



Recommendation ITU-R M.2071-1
(02/2017)

**Generic unwanted emission characteristics
of mobile stations using
the terrestrial radio interfaces of
IMT-Advanced**

M Series
**Mobile, radiodetermination, amateur
and related satellite services**



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Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R M.2071-1*

Generic unwanted emission characteristics of mobile stations using the terrestrial radio interfaces of IMT-Advanced*(Question ITU-R 229 3/5)*

(2015-2017)

Scope

This Recommendation provides the generic unwanted emission characteristics of mobile stations using the terrestrial radio interfaces of IMT-Advanced, suitable for establishing the technical basis for global circulation of IMT-Advanced terminals. The information about unwanted emissions included in this Recommendation could also be used as guidance by Administrations for cases not specifically covered herein. Implementation of characteristics of mobile stations using the terrestrial radio interfaces of IMT-Advanced in any of the bands included in this Recommendation is subject to compliance with the Radio Regulations.

Keywords

IMT-Advanced, emission characteristics, out-of-band, unwanted, mobile station

The ITU Radiocommunication Assembly,

considering

- a) that unwanted emissions consist of both spurious and out-of-band (OoB) emissions according to No. **1.146** of the Radio Regulations (RR) and that spurious and OoB emissions are defined in RR Nos. **1.145** and **1.144**, respectively;
- b) that limitation of the maximum permitted levels of unwanted emissions of IMT-Advanced mobile stations (MSs) is necessary to protect other radio systems and services from interference and to enable coexistence between different technologies;
- c) that too stringent limits may lead to an increase in size or in complexity of IMT-Advanced radio equipment;
- d) that every effort should be made to keep limits for unwanted emissions at the lowest possible values taking account of economic factors and technological limitations;
- e) that Recommendation ITU-R SM.329 relates to the effects, measurements and limits to be applied to spurious domain emissions;
- f) that the same spurious emission limits apply equally to MSs of all radio interfaces;
- g) that Recommendation ITU-R SM.1541 relating to OoB emission specifies generic limits in the OoB domain which generally constitute the least restrictive OoB emission limits and encourages the development of more specific limits for each system;
- h) that the levels of spurious emissions of IMT-Advanced terminals shall comply with the limits specified in RR Appendix 3;
- i) that Recommendation ITU-R M.1579 establishes the technical basis for global circulation of IMT-2000 and IMT-Advanced MSs;

* This Recommendation should be brought to the attention of Radiocommunication Study Group 1.

- j) that one of the basic requirements of global circulation is that the MS does not cause harmful interference in any country where it is taken;
- k) that the harmonization of unwanted emission limits will facilitate global use and access to a global market;
- l) that unwanted emission limits are dependent on the transmitter emission characteristics in addition to depending on services operating in other bands;
- m) that the technology used by a system and its conformance with the recommended specifications and standards in Recommendation ITU-R M.2012 defines that system as IMT-Advanced regardless of the frequency band of operation,

noting

- a) the work carried out by standardization bodies to define limits to protect other radio systems and services from interference and to enable coexistence between different technologies;
- b) that IMT-Advanced mobile stations must comply with local, regional, and international regulations for OoB and spurious emissions relevant to their operations, wherever such regulations apply;
- c) that the notes and annexes of this Recommendation – being based on the ongoing work in standardization bodies – in order to reflect the wide applicability of IMT-Advanced technologies and to maintain consistency with the technology specifications, may contain material which reflects information related to the technology applications in bands other than those identified for IMT,

noting further

that there are ongoing studies within ITU-R regarding the protection of other services from unwanted emissions of IMT-Advanced stations to address further cases of compatibility,

recommends

- 1 that the unwanted emission characteristics of IMT-Advanced mobile stations should be based on the limits contained in the technology specific Annexes 1 and 2 which correspond to the terrestrial radio interface specifications referenced in *recommends* 1 of Recommendation ITU-R M.2012;
- 2 that the unwanted emission characteristics of IMT-Advanced mobile stations in Annexes 1 and 2 should apply in Regions and countries in which corresponding bands are identified for IMT in the Radio regulations^{**}.

Annex 1 – LTE-Advanced¹

Annex 2 – WirelessMAN-Advanced²

^{**} In other cases the unwanted emission characteristics of IMT-Advanced mobile stations in Annexes 1 and 2 are provided for information. Administrations may choose to apply the unwanted characteristics in Annexes 1 and 2 for the bands not identified for IMT at their national level, bearing in mind global circulation aspects.

¹ Developed by 3GPP as LTE Release 10 and Beyond (LTE-Advanced).

² Developed by IEEE as the WirelessMAN-Advanced specification incorporated in IEEE Std 802.16 beginning with approval of IEEE Std 802.16m.

Annex 1

LTE-Advanced

The present Annex includes unwanted emission requirements from evolved Universal Mobile Telecommunications System (UMTS) terrestrial radio access (E-UTRA) carriers for E-UTRA Mobile Stations.

This Annex is divided into three parts:

- Chapter 1 specifies the Operating bands for which the requirements in the present Annex apply.
- Chapter 2 specifies Definitions, Symbols and Abbreviations.
- Chapters 3, 4 and 5 contains the E-UTRA MS unwanted emission requirements.

Values specified in the present Annex incorporate test tolerances defined in Recommendation ITU-R M.1545.

1 Operating bands

TABLE 1-1
E-UTRA operating bands

E-UTRA operating band	Uplink (UL) operating band BS receive UE transmit	Downlink (DL) operating band BS transmit UE receive	Duplex mode
	$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
6 ¹	830 MHz – 840 MHz	875 MHz – 885 MHz	FDD
7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	FDD
8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
9	1 749.9 MHz – 1 784.9 MHz	1 844.9 MHz – 1 879.9 MHz	FDD
10	1 710 MHz – 1 770 MHz	2110 MHz – 2 170 MHz	FDD
11	1 427.9 MHz – 1 447.9 MHz	1 475.9 MHz – 1 495.9 MHz	FDD
12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
13	777 MHz – 787 MHz	746 MHz – 756 MHz	FDD
14	788 MHz – 798 MHz	758 MHz – 768 MHz	FDD
15	Reserved	Reserved	FDD
16	Reserved	Reserved	FDD
17	704 MHz – 716 MHz	734 MHz – 746 MHz	FDD
18	815 MHz – 830 MHz	860 MHz – 875 MHz	FDD
19	830 MHz – 845 MHz	875 MHz – 890 MHz	FDD

TABLE 1-1 (end)

