the E-UTRA cell are specified in TS 36.521-1 [10] clause 5.4.2.All of these configurations shall be tested with applicable test parameters for each intra-band contiguous EN-DC configuration specified in clause 5.3B.1.2, and are shown in table 7.5B.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 7.5B.1.4.1-1: Test configuration table

Initial Conditions	
Test Environment as specified in TS 38.508-1 [6] subclause 4.1	TBD
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test SCS for the NR cell as specified in 38.521-1 [8] Table 5.3.5-1	TBD
Test Parameters for EN-DC Configuration	
FFS	

1. Connect the SS to the UE antenna connectors as shown in [TBD].
2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.
3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0 and TS 38.521-1 [8] Annex C.0 for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H and TS 38.521-1 [8] Annex G for E-UTRA CG and NR CG respectively.
4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.
5. Propagation conditions are set according to TS 36.521-1 [10] Annex B.0 and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 7.5B.1.4.3.

7.5B.1.4.2 Test Procedure

1. SS transmits PDSCH via PDCCH DCI format 1_1 for C_RNTI to transmit the DL RMC on the NR CC according to Table 7.5B.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0_1 for C_RNTI to schedule the UL RMC on the NR CC according to Table 7.5B.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
3. Set the Downlink signal level on the NR CC to the value as defined in Table 7.5-3 in TS 38.101-1[2] (Case 1), Send Uplink power control commands to the UE (less or equal to TBD dB step size should be used) to ensure that the UE output power is within [TBD] dB of the target level in Table 7.5-3 in TS 38.101-1[2] (Case 1) for at least the duration of the Throughput measurement.
4. Set the Interferer signal level to the value as defined in Table 7.5-3 in TS 38.101-1[2] (Case 1) and frequency below the wanted signal on the NR CC, using a modulated interferer bandwidth as defined in Annex [TBD].
5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex H.
6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 4.
7. Set the Downlink signal level on the NR CC to the value as defined in Table 7.5-4 in TS 38.101-1[2] (Case 2) Send Uplink power control commands to the UE (less or equal to TBD dB step size should be used), to ensure

that the UE output power is within [TBD] dB of the target level in Table 7.5-4 in TS 38.101-1[2] (Case 2) for at least the duration of the Throughput measurement.

8. Set the Interferer signal level to the value as defined in Table 7.5-4 in TS 38.101-1[2] (Case 2) and frequency below the wanted signal on the NR CC, using a modulated interferer bandwidth as defined in Annex [TBD].
9. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex H
10. Repeat steps from 7 to 9, using an interfering signal above the wanted signal in Case 2 at step 8.
11. Repeat for applicable channel bandwidths and operating band combinations in both Case 1 and Case 2.

7.5B.1.4.3 Message Contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

7.5B.1.5 Test requirement

For the NR CC, the throughput measurement of the carrier derived in test procedure shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex A.3 under the conditions specified in clause 7.5.5 in TS 38.521-1 [8]

7.5B.2 Adjacent Channel Selectivity for intra-band non-contiguous EN-DC

Editor's note: this clause is incomplete. The following aspects are either missing or not yet determined:

- The test point selection analysis is incomplete: LTE CC testing is waiting for RAN4 decision;
- Test configuration needs further investigation
- Test tolerance analysis is incomplete
- Connection diagram is TBD: the interferer requirement is not defined in RAN4

7.5B.2.1 Test purpose

Adjacent channel selectivity (ACS) is a measure of a receiver's ability to receive an NR and E-UTRA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

7.5B.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting intra-band non-contiguous EN-DC.

7.5B.2.3 Minimum conformance requirements

The minimum conformance requirements for NR CC is specified in TS 38.101-1[2] clause 7.5.

