

RESOLUTION 170 (WRC-19)

**Additional measures for satellite networks in the fixed-satellite service
in frequency bands subject to Appendix 30B for the enhancement
of equitable access to these frequency bands**

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

considering

- a) that WARC Orb-88 created an allotment Plan for the use of the frequency bands 4 500-4 800 MHz, 6 725-7 025 MHz, 10.70-10.95 GHz, 11.20-11.45 GHz and 12.75-13.25 GHz;
- b) that WRC-07 revised the regulatory regime governing the use of the frequency bands mentioned in *considering a)* above,

considering further

- a) the additional regulatory measures for the enhancement of equitable access included in Resolution **553 (WRC-15)**;
- b) that the Rule of Procedure on No. **9.6** states that “the intent of Nos. **9.6 (9.7 to 9.21), 9.27** and Appendix **5** is to identify to which administrations a request for coordination is to be addressed, and not to state an order of priorities for rights to a particular orbital position”,

recognizing

- a) that Article 44 of the ITU Constitution lays down the basic principles for the use of the radio-frequency spectrum and the geostationary-satellite and other satellite orbits, taking into account the needs of developing countries;
- b) that the “first-come first-served” concept can restrict and sometimes prevent access to and use of certain frequency bands and orbital positions;
- c) the relative disadvantage for developing countries in coordination negotiations for various reasons such as a lack of resources and expertise;
- d) that Resolution **2 (Rev.WRC-03)** resolves that “the registration with the Radiocommunication Bureau of frequency assignments for space radiocommunication services and their use do not provide any permanent priority for any individual country or groups of countries and do not create an obstacle to the establishment of space systems by other countries”,

recognizing further

- a) that information provided by the Radiocommunication Bureau (BR) in ITU Radiocommunication Sector studies indicates that a very significant number of Appendix **30B** submissions have been received by BR in the time period 1 January 2009 to 22 November 2019, and that the table below summarizes the data provided by BR into those studies (see also Attachment 2 to this Resolution) and shows the variations for the number of networks at the various stages;

	Request for conversion without change of initial allotment (national service area)	Request for conversion with changes within the envelope of initial allotment (national service area)	Request for conversion with changes outside the envelope of initial allotment (national service area)	Request for conversion with changes outside the envelope of initial allotment (supra national service area)	Request for additional use (national service area)	Request for additional use (supra national service area and global coverage ^{**})	Suppression
2009 Q1 + Q2	0	0	0	1	3	11	0
2009 Q3 + Q4	0	0	0	0	0	6	15
2010 Q1 + Q2	1	0	0	0	1	14	2
2010 Q3 + Q4	0	0	0	0	1	19	1
2011 Q1 + Q2	1	0	0	0	2	18	1
2011 Q3 + Q4	1	0	0	0	2	20	23
2012 Q1 + Q2	0	0	0	0	3	20	1
2012 Q3 + Q4	1	0	2	0	2	23	4
2013 Q1 + Q2	1	0	0	0	4	27	7
2013 Q3 + Q4	1	0	0	0	0	17	12
2014 Q1 + Q2	1	0	0	0	2	30	42
2014 Q3 + Q4	0	0	0	0	7	20	0
2015 Q1 + Q2	0	0	1	0	1	30	11
2015 Q3 + Q4	0	0	0	0	0	26	7
2016 Q1 + Q2	0	1	0	0	0	23	8
2016 Q3 + Q4	0	0	0	0	1	24	4
2017 Q1 + Q2	0	0	0	0	4	34	1
2017 Q3 + Q4	0	1	0	0	0	25	7
2018 Q1 + Q2	0	0	0	0	6	20	9
2018 Q3 + Q4	0	0	0	0	0	10	15
2019 Q1 + Q2	1	1	0	0	0	4	17
2019 Q3	0	0	0	0	1	3	6

^{**} Notices for additional use with service area and coverage beyond the national territory of the notifying administration.