E-UTRA operating band	Uplink (UL) operating band BS receive UE transmit	Downlink (DL) operating band BS transmit UE receive	Duplex mode
	$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
20	832 MHz – 862 MHz	791 MHz – 821 MHz	FDD
21	1 447.9 MHz – 1 462.9 MHz	1 495.9 MHz – 1 510.9 MHz	FDD
22	3 410 MHz – 3 490 MHz	3 510 MHz – 3 590 MHz	FDD
23	2 000 MHz – 2 020 MHz	2 180 MHz – 2 200 MHz	FDD
24#	1 626.5 MHz – 1 660.5 MHz	1 525 MHz – 1 559 MHz	FDD
25	1 850 MHz – 1 915 MHz	1 930 MHz – 1 995 MHz	FDD
26	814 MHz – 849 MHz	859 MHz – 894 MHz	FDD
27	807 MHz – 824 MHz	852 MHz – 869 MHz	FDD
28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD
29	N/A	717 MHz – 728 MHz	FDD ²
30	2 305 MHz – 2 315 MHz	2 350 MHz – 2 360 MHz	FDD
31	452.5 MHz – 457.5 MHz	462.5 MHz – 467.5 MHz	FDD
32	N/A	1 452 MHz – 1 496 MHz	FDD ²
33	1 900 MHz – 1 920 MHz	1 900 MHz – 1 920 MHz	TDD
34	2 010 MHz – 2 025 MHz	2 010 MHz – 2 025 MHz	TDD
35	1 850 MHz – 1 910 MHz	1 850 MHz – 1 910 MHz	TDD
36	1 930 MHz – 1 990 MHz	1 930 MHz – 1 990 MHz	TDD
37	1 910 MHz – 1 930 MHz	1 910 MHz – 1 930 MHz	TDD
38	2 570 MHz – 2 620 MHz	2 570 MHz – 2 620 MHz	TDD
39	1 880 MHz – 1 920 MHz	1 880 MHz – 1 920 MHz	TDD
40	2 300 MHz – 2 400 MHz	2 300 MHz – 2 400 MHz	TDD
41	2 496 MHz – 2 690 MHz	2 496 MHz – 2 690 MHz	TDD
42	3 400 MHz – 3 600 MHz	3 400 MHz – 3 600 MHz	TDD
43#	3 600 MHz – 3 800 MHz	3 600 MHz – 3 800 MHz	TDD
44	703 MHz – 803 MHz	703 MHz – 803 MHz	TDD

NOTE 1 – Band 6 is not applicable.

NOTE 2 – Restricted to E-UTRA operation when carrier aggregation is configured. The downlink operating band is paired with the uplink operating band (external) of the carrier aggregation (CA) configuration that is supporting the configured Primary Cell (Pcell) – Primary Cell: the cell, operating on the primary frequency, in which the UE either performs the initial connection establishment procedure or initiates the connection re-establishment procedure, or the cell indicated as the primary cell in the handover procedure.

NOTE 3 – All frequency bands or parts of the bands referenced in this Recommendation which are not identified for IMT in the ITU Radio Regulations have been marked with “#”.

The unwanted emission limits defined in the present Annex are for E-UTRA MS operating at least one of the intra-band contiguous CA arrangements in Table 1-2:

TABLE 1-2

E-UTRA Intra-band contiguous CA operating bands

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
CA_1	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
CA_2	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
CA_3	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
CA_7	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	FDD
CA_12	12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
CA_23	23	2 000 MHz – 2 020 MHz	2 180 MHz – 2 200 MHz	FDD
CA_27	27	807 MHz – 824 MHz	852 MHz – 869 MHz	FDD
CA_38	38	2 570 MHz – 2 620 MHz	2 570 MHz – 2 620 MHz	TDD
CA_39	39	1 880 MHz – 1 920 MHz	1 880 MHz – 1 920 MHz	TDD
CA_40	40	2 300 MHz – 2 400 MHz	2 300 MHz – 2 400 MHz	TDD
CA_41	41	2 496 MHz – 2 690 MHz	2 496 MHz – 2 690 MHz	TDD
CA_42	42	3 400 MHz – 3 600 MHz	3 400 MHz – 3 600 MHz	TDD

The unwanted emission limits defined in the present Annex are for E-UTRA MS operating at least one of the intra-band non-contiguous CA arrangements in Table 1-3:

TABLE 1-3

E-UTRA Intra-band non-contiguous CA operating bands (with two sub-blocks)

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
CA_2-2	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
CA_3-3	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
CA_4-4	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
CA_7-7	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	FDD
CA_23-23	23	2 000 MHz – 2 020 MHz	2 180 MHz – 2 200 MHz	FDD
CA_25-25	25	1 850 MHz – 1 915 MHz	1 930 MHz – 1 995 MHz	FDD
CA_41-41	41	2 496 MHz – 2 690 MHz	2 496 MHz – 2 690 MHz	TDD
CA_42-42	42	3 400 MHz – 3 600 MHz	3 400 MHz – 3 600 MHz	TDD

The unwanted emission limits defined in the present Annex are for E-UTRA MS operating at least one of the inter-band CA combinations in Table 1-4:

TABLE 1-4

E-UTRA Inter-band CA operating bands (two bands)

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
CA_1-3	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	
CA_1-5	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
CA_1-7	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	
CA_1-8	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	8	880 MHz – 915 MHz	925 MHz – 960 MHz	
CA_1-11	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	11	1 427.9 MHz – 1 447.9 MHz	1 475.9 MHz – 1 495.9 MHz	
CA_1-18	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	18	815 MHz – 830 MHz	860 MHz – 875 MHz	
CA_1-19	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	19	830 MHz – 845 MHz	875 MHz – 890 MHz	
CA_1-20	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	20	832 MHz – 862 MHz	791 MHz – 821 MHz	
CA_1-21	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	21	1 447.9 MHz – 1 462.9 MHz	1 495.9 MHz – 1 510.9 MHz	
CA_1-26	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	26	814 MHz – 849 MHz	859 MHz – 894 MHz	
CA_1-28	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	28	703 MHz – 748 MHz	758 MHz – 803 MHz	
CA_1-41	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	41	2 496 MHz – 2 690 MHz	2 496 MHz – 2 690 MHz	TDD
CA_1-42	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	42	3400 MHz – 3600 MHz	3400 MHz – 3600 MHz	TDD
CA_2-4	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	
CA_2-4-4	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	
CA_2-5	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
CA_2-2-5	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	

TABLE 1-4 (continued)

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
CA_2-12	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_2-13	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	13	777 MHz – 787 MHz	746 MHz – 756 MHz	
CA_2-2-13	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	13	777 MHz – 787 MHz	746 MHz – 756 MHz	
CA_2-17	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	17	704 MHz – 716 MHz	734 MHz – 746 MHz	
CA_2-29	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	29	[N/A]	717 MHz – 728 MHz	
CA_2-30	2	1 850 MHz – 1 910 MHz	1 930 MHz – 1 990 MHz	FDD
	30	2 305 MHz – 2 315 MHz	2 350 MHz – 2 360 MHz	
CA_3-5	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
CA_3-7	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	
CA_3-8	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
	8	880 MHz – 915 MHz	925 MHz – 960 MHz	
CA_3-19	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
	19	830 MHz – 845 MHz	875 MHz – 890 MHz	
CA_3-20	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
	20	832 MHz – 862 MHz	791 MHz – 821 MHz	
CA_3-26	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
	26	814 MHz – 849 MHz	859 MHz – 894 MHz	
CA_3-27	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
	27	807 MHz – 824 MHz	852 MHz – 869 MHz	
CA_3-28	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	FDD
	28	703 MHz – 748 MHz	758 MHz – 803 MHz	
CA_4-5	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
CA_4-4-5	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
CA_4-7	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	
CA_4-4-7	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	