7.5B.2.4 Test description

7.5B.2.4.1 Initial Condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies and channel bandwidths based on EN-DC operating bands specified in clause 5.2B.3, channel bandwidths and sub-carrier spacings for the NR cell specified in TS 38.521-1 [8] clause 5.3 and channel bandwidth for the E-UTRA cell are specified in TS 36.521-1 [10] clause 5.4.2.All of these configurations shall be tested with applicable test parameters for each intra-band contiguous EN-DC configuration specified in clause 5.3B.1.3, and are shown in table 7.5B.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 7.5B.2.4.1-1: Test configuration table

Initial Conditions	
Test Environment as specified in TS 38.508-1 [6] subclause 4.1	TBD
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test SCS for the NR cell as specified in 38.521-1 [8] Table 5.3.5-1	TBD
Test Parameters for EN-DC Configuration	
FFS	

1. Connect the SS to the UE antenna connectors as shown in [TBD].
2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.
3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0 and TS 38.521-1 [8] Annex C.0 for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H and TS 38.521-1 [8] Annex G for E-UTRA CG and NR CG respectively.
4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.
5. Propagation conditions are set according to TS 36.521-1 [10] Annex B.0 and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 7.5B.2.4.3.

7.5B.2.4.2 Test Procedure

1. SS transmits PDSCH via PDCCH DCI format 1_1 for C_RNTI to transmit the DL RMC on the NR CC according to Table 7.5B.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0_1 for C_RNTI to schedule the UL RMC on the NR CC according to Table 7.5B.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
3. Set the Downlink signal level on the NR CC to the value as defined in Table 7.5-3 in TS 38.101-1[2] (Case 1), Send Uplink power control commands to the UE (less or equal to TBD dB step size should be used) to ensure that the UE output power is within [TBD] dB of the target level in Table 7.5-3 in TS 38.101-1[2] (Case 1) for at least the duration of the Throughput measurement.
4. Set the Interferer signal level to the value as defined in Table 7.5-3 in TS 38.101-1[2] (Case 1) and frequency below the wanted signal on the NR CC, using a modulated interferer bandwidth as defined in Annex [TBD].
5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex H.
6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 4.
7. Set the Downlink signal level on the NR CC to the value as defined in Table 7.5-4 in TS 38.101-1[2] (Case 2) Send Uplink power control commands to the UE (less or equal to TBD dB step size should be used), to ensure that the UE output power is within [TBD] dB of the target level in Table 7.5-4 in TS 38.101-1[2] (Case 2) for at least the duration of the Throughput measurement.
8. Set the Interferer signal level to the value as defined in Table 7.5-4 in TS 38.101-1[2] (Case 2) and frequency below the wanted signal on the NR CC, using a modulated interferer bandwidth as defined in Annex [TBD].
9. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex H
10. Repeat steps from 7 to 9, using an interfering signal above the wanted signal in Case 2 at step 8.

11. Repeat for applicable channel bandwidths and operating band combinations in both Case 1 and Case 2.

7.5B.2.4.3 Message Contents

Message contents are according to TS 38.508-1 [6] subclause 4.6.1.

7.5B.2.5 Test requirement

For the NR CC, the throughput measurement of the carrier derived in test procedure shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex A.3 under the conditions specified in clause 7.5.5 in TS 38.521-1 [8]

7.5B.3 Adjacent Channel Selectivity for inter-band EN-DC within FR1

Editor's note: this clause is incomplete. The following aspects are either missing or not yet determined:

-The test point selection analysis is incomplete:

Working assumption: E-UTRA is not tested during test procedure

-Test configuration needs further investigation

-Test tolerance analysis is incomplete

-Connection diagram is TBD: the interferer requirement is not defined in RAN4 -Bandwidth combination configuration for inter band EN-DC within FR1 is TBD in RAN4

7.5B.3.1 Test purpose

Same test purpose as in clause 7.5B.1.1.

7.5B.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 15 and forward, supporting inter-band EN-DC within FR1.

7.5B.3.3 Minimum conformance requirements

The minimum conformance requirements for NR CC is specified in TS 38.101-1[2] clause 7.5

7.5B.3.4 Test description

7.5B.3.4.1 Initial Condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies and channel bandwidths based on EN-DC operating bands specified in clause 5.2B.4, channel bandwidths and sub-carrier spacings for the NR cell specified in TS 38.521-1 [8] clause 5.3 and channel bandwidth for the E-UTRA cell are specified in TS 36.521-1 [10] clause 5.4.2.All of these configurations shall be tested with applicable test parameters for each inter-band EN-DC within FR1 configuration specified in clause [5.3B.X], and are shown in table 7.5B.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in TS 36.521-1 [10] Annex C.2 and in TS 38.521-1 [8] Annex C.2 for E-UTRA CG and NR CG respectively.