b) that the number of Appendix **30B** submissions made by some administrations is large, which may not be realistic;

c) that the use of certain combinations of technical parameters in submissions (e.g. high-gain receiving space station antennas) can make systems/submissions overly sensitive to interference, in such a way that subsequent submissions for conversion from allotment into assignments with changes would cause interference to those systems,

taking into account

that the majority of submissions under § 6.1 of Appendix **30B** have a global coverage and service area, which is typically changed to limited service area with a considerably wider coverage area at the time of submission under § 6.17, notwithstanding the Note to Appendix **4** data item B.3.b.1, which states “Taking due account of applicable technical restrictions and allowing some reasonable degree of flexibility for satellite operations, administrations should, to the extent practicable, align the areas the satellite steerable beams could cover with the service area of their networks with due regard to their service objectives”, and this is complicating coordination for administrations attempting to convert their national allotments into assignments or introducing an additional system for national use in a technically and economically viable manner, or for administrations acting on behalf of a group of named administrations introducing an additional system for their national use in a technically and economically viable manner,

resolves

that, as of 23 November 2019, the special procedure described in Attachment 1 to this Resolution shall be applied for the processing of submissions received by BR under Article 6 of Appendix **30B** for conversion of the allotment of an administration into an assignment with modifications outside the envelope of the initial allotment while restricted to providing service to its national territory, designated by test points as contained in the corresponding allotment, a submission by an administration of an additional system the service area of which is limited to its national territory, designated by test points as contained in the allotment, or a submission by an administration acting on behalf of a group of named administrations of an additional system the service area of which is limited to the national territories of the group of named administrations, designated by test points as contained in the allotments, in the frequency bands 4 500-4 800 MHz, 6 725-7 025 MHz, 10.70-10.95 GHz, 11.20-11.45 GHz and 12.75-13.25 GHz, if requested by an administration or one acting on behalf of a group of named administrations in respect of its submission, as specified in Attachment 1 to this Resolution,

further resolves

that, when coordinating networks submitted under these additional measures, administrations, in particular those having satellite networks in process or included in the List with global coverage, exercise the utmost goodwill, and endeavour to overcome any difficulties encountered by the incoming network, in order to accommodate the incoming submission while respecting the underlying principles of No. **9.6** and its associated Rule of Procedure¹ which would apply by analogy to Article 6 of Appendix **30B**; in addressing, in particular, difficulties encountered in coordination due to the issue of potential Earth-to-space harmful interference caused by an incoming network which originates outside the service area of other potentially affected networks, administrations having potentially affected networks with global coverage shall implement, to the maximum extent possible, means to accommodate the incoming network, taking into account actual operating characteristics of the potentially affected networks,

¹ “in the application of Article **9** no administration obtains any particular priority as a result of being the first to start either the advance publication phase (Section I of Article **9**) or the request for coordination procedure (Section II of Article **9**).”

instructs the Director of the Radiocommunication Bureau

to provide assistance, if requested by an administration, in the generation of a minimum ellipse as called for in § 3 c) of Attachment 1 to this Resolution.

ATTACHMENT 1 TO
RESOLUTION 170 (WRC-19)

**Additional measures for satellite networks in the fixed-satellite service in
frequency bands subject to Appendix 30B for the enhancement
of equitable access to these frequency bands**

1 The special procedure described in this Attachment can only be applied once by an administration, or one acting on behalf of a group of named administrations², having no assignment in the List of Appendix 30B or assignment submitted under § 6.1 of Appendix 30B.

2 With regard to the latter case, in order to benefit from application of the special procedure, the submitting administration may either withdraw or modify its submission previously sent to the Radiocommunication Bureau (BR) under § 6.1 of Appendix 30B or submit its submission under § 6.17 of Appendix 30B to meet the criteria of this special procedure. Whenever an administration acts on behalf of a group of named administrations, all members of that group shall withdraw their submissions, if any, previously sent to BR under § 6.1 of Appendix 30B.

3 Administrations, or ones acting on behalf of a group of named administrations, seeking to apply this special procedure shall submit their request to BR, with the information specified in § 6.1 of Appendix 30B. Specifically, this information shall contain:

- a) in the cover letter to BR, the information that the administration, or one acting on behalf of a group of named administrations, requests the use of this special procedure;
- b) for an administration acting on its own behalf, a service area limited to the territory as contained in its national allotment, or as submitted in the case that a new Member State of the Union does not have an allotment in the Plan and has not submitted a request under § 7.2 of Article 7 of Appendix 30B, or, in the case of submission of an additional system by an administration acting on behalf of a group of named administrations, a service area limited to the national territories of the named administrations;

² Whenever, under this Resolution, an administration acts on behalf of a group of named administrations, all members of that group can no longer apply this procedure or take part in another group of named administrations that requests to apply this procedure. Furthermore, all members of that group shall have no assignment in the List of Appendix 30B or assignment submitted under § 6.1 of Appendix 30B.