TABLE 1-4 (continued)

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
CA_4-12	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_4-4-12	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_4-13	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	13	777 MHz – 787 MHz	746 MHz – 756 MHz	
CA_4-4-13	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	13	777 MHz – 787 MHz	746 MHz – 756 MHz	
CA_4-17	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	17	704 MHz – 716 MHz	734 MHz – 746 MHz	
CA_4-27	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	27	807 MHz – 824 MHz	852 MHz – 869 MHz	
CA_4-29	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	29	[N/A]	717 MHz – 728 MHz	
CA_4-30	4	1 710 MHz – 1 755 MHz	2 110 MHz – 2 155 MHz	FDD
	30	2 305 MHz – 2 315 MHz	2 350 MHz – 2 360 MHz	
CA_5-7	5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	
CA_5-12	5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_5-13	5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
	13	777 MHz – 787 MHz	746 MHz – 756 MHz	
CA_5-17	5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
	17	704 MHz – 716 MHz	734 MHz – 746 MHz	
CA_5-25	5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
	25	1 850 MHz – 1 915 MHz	1 930 MHz – 1 995 MHz	
CA_5-30	5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
	30	2 305 MHz – 2 315 MHz	2 350 MHz – 2 360 MHz	
CA_7-8	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	FDD
	8	880 MHz – 915 MHz	925 MHz – 960 MHz	
CA_7-12	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	FDD
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_7-20	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	FDD
	20	832 MHz – 862 MHz	791 MHz – 821 MHz	
CA_7-28	7	2 500 MHz – 2 570 MHz	2 620 MHz – 2 690 MHz	FDD
	28	703 MHz – 748 MHz	758 MHz – 803 MHz	

TABLE 1-4 (end)

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
CA_8-11	8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
	11	1 427.9 MHz – 1 447.9 MHz	1 475.9 MHz – 1 495.9 MHz	
CA_8-20	8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
	20	832 MHz – 862 MHz	791 MHz – 821 MHz	
CA_8-40	8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
	40	2 300 MHz – 2 400 MHz	2 300 MHz – 2 400 MHz	TDD
CA_11-18	11	1 427.9 MHz – 1 447.9 MHz	1 475.9 MHz – 1 495.9 MHz	FDD
	18	815 MHz – 830 MHz	860 MHz – 875 MHz	
CA_12-25	12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
	25	1 850 MHz – 1 915 MHz	1 930 MHz – 1 995 MHz	
CA_12-30	12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
	30	2 305 MHz – 2 315 MHz	2 350 MHz – 2 360 MHz	
CA_18-28	18	815 MHz – 830 MHz	860 MHz – 875 MHz	FDD
	28	703 MHz – 733 MHz	758 MHz – 788 MHz	
CA_19-21	19	830 MHz – 845 MHz	875 MHz – 890 MHz	FDD
	21	1 447.9 MHz – 1 462.9 MHz	1 495.9 MHz – 1 510.9 MHz	
CA_19-42	19	830 MHz – 845 MHz	875 MHz – 890 MHz	FDD
	42	3 400 MHz – 3 600 MHz	3 400 MHz – 3 600 MHz	
CA_20-32	20	832 MHz – 862 MHz	791 MHz – 821 MHz	FDD
	32	N/A	1 452 MHz – 1 496 MHz	
CA_23-29	23	2 000 MHz – 2 020 MHz	2 180 MHz – 2 200 MHz	FDD
	29	N/A	717 MHz – 728 MHz	
CA_25-41	25	1 850 MHz – 1 915 MHz	1 930 MHz – 1 995 MHz	FDD
	41	2 496 MHz – 2 690 MHz	2 496 MHz – 2 690 MHz	TDD
CA_26-41	26	814 MHz – 849 MHz	859 MHz – 894 MHz	FDD
	41	2 496 MHz – 2 690 MHz	2 496 MHz – 2 690 MHz	TDD
CA_29-30	29	N/A	717 MHz – 728 MHz	FDD
	30	2 305 MHz – 2 315 MHz	2 350 MHz – 2 360 MHz	
CA_39-41	39	1 880 MHz – 1 920 MHz	1 880 MHz – 1 920 MHz	TDD
	41	2 496 MHz – 2 690 MHz	2 496 MHz – 2 690 MHz	
CA_41-42	41	2 496 MHz – 2 690 MHz	2 496 MHz – 2 690 MHz	TDD
	42	3 400 MHz – 3 600 MHz	3 400 MHz – 3 600 MHz	

NOTE 1 – All frequency bands or parts of the bands referenced in this Recommendation which are not identified for IMT in the ITU Radio Regulations have been marked with “#”.

The unwanted emission limits defined in the present Annex are for E-UTRA MS operating at least one of the inter-band CA combinations in Table 1-5:

TABLE 1-5
E-UTRA Inter-band CA operating bands (three bands)

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
CA_1-3-5	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
CA_1-3-8	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	
	8	880 MHz – 915 MHz	925 MHz – 960 MHz	
CA_1-3-19	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	
	19	830 MHz – 845 MHz	875 MHz – 890 MHz	
CA_1-3-20	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	3	1 710 MHz – 1 785 MHz	1 805 MHz – 1 880 MHz	
	20	832 MHz – 862 MHz	791 MHz – 821 MHz	
CA_1-3-26	1	1 920 MHz – 1 980 MHz	2 110 MHz – 2 170 MHz	FDD
	3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	
	26	814 MHz – 849 MHz	859 MHz – 894 MHz	
CA_1-5-7	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
	7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	
CA_1-7-20	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	
	20	832 MHz – 862 MHz	791 MHz – 821 MHz	
CA_1-18-28	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	18	815 MHz – 830 MHz	860 MHz – 875 MHz	
	28	703 MHz – 733 MHz	758 MHz – 788 MHz	
CA_1-19-21	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	19	830 MHz – 845 MHz	875 MHz – 890 MHz	
	21	1447.9 MHz – 1462.9 MHz	1495.9 MHz – 1510.9 MHz	
CA_2-4-5	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
CA_2-4-12	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD

TABLE 1-5 (continued)