Table 7.5B.3.4.1-1: Test configuration table

Initial Conditions	
Test Environment as specified in TS 38.508-1 [6] subclause 4.1	TBD
Test Frequencies as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test CC Combinations setting (N_{RB_agg}) as specified in TS 38.508-1 [6] subclause 4.3.1	TBD
Test SCS for the NR cell as specified in 38.521-1 [8] Table 5.3.5-1	TBD
Test Parameters for EN-DC Configuration	
FFS	

1. Connect the SS to the UE antenna connectors as shown in [TBD].
2. The parameter settings for the cell are set up according to TS 38.508-1 [6] subclause 4.4.3.
3. Downlink signals are initially set up according to TS 36.521-1 [10] Annex C.0 and TS 38.521-1 [8] Annex C.0 for E-UTRA CG and NR CG respectively, and uplink signals according to TS 36.521-1 [10] Annex H and TS 38.521-1 [8] Annex G for E-UTRA CG and NR CG respectively.
4. The UL Reference Measurement channels are TS 36.521-1 [10] Annex A.2 and TS 38.521-1 [8] Annex A.2 for E-UTRA CG and NR CG respectively.
5. Propagation conditions are set according to TS 36.521-1 [10] Annex B.0 and TS 38.521-1 [8] Annex B.0 for E-UTRA CG and NR CG respectively.
6. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG* according to TS 38.508-1 [6] clause 4.5. Message contents are defined in clause 7.5B.3.4.3.

7.5B.3.4.2 Test Procedure

1. SS transmits PDSCH via PDCCH DCI format 1_1 for C_RNTI to transmit the DL RMC on the NR CC according to Table 7.5B.3.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0_1 for C_RNTI to schedule the UL RMC on the NR CC according to Table 7.5B.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
3. Set the Downlink signal level on the NR CC to the value as defined in Table 7.5-3 in TS 38.101-1[2] (Case 1), Send Uplink power control commands to the UE (less or equal to TBD dB step size should be used) to ensure that the UE output power is within [TBD] dB of the target level in Table 7.5-3 in TS 38.101-1[2] (Case 1) for at least the duration of the Throughput measurement.
4. Set the Interferer signal level to the value as defined in Table 7.5-3 in TS 38.101-1[2] (Case 1) and frequency below the wanted signal on the NR CC, using a modulated interferer bandwidth as defined in Annex [TBD].
5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex H.
6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 4.
7. Set the Downlink signal level on the NR CC to the value as defined in Table 7.5-4 in TS 38.101-1[2] (Case 2) Send Uplink power control commands to the UE (less or equal to TBD dB step size should be used), to ensure that the UE output power is within [TBD] dB of the target level in Table 7.5-4 in TS 38.101-1[2] (Case 2) for at least the duration of the Throughput measurement.
8. Set the Interferer signal level to the value as defined in Table 7.5-4 in TS 38.101-1[2] (Case 2) and frequency below the wanted signal on the NR CC, using a modulated interferer bandwidth as defined in Annex [TBD].
9. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex H
10. Repeat steps from 7 to 9, using an interfering signal above the wanted signal in Case 2 at step 8.

11. Repeat for applicable channel bandwidths and operating band combinations in both Case 1 and Case 2.

7.5B.3.4.3 Message contents

Same message contents with clause 7.5B.1.4.3

7.5B.3.5 Test requirement

For the NR CC, the throughput measurement of the carrier derived in test procedure shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex A.3 under the conditions specified in clause 7.5.5 in TS 38.521-1 [8]

Annex A (normative): Measurement Channels

Please refer to Annex A in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. EN-DC exceptions will be added.