- c) a minimum ellipse for an administration acting on its own behalf, or a beam formed by combining all individual minimum ellipses for a group of named administrations, determined by the same set of test points contained in the Appendix **30B** Plan from each administration, using the relevant BR software application. An administration, or one acting on behalf of a group of named administrations, may request BR to create such a diagram. See the *resolves* section of this Resolution.

4 If the information submitted under § 3 above is found to be incomplete, BR shall immediately seek from the administration concerned any clarification required and information not provided.

5 An administration, or one acting on behalf of a group of named administrations, using this special procedure shall effect coordination with other administrations as required in § 6 below before:

- i) submitting a request under § 6.17³ of Appendix **30B** to have the satellite network entered into the Appendix **30B** List; and
- ii) bringing into use a frequency assignment.

6 Following the successful application of §§ 1 to 4 above, BR shall, ahead of submissions not yet processed under § 6.3 of Appendix **30B**, promptly:

- a) examine the information with respect to its conformity with § 6.3 of Appendix **30B**;
- b) identify, in accordance with Appendix 1 to this Attachment, any administration with which coordination may need to be effected^{4, 5};
- c) include their names in the publication under d) below;
- d) publish⁶, as appropriate, the complete information in the International Frequency Information Circular (BR IFIC) within the time-limit as specified in Appendix **30B**;
- e) inform the administrations concerned of its actions and communicate the results of its calculations, drawing attention to the relevant BR IFIC.

³ During the coordination with an administration identified as affected, the notifying administration may change the beam to a shaped beam. Therefore, BR shall accept submissions of satellite networks applying this Resolution and containing a shaped beam under § 6.17 of Appendix **30B**, if the characteristics of the submission under § 6.17 of Appendix **30B** are within the envelope of the characteristics of the submission under § 6.1 of Appendix **30B**.

⁴ BR shall also identify the specific satellite networks with which coordination needs to be effected.

⁵ Whenever an administration acts on behalf of a group of named administrations, all members of that group retain the right to respond in respect of their own allotments or assignments.

⁶ If the payments are not received in accordance with the provisions of ITU Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, BR shall cancel the publication, after informing the administration concerned. BR shall inform all administrations of such action and that the network specified in the publication in question no longer has to be taken into consideration by BR and other administrations. BR shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with above-mentioned Council Decision 482 unless the payment has already been received.

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7 In applying §§ 6.5, 6.12, 6.14, 6.21 and 6.22 of Appendix **30B**, the criteria in Annex 4 to Appendix **30B** shall be replaced by those given in Appendix 1 to this Attachment.

8 Administrations identified under § 6 b) above, especially with a global coverage in uplink and limited service area, are required to apply all practical measures to overcome coordination difficulties encountered by the incoming network, in accordance with *further resolves* above.

9 If there is still continuing disagreement, the notifying administration may seek the assistance of BR.

10 If there is still continuing disagreement, the notifying administration can resubmit the notice under § 6.25 of Appendix **30B** and insist upon its reconsideration; BR, on the condition of a favourable finding under § 6.21 and § 6.22 of Appendix **30B** with respect to allotments in the Plan, shall enter the assignment provisionally in the List.

11 The administration responsible for the assignment which was the basis of the provisional entry under § 6.25 of Appendix **30B** shall be deemed to have agreed to the proposed assignment if BR is informed that the new assignment in the List has been in use, together with the assignment which was the basis for the disagreement, for at least four months without any complaint of harmful interference being made, and § 6.29 does not apply⁷.

12 The start of the four-month period referred to in § 11 above and the conditions for the operation to verify no harmful interference during this period shall be agreed by both administrations. If there is no agreement between administrations, any administration may seek the assistance of BR.

13 If there is no reply under § 8 or § 12 above from the notifying administration of the existing network to the request for collaboration of the notifying administration of the incoming network, or if there are problems in communication between the two administrations, the notifying administration of the incoming network may seek the assistance of BR. In this event, BR shall forthwith send a telefax to the notifying administration of the existing network which has failed to reply, requesting an immediate beginning of collaboration with the notifying administration of the incoming network.

14 If there is no acknowledgement of receipt within 30 days after BR's action under § 13 above, BR shall immediately send a reminder providing an additional 15-day period for response. In the absence of such an acknowledgement within 15 days, it shall be deemed that the notifying administration of the existing network which has failed to acknowledge receipt has undertaken that no complaint will be made in respect of any harmful interference affecting its own assignments which may be caused by the assignment of the notifying administration of the incoming network for which coordination was requested.