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_2-4-13	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	
	13	777 MHz – 787 MHz	746 MHz – 756 MHz	
CA_2-4-29	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	
	29	N/A	717 MHz – 728 MHz	
CA_2-5-12	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_2-5-13	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
	13	777 MHz – 787 MHz	746 MHz – 756 MHz	
CA_2-5-30	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
	30	2305 MHz – 2315 MHz	2350 MHz – 2360 MHz	
CA_2-12-30	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
	30	2305 MHz – 2315 MHz	2350 MHz – 2360 MHz	
CA_2-29-30	2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
	29	N/A	717 MHz – 728 MHz	
	30	2305 MHz – 2315 MHz	2350 MHz – 2360 MHz	
CA_3-7-20	3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
	7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	
	20	832 MHz – 862 MHz	791 MHz – 821 MHz	
CA_4-5-12	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_4-5-13	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
	13	777 MHz – 787 MHz	746 MHz – 756 MHz	
CA_4-5-30	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
	30	2305 MHz – 2315 MHz	2350 MHz – 2360 MHz	

TABLE 1-5 (end)

E-UTRA CA band	E-UTRA band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
CA_4-7-12	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	FDD
	7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
CA_4-12-30	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	FDD
	12	699 MHz – 716 MHz	729 MHz – 746 MHz	
	30	2305 MHz – 2315 MHz	2350 MHz – 2360 MHz	
CA_4-29-30	4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	FDD
	29	N/A	717 MHz – 728 MHz	
	30	2305 MHz – 2315 MHz	2350 MHz – 2360 MHz	
CA_7-8-20	7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	FDD
	8	880 MHz – 915 MHz	925 MHz – 960 MHz	
	20	832 MHz – 862 MHz	791 MHz – 821 MHz	

The unwanted emission limits defined in the present Annex are for E-UTRA MS operating at least one of the dual connectivity (DC) combinations in Table 1-6:

TABLE 1-6

E-UTRA Inter-band dual connectivity operating bands (two bands)

E-UTRA DC Band	E-UTRA Band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex Mode
		BS receive / UE transmit	BS transmit / UE receive	
		$F_{UL_low} - F_{UL_high}$	$F_{DL_low} - F_{DL_high}$	
DC_1-3	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	
DC_1-5	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	5	824 MHz – 849 MHz	869 MHz – 894 MHz	
DC_1-7	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	
DC_1-8	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	8	880 MHz – 915 MHz	925 MHz – 960 MHz	
DC_1-19	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
	19	830 MHz – 845 MHz	875 MHz – 890 MHz	
DC_1-21	1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD

TABLE 1-6 (continued)

E-UTRA DC Band	E-UTRA Band	Uplink (UL) operating band			Downlink (DL) operating band			Duplex Mode
		BS receive / UE transmit			BS transmit / UE receive			
		$F_{UL_low} - F_{UL_high}$			$F_{DL_low} - F_{DL_high}$			
	21	1447.9 MHz	–	1462.9 MHz	1495.9 MHz	–	1510.9 MHz	
DC_2-4	2	1850 MHz	–	1910 MHz	1930 MHz	–	1990 MHz	FDD
	4	1710 MHz	–	1755 MHz	2110 MHz	–	2155 MHz	
DC_2-13	2	1850 MHz	–	1910 MHz	1930 MHz	–	1990 MHz	FDD
	13	777 MHz	–	787 MHz	746 MHz	–	756 MHz	
DC_3-5	3	1710 MHz	–	1785 MHz	1805 MHz	–	1880 MHz	FDD
	5	824 MHz	–	849 MHz	869 MHz	–	894 MHz	
DC_3-7	3	1710 MHz	–	1785 MHz	1805 MHz	–	1880 MHz	FDD
	7	2500 MHz	–	2570 MHz	2620 MHz	–	2690 MHz	
DC_3-8	3	1710 MHz	–	1785 MHz	1805 MHz	–	1880 MHz	FDD
	8	880 MHz	–	915 MHz	925 MHz	–	960 MHz	
DC_3-19	3	1710 MHz	–	1785 MHz	1805 MHz	–	1880 MHz	FDD
	19	830 MHz	–	845 MHz	875 MHz	–	890 MHz	
DC_3-20	3	1710 MHz	–	1785 MHz	1805 MHz	–	1880 MHz	FDD
	20	832 MHz	–	862 MHz	791 MHz	–	821 MHz	
DC_3-26	3	1710 MHz	–	1785 MHz	1805 MHz	–	1880 MHz	FDD
	26	814 MHz	–	849 MHz	859 MHz	–	894 MHz	
DC_4-7	4	1710 MHz	–	1755 MHz	2110 MHz	–	2155 MHz	FDD
	7	2500 MHz	–	2570 MHz	2620 MHz	–	2690 MHz	
DC_4-12	4	1710 MHz	–	1755 MHz	2110 MHz	–	2155 MHz	FDD
	12	699 MHz	–	716 MHz	729 MHz	–	746 MHz	
DC_4-13	4	1710 MHz	–	1755 MHz	2110 MHz	–	2155 MHz	FDD
	13	777 MHz	–	787 MHz	746 MHz	–	756 MHz	
DC_4-17	4	1710 MHz	–	1755 MHz	2110 MHz	–	2155 MHz	FDD
	17	704 MHz	–	716 MHz	734 MHz	–	746 MHz	
DC_5-7	5	824 MHz	–	849 MHz	869 MHz	–	894 MHz	FDD
	7	2500 MHz	–	2570 MHz	2620 MHz	–	2690 MHz	
DC_5-12	5	824 MHz	–	849 MHz	869 MHz	–	894 MHz	FDD
	12	699 MHz	–	716 MHz	729 MHz	–	746 MHz	
DC_5-17	5	824 MHz	–	849 MHz	869 MHz	–	894 MHz	FDD
	17	704 MHz	–	716 MHz	734 MHz	–	746 MHz	
DC_7-20	7	2500 MHz	–	2570 MHz	2620 MHz	–	2690 MHz	FDD
	20	832 MHz	–	862 MHz	791 MHz	–	821 MHz	
DC_7-28	7	2500 MHz	–	2570 MHz	2620 MHz	–	2690 MHz	FDD
	28	703 MHz	–	748 MHz	758 MHz	–	803 MHz	

TABLE 1-6 (end)

E-UTRA DC Band	E-UTRA Band	Uplink (UL) operating band			Downlink (DL) operating band			Duplex Mode
		BS receive / UE transmit			BS transmit / UE receive			
		$F_{UL_low} - F_{UL_high}$			$F_{DL_low} - F_{DL_high}$			
DC_19-21	19	830 MHz	–	845 MHz	875 MHz	–	890 MHz	FDD
	21	1447.9 MHz	–	1462.9 MHz	1495.9 MHz	–	1510.9 MHz	
DC_39-41	39	1880 MHz	–	1920 MHz	1880 MHz	–	1920 MHz	TDD
	41	2496 MHz	–	2690 MHz	2496 MHz	–	2690 MHz	

NOTE 1 – The DC configurations will follow corresponding CA configurations as defined in Table 1.1.2-2.

1.1 Channel bandwidth

Requirements in the present document are specified for the channel bandwidths listed in Table 1.1-1.