Annex B (normative): Propagation Conditions

Please refer to Annex B in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. EN-DC exceptions will be added,

Annex C (normative): Downlink Physical Channels

Please refer to Annex C in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. EN-DC exceptions will be added,

Annex D (normative): Characteristics of the Interfering Signal

Please refer to Annex D in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. EN-DC exceptions will be added,

Annex E (normative): Global In-Channel Tx Test

Please refer to Annex E in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. EN-DC exceptions will be added,

Annex F (informative): Measurement uncertainties and Test Tolerances

F.1 Acceptable uncertainty of Test System (normative)

TBD

F.1.1 Measurement of test environments

TBD

F.1.2 Measurement of transmitter

Table F.1.2-1: Maximum Test System Uncertainty for transmitter tests

Subclause	Maximum Test System Uncertainty	Derivation of Test System Uncertainty
6.2B.1.3 UE Maximum Output Power for Inter-Band EN-DC within FR1	TBD	
6.3B.1.3 Minimum output power for inter-band EN-DC within FR1	Same as 6.3.1 in TS 38.521-1	
6.5B.2.3.1 Spectrum emissions mask for Inter-band EN-DC within FR1	Same as 6.5.2.2 in TS 38.521-1	
6.5B.2.3.3 Adjacent channel leakage ratio for inter-band EN-DC within FR1	Same as 6.5.2.4.1 in TS 38.521-1	
6.5B.3.3.1 General spurious emissions for Inter-band EN-DC within FR1	Same as 6.5.3.1 in TS 38.521-1	

F.1.3 Measurement of receiver

Table F.1.3-1: Maximum Test System Uncertainty for receiver tests

Subclause	Maximum Test System Uncertainty	Derivation of Test System Uncertainty
7.3B.2.3 Reference sensitivity for Inter-band EN-DC within FR1	Same as 7.3.2 in TS 38.521-1	

F.2 Interpretation of measurement results (normative)

TBD

F.3 Test Tolerance and Derivation of Test Requirements (informative)

TBD

F.3.1 Measurement of test environments

TBD

F.3.2 Measurement of transmitter

Table F.3.2-1: Derivation of Test Requirements (Transmitter tests)

Sub clause	Test Tolerance (TT)	Formula for test requirement
6.2B.1.3 UE Maximum Output Power for Inter-Band EN-DC within FR1	Same as 6.2.1 in TS 38.521-1	
6.3B.1.3 Minimum output power for inter-band EN-DC within FR1	Same as 6.3.1 in TS 38.521-1	
6.5B.2.3.1 Spectrum emissions mask for Inter-band EN-DC within FR1	Same as 6.5.2.2 in TS 38.521-1	
6.5B.2.3.3 Adjacent channel leakage ratio for inter-band EN-DC within FR1	Same as 6.5.2.4.1 in TS 38.521-1	
6.5B.3.3.1 General spurious emissions for Inter-band EN-DC within FR1	Same as 6.5.3.1 in TS 38.521-1	

F.3.3 Measurement of receiver

Table F.3.3-1: Derivation of Test Requirements (Receiver tests)

Sub clause	Test Tolerance (TT)	Formula for test requirement
7.3B.2.3 Reference sensitivity for Inter-band EN-DC within FR1	Same as 7.3.2 in TS 38.521-1	

Annex G (normative): Uplink Physical Channels

Please refer to Annex G in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. EN-DC exceptions will be added,

Annex H (normative): Statistical Testing

Editor's Note:

- Further investigate the technical details behind this statistical method to ensure that this is applicable for FR2 radiated test cases.

H.1 General

FFS.

H.2 Statistical testing of receiver characteristics

H.2.1 General

The test of receiver characteristics is two fold.

1. A signal or a combination of signals is offered to the RX port(s) of the receiver.
2. The ability of the receiver to demodulate /decode this signal is verified by measuring the throughput.

In (2) is the statistical aspect of the test and is treated here.

The minimum requirement for all receiver tests is >95% of the maximum throughput.

All receiver tests are performed in static propagation conditions. No fading conditions are applied.

H.2.2 Mapping throughput to error ratio

a) The measured information bit throughput R is defined as the sum (in kilobits) of the information bit payloads successfully received during the test interval, divided by the duration of the test interval (in seconds).

b) In measurement practice the UE indicates successfully received information bit payload by signalling an ACK to the SS.
If payload is received, but damaged and cannot be decoded, the UE signals a NACK.

c) Only the ACK and NACK signals, not the data bits received, are accessible to the SS.
The number of bits is known in the SS from knowledge of what payload was sent.

d) For the reference measurement channel, applied for testing, the number of bits is different in different subframes, however in a radio frame it is fixed during one test.

e) The time in the measurement interval is composed of successfully received subframes (ACK), unsuccessfully received subframes (NACK) and no reception at all (DTX-subframes).

f) DTX-subframes may occur regularly according the applicable reference measurement channel (regDTX).
In real live networks this is the time when other UEs are served. In TDD these are the UL and special subframes.
regDTX vary from test to test but are fixed within the test.

g) Additional DTX-subframes occur statistically when the UE is not responding ACK or NACK where it should. (statDTX)
This may happen when the UE was not expecting data or decided that the data were not intended for it.

The pass / fail decision is done by observing the:

- number of NACKs
- number of ACKs and
- number of statDTXs (regDTX is implicitly known to the SS)

The ratio `(NACK + statDTX)/(NACK+ statDTX + ACK)`is the Error Ratio (ER). Taking into account the time consumed by the ACK, NACK, and DTX-TTIs (regular and statistical), ER can be mapped unambiguously to throughput for any single reference measurement channel test.

H.2.3 Design of the test

The test is defined by the following design principles (see clause H.x, Theory….):

1. The early decision concept is applied.
2. A second limit is introduced: Bad DUT factor M>1
3. To decide the test pass:

   Supplier risk is applied based on the Bad DUT quality

   To decide the test fail

   Customer Risk is applied based on the specified DUT quality

The test is defined by the following parameters:

1. Limit ER = 0.05 (Throughput limit = 95%)
2. Bad DUT factor M=1.5 (selectivity)
3. Confidence level CL = 95% (for specified DUT and Bad DUT-quality)

H.2.4 Numerical definition of the pass fail limits

Table H.2.4-1: pass fail limits

ne	ns_p	ns_f	ne	ns_p	ns_f	ne	ns_p	ns_f	ne	ns_p	ns_f
0	67	NA	39	763	500	78	1366	1148	117	1951	1828
1	95	NA	40	778	516	79	1381	1166	118	1965	1845
2	119	NA	41	794	532	80	1396	1183	119	1980	1863
3	141	NA	42	810	548	81	1412	1200	120	1995	1881
4	162	NA	43	826	564	82	1427	1217	121	2010	1899
5	183	NA	44	842	580	83	1442	1234	122	2025	1916
6	202	NA	45	858	596	84	1457	1252	123	2039	1934
7	222	NA	46	873	612	85	1472	1269	124	2054	1952
8	241	NA	47	889	629	86	1487	1286	125	2069	1969
9	259	NA	48	905	645	87	1502	1303	126	2084	1987
10	278	76	49	920	661	88	1517	1321	127	2099	2005
11	296	88	50	936	678	89	1532	1338	128	2113	2023
12	314	100	51	952	694	90	1547	1355	129	2128	2040
13	332	113	52	967	711	91	1562	1373	130	2143	2058
14	349	126	53	983	727	92	1577	1390	131	2158	2076
15	367	140	54	998	744	93	1592	1407	132	2172	2094
16	384	153	55	1014	760	94	1607	1425	133	2187	2111
17	401	167	56	1029	777	95	1623	1442	134	2202	2129
18	418	181	57	1045	793	96	1637	1459	135	2217	2147
19	435	195	58	1060	810	97	1652	1477	136	2231	2165
20	452	209	59	1076	827	98	1667	1494	137	2246	2183
21	469	224	60	1091	844	99	1682	1512	138	2261	2201
22	486	238	61	1106	860	100	1697	1529	139	2275	2218
23	503	253	62	1122	877	101	1712	1547	140	2290	2236
24	519	268	63	1137	894	102	1727	1564	141	2305	2254
25	536	283	64	1153	911	103	1742	1582	142	2320	2272
26	552	298	65	1168	928	104	1757	1599	143	2334	2290
27	569	313	66	1183	944	105	1772	1617	144	2349	2308
28	585	328	67	1199	961	106	1787	1634	145	2364	2326
29	602	343	68	1214	978	107	1802	1652	146	2378	2344
30	618	359	69	1229	995	108	1817	1669	147	2393	2361
31	634	374	70	1244	1012	109	1832	1687	148	2408	2379
32	650	389	71	1260	1029	110	1847	1704	149	2422	2397
33	667	405	72	1275	1046	111	1861	1722	150	2437	2415
34	683	421	73	1290	1063	112	1876	1740	151	2452	2433
35	699	436	74	1305	1080	113	1891	1757	152	2466	2451
36	715	452	75	1321	1097	114	1906	1775	153*)	NA	2469
37	731	468	76	1336	1114	115	1921	1793			
38	747	484	77	1351	1131	116	1936	1810	*) note 2 in H.2.5		