TABLE 1.1-1

Transmission bandwidth configuration N_{RB} in E-UTRA channel bandwidths

Channel bandwidth $BW_{Channel}$ (MHz)	1.4	3	5	10	15	20
Transmission bandwidth configuration N_{RB}	6	15	25	50	75	100

1.1.1 Channel bandwidths per operating band

TABLE 1.1.1-1

E-UTRA channel bandwidth

E-UTRA band / Channel bandwidth						
E-UTRA band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
1			Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes ¹	Yes ¹
3	Yes	Yes	Yes	Yes	Yes ¹	Yes ¹
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes ¹		
6			Yes	Yes ¹		
7			Yes	Yes	Yes ³	Yes ^{1,3}
8	Yes	Yes	Yes	Yes ¹		
9			Yes	Yes	Yes ¹	Yes ¹
10			Yes	Yes	Yes	Yes
11			Yes	Yes ¹		
12	Yes	Yes	Yes ¹	Yes ¹		
13			Yes ¹	Yes ¹		

TABLE 1.1.1-1 (*end*)

E-UTRA band / Channel bandwidth						
E-UTRA band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
14			Yes ¹	Yes ¹		
...						
17			Yes ¹	Yes ¹		
18			Yes	Yes ¹	Yes ¹	
19			Yes	Yes ¹	Yes ¹	
20			Yes	Yes ¹	Yes ¹	Yes ¹
21			Yes	Yes ¹	Yes ¹	
22			Yes	Yes	Yes ¹	Yes ¹
23	Yes	Yes	Yes	Yes	Yes ¹	Yes ¹
24			Yes	Yes		
25	Yes	Yes	Yes	Yes	Yes ¹	Yes ¹
26	Yes	Yes	Yes	Yes ¹	Yes ¹	
27	Yes	Yes	Yes	Yes ¹		
28		Yes	Yes	Yes ¹	Yes ¹	Yes ^{1, 2}
30			Yes	Yes ¹		
31	Yes	Yes ¹	Yes ¹			
...						
33			Yes	Yes	Yes	Yes
34			Yes	Yes	Yes	
35	Yes	Yes	Yes	Yes	Yes	Yes
36	Yes	Yes	Yes	Yes	Yes	Yes
37			Yes	Yes	Yes	Yes
38			Yes	Yes	Yes ³	Yes ³
39			Yes	Yes	Yes	Yes
40			Yes	Yes	Yes	Yes
41			Yes	Yes	Yes	Yes
42			Yes	Yes	Yes	Yes
43			Yes	Yes	Yes	Yes
44		Yes	Yes	Yes	Yes	Yes

NOTE 1 – Refers to the bandwidth for which a relaxation of the specified UE receiver sensitivity requirement is allowed.

NOTE 2 – For the 20 MHz bandwidth, the minimum requirements are specified for E-UTRA UL carrier frequencies confined to either 713-723 MHz or 728-738 MHz.

NOTE 3 – Refers to the bandwidth for which the uplink transmission bandwidth can be restricted by the network for some channel assignments in FDD/TDD co-existence scenarios in order to meet unwanted emissions requirements (§ 4.3).

1.1.2 Channel bandwidths per operating band for CA

The requirements for CA in this specification are defined for CA configurations with associated bandwidth combination sets. For inter-band CA, a *CA configuration* is a combination of operating bands, each supporting a CA bandwidth class. For intra-band contiguous CA, a CA configuration is a single operating band supporting a CA bandwidth class.

For each CA 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. Furthermore, if the UE indicates support of a bandwidth combination set that is a superset of another applicable bandwidth combination set, the latter is supported by the UE even if not indicated.

Requirements for intra-band contiguous CA are defined for the CA configurations and bandwidth combination sets specified in Table 1.1.2-1. Requirements for inter-band CA are defined for the CA configurations and bandwidth combination sets specified in Table 1.1.2-2.

The downlink component carrier combinations for a given CA configuration shall be symmetrical in relation to channel centre unless stated otherwise in Table 1.1.2-1 or Table 1.1.2-2.

TABLE 1.1.2-1

E-UTRA CA configurations and bandwidth combination sets defined for intra-band contiguous CA

E-UTRA CA configuration / Bandwidth combination set						
E-UTRA CA configuration	Uplink CA configurations (NOTE 3)	Component carriers in order of increasing carrier frequency			Maximum aggregated bandwidth (MHz)	Bandwidth combination set
		Channel bandwidths for carrier (MHz)	Channel bandwidths for carrier (MHz)	Channel bandwidths for carrier (MHz)		
CA_1C	CA_1C	15	15		40	0
		20	20			
CA_2C		5	20		40	0
		10	15, 20			
		15	10, 15, 20			
		20	5, 10, 15, 20			
CA_3C	CA_3C	5, 10, 15	20		40	0
		20	5, 10, 15, 20			
CA_7C	CA_7C	15	15		40	0
		20	20			
		10	20		40	1
		15	15, 20			
		20	10, 15, 20			
CA_12B	-	5	5, 10		15	0
CA_23B	-	10	10		20	0
		5	15			
CA_27B	-	1.4, 3, 5	5		13	0

TABLE 1.1.2-1 (end)

E-UTRA CA configuration / Bandwidth combination set						
E-UTRA CA configuration	Uplink CA configurations (NOTE 3)	Component carriers in order of increasing carrier frequency			Maximum aggregated bandwidth (MHz)	Bandwidth combination set
		Channel bandwidths for carrier (MHz)	Channel bandwidths for carrier (MHz)	Channel bandwidths for carrier (MHz)		
		1.4, 3	10			
CA_38C	CA_38C	15	15		40	0
		20	20			
CA_39C	CA_39C	5,10,15	20		35	0
		20	5, 10, 15			
CA_40C	CA_40C	10	20		40	0
		15	15			
		20	10, 20			
		10, 15	20		40	1
		15	15			
		20	10, 15, 20			
CA_40D	CA_40C	10, 15, 20	20	20	60	0
		20	10, 15	20		
		20	20	10, 15		
CA_41C	CA_41C	10	20		40	0
		15	15, 20			
		20	10, 15, 20			
		5, 10	20		40	1
		15	15, 20			
		20	5, 10, 15, 20			
CA_41D	CA_41C	10	20	15	60	0
		10	15, 20	20		
		15	20	10, 15		
		15	10, 15, 20	20		
		20	15, 20	10		
		20	10, 15, 20	15, 20		
CA_42C	CA_42C	5, 10, 15, 20	20		40	0
		20	5, 10, 15			

NOTE 1 – The CA Configuration refers to an operating band and a CA bandwidth class specified in Table 1.1.2-4 (the indexing letter). Absence of a CA bandwidth class for an operating band implies support of all classes.

NOTE 2 – For the supported CC bandwidth combinations, the CC downlink and uplink bandwidths are equal.

NOTE 3 – Uplink CA configurations are the configurations supported by the present release of the Recommendation.