NOTE 1: The first column is the number of errors (ne = number of NACK + statDTX)

NOTE 2: The second column is the number of samples for the pass limit (ns_p, ns=Number of Samples= number of `NACK + statDTX + ACK`)

NOTE 3: The third column is the number of samples for the fail limit (ns_f)

H.2.5 Pass fail decision rules

The pass fail decision rules apply for a single test, comprising one component in the test vector. The over all Pass /Fail conditions are defined in clause H.2.6and H.2A.6

Having observed 0 errors, pass the test at 67+ samples, otherwise continue

Having observed 1 error, pass the test at 95+ otherwise continue

Having observed 2 errors, pass the test at 119+ samples, fail the test at 2- samples, otherwise continue

Etc. etc.

Having observed 151 errors, pass the test at 2452+ samples, fail the test at 2433- samples, otherwise continue

Having observed 152 errors, pass the test at 2466+ samples, fail the test at 2451- samples.

Where x+ means: x or more, x- means x or less

NOTE 1: an ideal DUT passes after 67 samples. The maximum test time is 2466 samples.

NOTE 2: It is allowed to deviate from the early decision concept by postponing the decision (pass/fail or continue). Postponing the decision to or beyond the end of Table H.2.4-1 requires a pass fail decision against the test limit: pass the DUT for ER<0.0618, otherwise fail.

Annex I (normative): Coarse grid and offset value for spurious emission tests

Please refer to Annex I in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. Exceptions for EN-DC may be added as needed.

Annex J (normative): Test applicability per permitted test method

Please refer to Annex J in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. Exceptions for EN-DC may be added as needed.

Annex K (normative): EIRP Measurement Procedures

Please refer to Annex K in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. Exceptions for EN-DC may be added as needed.

Annex L (normative): TRP Measurement Procedures

Please refer to Annex L in TS 38.521-1 [8] and 38.521-2 [9] for appropriate details as needed for test cases in this test specification. Exceptions for EN-DC may be added as needed.

Annex M (normative): Dual uplink interferer

UE is mandated to support operation in dual uplink mode also in EN-DC configuration for FR1 listed in Table 7.3.2.1.5-1 and indicated by column single uplink allowed if the intermodulation products caused by the dual uplink operation do not interfere own downlink transmission.

Formula for determining if the EN-DC in NR FR1 configuration with dual uplink operation interferes own downlink reception.

Interference bandwidth: IBW = |a| * CBW1 + |b| * CBW2

- |a| + |b| = 2 (or 3)
- CBW1 and CBW2 are the transmission bandwidth configurations of the UL channels

Centre frequency of IBW: fIBW = |a * f1 + b * f2|

- f1 and f2 are centre frequency of the transmission bandwidth configurations of each UL channel

The range of IMD 2 (or 3): [fIBW – IBW/2, fIBW + IBW/2]

NOTE 1: UE shall be able to apply operations which are configured by RRC reconfiguration and corresponding HARQ timing on the transmission bandwidth.

NOTE 2: For identified difficult band combination, during two adjacent RRC reconfiguration, the changing of transmission bandwidth should not introduce IM2 and IM3, which will result in UE changing from 2Tx to 1Tx. Otherwise, UE behaviour is not specified.

For DC_3A_n3A intra-band non-contiguous EN-DC combination, only single switched UL is supported in rel.15.

Annex N (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-08	RAN5#76	R5-174710	-	-	-	Draft skeleton	0.0.1
2018-01	RAN5#1-5G-NR Adhoc	R5-180086	-	-	-	TP to add clause 6.2B.3.3 UE A-MPR intra-band EN-DC to 38.521-3	0.1.0
2018-01	RAN5#1-5G-NR Adhoc	R5-180087	-	-	-	TP to add clause 6.5B.2.1.2 Additional Spectrum emissions mask (contiguous sub-blocks) for intra-band EN-DC to 38.521-3	0.1.0
2018-02	RAN5#78	R5-181509	-	-	-	Updated 38.521-3 for new Annex A Dual uplink interferer information	0.2.0
2018-02	RAN5#78	R5-181690	-	-	-	Updated 38.521-3 for channel bandwidth information	0.2.0
2018-03	RAN5#2-5G-NR Adhoc	R5-181760	-	-	-	Draft TS 38.521-3 0.3.0	0.3.0
2018-04	RAN5#2-5G-NR Adhoc	R5-182035	-	-	-	5G-NR Text Proposal to add spurious emissions test case to 38.521-3	0.4.0
2018-04	RAN5#2-5G-NR Adhoc	R5-182016	-	-	-	TP for new test case: 6.5B.2.1.3, Adjacent channel leakage ratio for intra-band contiguous EN-DC	0.4.0
2018-04	RAN5#2-5G-NR Adhoc	R5-182017	-	-	-	TP to update clause 6.2B.3.1 UE A-MPR intra-band EN-DC to 38.521-3	0.4.0
2018-04	RAN5#2-5G-NR Adhoc	R5-182018	-	-	-	TP to update clause 6.5B.2.1.2 Additional spectrum emission mask to 38.521-3	0.4.0
2018-04	RAN5#2-5G-NR Adhoc	R5-181807	-	-	-	Update to Operating bands of 38.521-3	0.4.0
2018-04	RAN5#2-5G-NR Adhoc	R5-181808	-	-	-	Update to section 3 and section 4 of 38.521-3	0.4.0
2018-04	RAN5#2-5G-NR Adhoc	R5-181828	-	-	-	Updated 38.521-3 for channel bandwidth information with new structure	0.4.0
2018-07	RAN5#79	R5-183961	-	-	-	5G_FR1_EN_DC_RF_sensitivity_for_DC	0.5.0
2018-07	RAN5#79	R5-183962	-	-	-	Introduction of TC 6.2B.1.3 for EN-DC	0.5.0
2018-07	RAN5#79	R5-183949	-	-	-	Statistical Testing Annex for 38.521-3	0.5.0
2018-07	RAN5#79	R5-182995	-	-	-	Corrections annex for EIRP and TRP metric definition in TS 38.521-3	0.5.0
2018-07	RAN5#79	R5-183707	-	-	-	TP for updating test case 6.2B.2.1, UE Maximum Output Power reduction for Intra-Band Contiguous EN-DC	0.5.0
2018-07	RAN5#79	R5-183708	-	-	-	Updated clause 5.5B Configuration for DC to 38.521-3	0.5.0
2018-07	RAN5#79	R5-183709	-	-	-	TP to add Occupied BW EN-DC test case	0.5.0
2018-07	RAN5#79	R5-183710	-	-	-	TP to add SEM EN-DC test case	0.5.0
2018-07	RAN5#79	R5-183711	-	-	-	TP to add ACLR EN-DC test case	0.5.0
2018-09	RAN5#80	R5-185563	-	-	-	FR2_StoreTxRxBeamPeakCoordinates_38.521-3	1.0.0
2018-09	RAN5#80	R5-185520	-	-	-	Addition of TRx MU and TT in TS 38.521-3 Annex	1.0.0
2018-09	RAN5#80	R5-185503	-	-	-	Add Clause 7.5B.1 into TS 38.521-3	1.0.0
2018-09	RAN5#80	R5-185504	-	-	-	Add Clause 7.5B.2 into TS 38.521-3	1.0.0
2018-09	RAN5#80	R5-185505	-	-	-	Add Clause 7.5B.3 into TS 38.521-3	1.0.0
2018-09	RAN5#80	R5-184579	-	-	-	Updated EN-DC configuration information in clause 5	1.0.0
2018-09	RAN5#80	R5-184580	-	-	-	TIB value add for EN-DC band in 38.521-3	1.0.0
2018-09	RAN5#80	R5-184671	-	-	-	Update of References in Section 2 of 38.521-3 spec	1.0.0
2018-09	RAN5#80	R5-184672	-	-	-	Updates to Operating Bands in Section 5.2	1.0.0
2018-09	RAN5#80	R5-184737	-	-	-	Dual uplink interferer updated to 38.521-3	1.0.0
2018-09	RAN5#80	R5-184737	-	-	-	Dual uplink interferer updated to 38.521-3	1.0.0
2018-09	RAN5#80	R5-185332	-	-	-	Addition of 6.2B.4.1.1 Configured OP for Intra-Band Contiguous EN-DC	1.0.0
2018-09	RAN5#80	R5-185333	-	-	-	Addition of 6.2B.4.1.2 Configured OP for Intra-Band Non-Contiguous EN-DC	1.0.0
2018-09	RAN5#80	R5-185507	-	-	-	Addition of 6.2B.4.1.3 Configured OP for Inter-Band within FR1	1.0.0
2018-09	RAN5#80	R5-185198	-	-	-	Addition of 6.2B.4.1.4 Configured OP for Inter-Band EN-DC including FR2	1.0.0
2018-09	RAN5#80	R5-185199	-	-	-	Addition of 6.2B.4.1.5 Configured OP for Inter-Band EN-DC including both FR1 and FR2	1.0.0
2018-09	RAN5#80	R5-185469	-	-	-	TP for updating test case 6.2B.3.1 UE AMPR for Intra-band contiguous EN-DC	1.0.0
2018-09	RAN5#80	R5-185470	-	-	-	TP for updating test case 6.2B.3.2 UE AMPR for Intra-band non-contiguous EN-DC	1.0.0
2018-09	RAN5#80	R5-185200	-	-	-	TP for updating test case 6.5B.2.1.2 Additional spectrum emission mask for intra-band contiguous EN-DC	1.0.0