TABLE 1.1.2-2

**E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA
(two bands)**

E-UTRA CA configuration / Bandwidth combination set											
E-UTRA CA Configuration	Uplink CA configurations (NOTE 4)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set	Dual uplink CA capability
CA_1A-3A	-	1			Yes	Yes	Yes	Yes	40	0	Yes
		3			Yes	Yes	Yes	Yes			
CA_1A-5A	-	1				Yes			20	0	Yes
		5				Yes					
		1			Yes	Yes	Yes	Yes	30	1	Yes
		5			Yes	Yes					
CA_1A-7A	-	1			Yes	Yes	Yes	Yes	40	0	Yes
		7				Yes	Yes	Yes			
CA_1A-8A	-	1			Yes	Yes	Yes	Yes	30	0	Yes
		8			Yes	Yes					
		1			Yes	Yes			20	1	Yes
		8			Yes	Yes					
		1			Yes	Yes	Yes	Yes	30	2	No
		8		Yes	Yes	Yes					
CA_1A-11A	-	1			Yes	Yes	Yes	Yes	30	0	No
		11			Yes	Yes					
CA_1A-18A	-	1			Yes	Yes	Yes	Yes	35	0	No
		18			Yes	Yes	Yes				
		1			Yes	Yes			20	1	No
		18			Yes	Yes					
CA_1A-19A	-	1			Yes	Yes	Yes	Yes	35	0	Yes
		19			Yes	Yes	Yes				
CA_1A-20A	-	1			Yes	Yes	Yes	Yes	40	0	No
		20			Yes	Yes	Yes	Yes			
CA_1A-21A	-	1			Yes	Yes	Yes	Yes	35	0	Yes
		21			Yes	Yes	Yes				
CA_1A-26A	-	1			Yes	Yes	Yes	Yes	35	0	No
		26			Yes	Yes	Yes				
		1			Yes	Yes			20	1	No
		26			Yes	Yes					
CA_1A-28A	-	1			Yes	Yes	Yes	Yes	40	0	
		28			Yes	Yes	Yes	Yes			
		1			Yes	Yes			20	1	

TABLE 1.1.2-2 (continued)

E-UTRA CA configuration / Bandwidth combination set											
E-UTRA CA Configuration	Uplink CA configurations (NOTE 4)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set	Dual uplink CA capability
		28			Yes	Yes					
CA_1A-41A	-	1			Yes	Yes	Yes	Yes	40	0	
		41			Yes	Yes	Yes	Yes			
CA_1A-41C	-	1			Yes	Yes	Yes	Yes	60	0	
		41	See CA_41C Bandwidth Combination Set 1 in Table 1.1.2-1								
CA_1A-42A	-	1			Yes	Yes	Yes	Yes	40	0	No
		42			Yes	Yes	Yes	Yes			
CA_1A-42C	-	1			Yes	Yes	Yes	Yes	60	0	No
		42	See CA_42C in Table 1.1.2-1								
CA_2A-4A	-	2	Yes	Yes	Yes	Yes	Yes	Yes	40	0	Yes
		4			Yes	Yes	Yes	Yes			
		2			Yes	Yes			20	1	Yes
		4			Yes	Yes					
		2			Yes	Yes	Yes	Yes	40	2	Yes
		4			Yes	Yes	Yes	Yes			
CA_2A-4A-4A	-	2			Yes	Yes	Yes	Yes	60	0	No
		4	See CA_4A-4A in Table 1.1.2-3								
CA_2A-5A	-	2			Yes	Yes	Yes	Yes	30	0	No
		5			Yes	Yes					
		2			Yes	Yes			20	1	
		5			Yes	Yes					
CA_2A-2A-5A	-	2	See CA_2A-2A in Table 1.1.2-3						50	0	
		5			Yes	Yes					
CA_2A-12A	-	2			Yes	Yes	Yes	Yes	30	0	No
		12			Yes	Yes					
		2			Yes	Yes	Yes	Yes	30	1	No
		12		Yes	Yes	Yes					
CA_2A-12B	-	2			Yes	Yes	Yes	Yes	35	0	No
		12	See CA_12B in Table 1.1.2-1								
CA_2A-13A	-	2			Yes	Yes	Yes	Yes	30	0	Yes
		13				Yes					
		2			Yes	Yes			20	1	Yes
		13				Yes					
CA_2A-2A-13A	-	2	See CA_2A-2A in Table 1.1.2-3						50	0	No

TABLE 1.1.2-2 (continued)

E-UTRA CA configuration / Bandwidth combination set											
E-UTRA CA Configuration	Uplink CA configurations (NOTE 4)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set	Dual uplink CA capability
		13				Yes					
CA_2A-17A	-	2			Yes	Yes			20	0	No
		17			Yes	Yes					
CA_2A-29A	-	2			Yes	Yes			20	0	No
		29		Yes	Yes	Yes					
		2			Yes	Yes			20	1	No
		29			Yes	Yes					
		2			Yes	Yes	Yes	Yes	30	2	No
		29			Yes	Yes					
CA_2C-29A	-	2	See CA_2C in Table 1.1.2-1						50	0	
		29			Yes	Yes					
CA_2A-30A	-	2			Yes	Yes	Yes	Yes	30	0	No
		30			Yes	Yes					
CA_3A-5A	-	3				Yes	Yes	Yes	30	0	Yes
		5			Yes	Yes					
		3				Yes			20	1	Yes
		5			Yes	Yes					
		3			Yes	Yes	Yes	Yes	30	2	Yes
		5			Yes	Yes					
CA_3A-7A	-	3			Yes	Yes	Yes	Yes	40	0	Yes
		7				Yes	Yes	Yes			
CA_3A-7C	-	3			Yes	Yes	Yes	Yes	60	0	No
		7	See CA_7C Bandwidth combination set 1 in table 1.1.2-1								
CA_3C-7A	-	3	See CA_3C in table 1.1.2-1						60	0	No
		7			Yes	Yes	Yes	Yes			
CA_3A-8A	-	3				Yes	Yes	Yes	30	0	Yes
		8			Yes	Yes					
		3				Yes			20	1	Yes
		8			Yes	Yes					
		3			Yes	Yes	Yes	Yes	30	2	No
		8		Yes	Yes	Yes					
CA_3A-19A	-	3			Yes	Yes	Yes	Yes	35	0	Yes
		19			Yes	Yes	Yes				
CA_3A-20A	-	3			Yes	Yes	Yes	Yes	30	0	Yes

TABLE 1.1.2-2 (continued)