2018-09	RAN5#80	R5-185556	-	-	-	FR2_UE_BeamlockInvoke_38.521-3	1.0.0
2018-09	RAN5#80	R5-185472	-	-	-	Update of TC 6.2B.1.1	1.0.0
2018-09	RAN5#80	R5-185473	-	-	-	Introduction of TC 6.2B.1.2	1.0.0
2018-09	RAN5#80	R5-185474	-	-	-	Update of 6.2B.1.3	1.0.0
2018-09	RAN5#80	R5-185201	-	-	-	Introduction of TC 7.4B.1	1.0.0
2018-09	RAN5#80	R5-185202	-	-	-	Introduction of 7.4B.2	1.0.0
2018-09	RAN5#80	R5-185203	-	-	-	Introduction of 7.4B.3	1.0.0
2018-09	RAN5#80	R5-185479	-	-	-	Update Occupied Bandwidth for interband EN-DC within FR1	1.0.0
2018-09	RAN5#80	R5-185480	-	-	-	Update SEM interband EN-DC within FR1	1.0.0
2018-09	RAN5#80	R5-185481	-	-	-	Update ACLR for interband EN-DC within FR1	1.0.0
2018-09	RAN5#80	R5-185204	-	-	-	5G NR_EN_DC with FR1_Text update for RX sensitivity	1.0.0
2018-09	RAN5#80	R5-185205	-	-	-	5G NR_EN_DC with FR1_Text_proposal for_TX_Spurious_emission	1.0.0
2018-09	RAN5#80	R5-185422	-	-	-	Alignment of Annex numbering with core spec	1.0.0
2018-09	RAN5#80	R5-184897	-	-	-	Updates to Channel Arrangement section in 38.521-3	1.0.0
2018-09	RAN5#80	R5-185206	-	-	-	Addition of TC6.3B.1.1 Minimum Output power for intra-band contiguous EN-DC	1.0.0
2018-09	RAN5#80	R5-185207	-	-	-	Addition of TC6.3B.1.2 Minimum output power for intra-band non-contiguous EN-DC	1.0.0
2018-09	RAN5#80	R5-185208	-	-	-	Addition of TC6.3B.1.3 Minimum output power for inter-band EN-DC within FR1	1.0.0
2018-09	RAN5#80	R5-185351	-	-	-	Update across EN-DC RF test cases in TS 38.521-3	1.0.0
2018-09	RAN#81	-	-	-	-	raised to v15.0.0 with editorial changes only	15.0.0

History

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