E-UTRA CA configuration / Bandwidth combination set											
E-UTRA CA Configuration	Uplink CA configurations (NOTE 4)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set	Dual uplink CA capability
		20			Yes	Yes			40	1	Yes
		3			Yes	Yes	Yes	Yes			
		20			Yes	Yes	Yes	Yes			
CA_3A-26A	-	3			Yes	Yes	Yes	Yes	35	0	Yes
		26			Yes	Yes	Yes		20	1	Yes
		3			Yes	Yes					
		26			Yes	Yes					
CA_3A-27A	-	3			Yes	Yes	Yes	Yes	30	0	No
		27			Yes	Yes					
CA_3A-28A	-	3			Yes	Yes	Yes	Yes	40	0	No
		28			Yes	Yes	Yes	Yes			
CA_4A-5A	-	4			Yes	Yes			20	0	No
		5			Yes	Yes					
		4			Yes	Yes	Yes	Yes	30	1	No
		5			Yes	Yes					
CA_4A-4A-5A	-	4	See CA_4A-4A in Table 1.1.2-3						50	0	
		5			Yes	Yes					
CA_4A-7A	-	4			Yes	Yes			30	0	Yes
		7			Yes	Yes	Yes	Yes			
CA_4A-4A-7A	-	4			Yes	Yes			40	0	
		4			Yes	Yes					
		7			Yes	Yes	Yes	Yes			
CA_4A-12A	-	4	Yes	Yes	Yes	Yes			20	0	Yes
		12			Yes	Yes					
		4	Yes	Yes	Yes	Yes	Yes	Yes	30	1	Yes
		12			Yes	Yes					
		4			Yes	Yes	Yes	Yes	30	2	Yes
		12		Yes	Yes	Yes					
		4			Yes	Yes			20	3	Yes
		12			Yes	Yes			30	4	Yes
		4			Yes	Yes	Yes	Yes			
		12			Yes	Yes					
CA_4A-4A-12A	-	4	See CA_4A-4A in Table 1.1.2-3						50	0	No
		12			Yes	Yes					

TABLE 1.1.2-2 (continued)

E-UTRA CA configuration / Bandwidth combination set											
E-UTRA CA Configuration	Uplink CA configurations (NOTE 4)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set	Dual uplink CA capability
CA_4A-12B	-	4			Yes	Yes	Yes	Yes	35	0	No
		12	See CA_12B in Table 1.1.2-1								
CA_4A-13A	-	4			Yes	Yes	Yes	Yes	30	0	Yes
		13				Yes					
		4			Yes	Yes			20	1	Yes
		13				Yes					
CA_4A-4A-13A	-	4	See CA_4A-4A in Table 1.1.2-3						50	0	No
		13				Yes					
CA_4A-17A	-	4			Yes	Yes			20	0	Yes
		17			Yes	Yes					
CA_4A-27A	-	4			Yes	Yes	Yes	Yes	30	0	No
		27		Yes	Yes	Yes					
CA_4A-29A	-	4			Yes	Yes			20	0	No
		29		Yes	Yes	Yes					
		4			Yes	Yes			20	1	No
		29			Yes	Yes					
		4			Yes	Yes	Yes	Yes	30	2	No
		29			Yes	Yes					
CA_4A-30A	-	4			Yes	Yes	Yes	Yes	30	0	No
		30			Yes	Yes					
CA_5A-7A	-	5	Yes	Yes	Yes	Yes			30	0	Yes
		7				Yes	Yes	Yes			
CA_5A-12A	-	5			Yes	Yes			20	0	Yes
		12			Yes	Yes					
CA_5A-13A	-	5			Yes	Yes			20	0	
		13				Yes					
CA_5A-17A	-	5			Yes	Yes			20	0	Yes
		17			Yes	Yes					
CA_5A-25A	-	5			Yes	Yes			30	0	No
		25			Yes	Yes	Yes	Yes			
CA_5A-30A	-	5			Yes	Yes			20	0	No
		30			Yes	Yes					
CA_7A-8A	-	7				Yes	Yes	Yes	30	0	
		8		Yes	Yes	Yes					
CA_7A-12A	-	7			Yes	Yes	Yes	Yes	30	0	

TABLE 1.1.2-2 (continued)

E-UTRA CA configuration / Bandwidth combination set														
E-UTRA CA Configuration	Uplink CA configurations (NOTE 4)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set	Dual uplink CA capability			
		12			Yes	Yes								
CA_7A-20A	-	7				Yes	Yes	Yes	30	0	Yes			
		20			Yes	Yes								
		7				Yes	Yes	Yes	40	1	Yes			
		20			Yes	Yes	Yes	Yes						
CA_7A-28A	-	7			Yes	Yes	Yes	Yes	35	0	Yes			
		28			Yes	Yes	Yes							
CA_8A-11A	-	8			Yes	Yes			20	0	No			
		11			Yes	Yes								
CA_8A-20A	-	8			Yes	Yes			20	0	No			
		20			Yes	Yes								
		8		Yes	Yes	Yes						20	1	No
		20			Yes	Yes								
CA_8A-40A	-	8			Yes	Yes			30	0	No			
		40			Yes	Yes	Yes	Yes						
CA_11A-18A	-	11			Yes	Yes			25	0	No			
		18			Yes	Yes	Yes							
CA_12A-25A	-	12			Yes	Yes			30	0	No			
		25			Yes	Yes	Yes	Yes						
CA_12A-30A	-	12			Yes	Yes			20	0	No			
		30			Yes	Yes								
CA_18A-28A	-	18			Yes	Yes	Yes		25	0	No			
		28			Yes	Yes								
CA_19A-21A	-	19			Yes	Yes	Yes		30	0	Yes			
		21			Yes	Yes	Yes							
CA_19A-42A	-	19			Yes	Yes	Yes		35	0	No			
		42			Yes	Yes	Yes	Yes						
CA_19A-42C	-	19			Yes	Yes	Yes		55	0	No			
		42	See CA_42C in Table 1.1.2-1											
CA_20A-32A	-	20			Yes	Yes			30	0	No			
		32			Yes	Yes	Yes	Yes						
CA_23A-29A	-	23			Yes	Yes	Yes	Yes	30	0	No			
		29		Yes	Yes	Yes								
		23			Yes	Yes			20	1	No			
		29		Yes	Yes	Yes								

TABLE 1.1.2-2 (end)

E-UTRA CA configuration / Bandwidth combination set											
E-UTRA CA Configuration	Uplink CA configurations (NOTE 4)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set	Dual uplink CA capability
CA_25A-41A	-	25			Yes	Yes	Yes	Yes	40	0	
		41			Yes	Yes	Yes	Yes			
CA_25A-41C	-	25			Yes	Yes	Yes	Yes	60	0	
		41	See CA_41C Bandwidth Combination Set 1 in Table 1.1.2-1								
CA_26A-41A	-	26			Yes	Yes	Yes		40	0	
		41			Yes	Yes	Yes	Yes			
CA_26A-41C	-	26			Yes	Yes	Yes		55	0	
		41	See CA_41C Bandwidth Combination Set 1 in Table 1.1.2-1								
CA_29A-30A	-	29			Yes	Yes			20	0	No
		30			Yes	Yes					
CA_39A-41A	-	39				Yes	Yes	Yes	40	0	Yes
		41						Yes			
CA_39A-41C	-	39				Yes	Yes	Yes	60	0	
		41						Yes			
		41						Yes			
CA_39C-41A	-	39	See CA_39C in Table 1.1.2-1						55	0	
		41						Yes			
CA_41A-42A	-	41				Yes	Yes	Yes	40	0	No
		42				Yes	Yes	Yes			

NOTE 1 – The CA Configuration refers to an operating band and a CA bandwidth class specified in Table 1.1.2-4 (the indexing letter). Absence of a CA bandwidth class for an operating band implies support of all classes.

NOTE 2 – For each band combination, all combinations of indicated bandwidths belong to the set.

NOTE 3 – For the supported CC bandwidth combinations, the CC downlink and uplink bandwidths are equal.

NOTE 4 – Uplink CA configurations are the configurations supported by the present release of the Recommendation.

TABLE 1.1.2-2b

**E-UTRA CA configurations and bandwidth combination sets defined for inter-band CA
(three bands)**

E-UTRA CA configuration / Bandwidth combination set										
E-UTRA CA Configuration	Uplink CA configurations (NOTE 5)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set
CA_1A-3A-5A	-	1			Yes	Yes	Yes	Yes	50	0
		3			Yes	Yes	Yes	Yes		
		5			Yes	Yes				
		1			Yes	Yes			40	1
		3			Yes	Yes	Yes	Yes		
		5			Yes	Yes				
CA_1A-3A-8A	-	1			Yes	Yes	Yes	Yes	50	0
		3			Yes	Yes	Yes	Yes		
		8		Yes	Yes	Yes				
		1			Yes	Yes			40	1
		3			Yes	Yes	Yes	Yes		
		8		Yes	Yes	Yes				
		1			Yes	Yes	Yes		40	2
		3			Yes	Yes	Yes			
		8		Yes	Yes	Yes				
CA_1A-3A-19A	-	1			Yes	Yes	Yes	Yes	55	0
		3			Yes	Yes	Yes	Yes		
		19			Yes	Yes	Yes			
CA_1A-3A-26A	-	1			Yes	Yes	Yes	Yes	50	0
		3			Yes	Yes	Yes	Yes		
		26			Yes	Yes				
CA_1A-3A-20A (NOTE 4)	-	1			Yes	Yes	Yes	Yes	60	0
		3			Yes	Yes	Yes	Yes		
		20			Yes	Yes	Yes	Yes		
CA_1A-5A-7A	-	1			Yes	Yes			40	0
		5			Yes	Yes				
		7				Yes	Yes	Yes		
		1			Yes	Yes	Yes	Yes	50	1
		5			Yes	Yes				
		7				Yes	Yes	Yes		
CA_1A-7A-20A (NOTE 4)	-	1			Yes	Yes	Yes	Yes	50	0
		7				Yes	Yes	Yes		
		20			Yes	Yes				

TABLE 1.1.2-2b (continued)

E-UTRA CA configuration / Bandwidth combination set										
E-UTRA CA Configuration	Uplink CA configurations (NOTE 5)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set
CA_1A-18A-28A	-	1			Yes	Yes	Yes	Yes	45	0
		18			Yes	Yes	Yes			
		28			Yes	Yes				
		1			Yes	Yes	Yes	Yes	40	1
		18			Yes	Yes				
		28			Yes	Yes				
CA_1A-19A-21A	-	1			Yes	Yes	Yes	Yes	50	0
		19			Yes	Yes	Yes			
		21			Yes	Yes	Yes			
CA_2A-4A-5A	-	2			Yes	Yes	Yes	Yes	50	0
		4			Yes	Yes	Yes	Yes		
		5			Yes	Yes				
CA_2A-4A-12A	-	2			Yes	Yes	Yes	Yes	50	0
		4			Yes	Yes	Yes	Yes		
		12			Yes	Yes				
CA_2A-4A-13A	-	2			Yes	Yes	Yes	Yes	50	0
		4			Yes	Yes	Yes	Yes		
		13				Yes				
CA_2A-4A-29A	-	2			Yes	Yes	Yes	Yes	50	0
		4			Yes	Yes	Yes	Yes		
		29			Yes	Yes				
CA_2A-5A-12A	-	2			Yes	Yes	Yes	Yes	40	0
		5			Yes	Yes				
		12			Yes	Yes				
CA_2A-5A-13A	-	2			Yes	Yes	Yes	Yes	40	0
		5			Yes	Yes				
		13				Yes				
CA_2A-5A-30A	-	2			Yes	Yes	Yes	Yes	40	0
		5			Yes	Yes				
		30			Yes	Yes				
CA_2A-12A-30A	-	2			Yes	Yes	Yes	Yes	40	0
		12			Yes	Yes				
		30			Yes	Yes				
CA_2A-29A-30A	-	2			Yes	Yes	Yes	Yes	40	0
		29			Yes	Yes				

TABLE 1.1.2-2b (end)

E-UTRA CA configuration / Bandwidth combination set										
E-UTRA CA Configuration	Uplink CA configurations (NOTE 5)	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth (MHz)	Bandwidth combination set
		30			Yes	Yes				
CA_3A-7A-20A	-	3			Yes	Yes	Yes	Yes	60	0
		7				Yes	Yes	Yes		
		20			Yes	Yes	Yes	Yes		
CA_4A-5A-12A	-	4			Yes	Yes	Yes	Yes	40	0
		5			Yes	Yes				
		12			Yes	Yes				
CA_4A-5A-13A	-	4			Yes	Yes	Yes	Yes	40	0
CA_4A-5A-30A	-	5			Yes	Yes			40	0
		13				Yes				
		4			Yes	Yes	Yes	Yes		
CA_4A-7A-12A	-	5			Yes	Yes			40	0
		30			Yes	Yes				
		4			Yes	Yes				
CA_4A-7A-12A	-	7			Yes	Yes	Yes	Yes	40	0
		12			Yes	Yes				
		4			Yes	Yes				
CA_4A-12A-30A	-	2			Yes	Yes	Yes	Yes	40	0
		12			Yes	Yes				
		30			Yes	Yes				
CA_4A-29A-30A	-	4			Yes	Yes	Yes	Yes	40	0
		29			Yes	Yes				
		30			Yes	Yes				
CA_7A-8A-20A	-	7				Yes	Yes	Yes	40	0
		8		Yes	Yes	Yes				
		20			Yes	Yes				

NOTE 1 – The CA Configuration refers to a combination of an operating band and a CA bandwidth class specified in Table 1.1.2-4 (the indexing letter). Absence of a CA bandwidth class for an operating band implies support of all classes.

NOTE 2 – For each band combination, all combinations of indicated bandwidths belong to the set.

NOTE 3 – For the supported CC bandwidth combinations, the CC downlink and uplink bandwidths are equal.

NOTE 4 – A terminal which supports a DL CA configuration shall support all the lower order fallback DL CA combinations and it shall support at least one bandwidth combination set for each of the constituent lower order DL combinations containing all the bandwidths specified within each specific combination set of the upper order DL combination.

NOTE 5 – Uplink CA configurations are the configurations supported by the present release of specifications.