⁷ Should harmful interference be caused at any later time by an assignment submitted under the provisions of this Resolution and for which § 14 has not been applied and which is entered in the List under § 6.25 of Appendix **30B** to any assignment in the List in respect of which § 6.25 of Appendix **30B** was applied, the administrations shall exercise the utmost goodwill and efforts to overcome any difficulties encountered by the incoming network, and the interfered-with administration shall identify appropriate remedial measures to be implemented, taking into account actual operations and cooperation with the incoming network.

15 The calculation of the reference situation (*C/I*) of an assignment with which agreement has been deemed to have been obtained under § 11 above shall not take into account the interference produced by the assignment for which the provisions of § 6.25 of Appendix **30B** have been applied until an explicit agreement has been reached.

16 The provisions in this Attachment are supplementary to the provisions of Article 6 of Appendix **30B**.

APPENDIX 1 TO ATTACHMENT 1 TO RESOLUTION 170 (WRC-19)

Criteria for determining whether an assignment is considered to be affected by networks submitted to Appendix 30B under this Resolution

The criteria as contained in Annex 4 to Appendix **30B** continue to apply in order to determine if a proposed new assignment applying the procedures of this Attachment affects:

- a) national allotments in the Plan;
- b) an assignment stemming from the conversion of an allotment into an assignment without modification or with modification within the envelope of the allotment;
- c) an allotment requested under Article 7 of Appendix **30B** by a new Member State of the Union which has received unfavourable findings under Article 7 and has been subsequently treated as a submission under § 6.1 of Appendix **30B**;
- d) assignments stemming from the application of § 6.35 of Appendix **30B**;
- e) assignments for which the procedures of this Resolution have been previously applied;
- f) assignments recorded in the List until 22 November 2019 with a service area limited to the national territories.

An assignment which appears in the List with a service area beyond national territories or which BR has previously examined after receiving complete information and published under § 6.7 of Appendix **30B**, which does not fall into any of the above categories and that is not applying the procedures of this Attachment, is considered as being affected by a proposed new assignment that is applying the procedures of this Attachment:

- 1) if the orbital spacing between its orbital position and the orbital position of the proposed new assignment is equal to or less than:
 - 1.1) 7° in the frequency bands 4 500-4 800 MHz (space-to-Earth) and 6 725-7 025 MHz (Earth-to-space);
 - 1.2) 6° in the frequency bands 10.70-10.95 GHz (space-to-Earth), 11.20-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space);

2) however, an administration is considered as not being affected by a proposed new assignment that is applying the procedures of this Attachment if the conditions listed in 2.1 or 2.2 are satisfied:

- 2.1) the calculated⁸ Earth-to-space single-entry carrier-to-interference $(C/I)_u$ value at each test point associated with the assignment under consideration is greater than or equal to a reference value of 27 dB, or $(C/N)_u + 6$ dB⁹, or any already accepted Earth-to-space single entry (C/I) , whichever is the lowest, and the calculated⁸ space-to-Earth single-entry $(C/I)_d$ value everywhere within the service area of the assignment under consideration is greater than or equal to a reference value¹⁰ of 23.65 dB, or $(C/N)_d + 8.65$ dB¹¹, or any already accepted value, whichever is the lowest, and the calculated⁸ overall aggregate $(C/I)_{agg}$ value at each test point associated with the assignment under consideration is greater than or equal to a reference value of 21 dB, or $(C/N)_t + 7$ dB¹², or any already accepted overall aggregate $(C/I)_{agg}$ value, whichever is the lowest, with a tolerance of 0.45 dB¹³ in the case of assignments not stemming from the conversion of an allotment into an assignment without modification, or when the modification is within the envelope characteristics of the initial allotment;
- 2.2) in the frequency band 4 500-4 800 MHz (space-to-Earth), the power flux-density (pfd) produced under assumed free-space propagation conditions does not exceed the threshold values shown below, anywhere within the service area of the potentially affected assignment:

$0 \leq \theta \leq 0.09$	-240.5	dB(W/(m ² · Hz))
$0.09 < \theta \leq 3$	$-240.5 + 20\log(\theta/0.09)$	dB(W/(m ² · Hz))
$3 < \theta \leq 5.5$	$-216.79 + 0.75 \cdot \theta^2$	dB(W/(m ² · Hz))
$5.5 < \theta \leq 7$	$-194.1 + 25\log(\theta/5.5)$	dB(W/(m ² · Hz))

where θ denotes nominal geocentric separation (degrees) between interfering and interfered with satellite networks;

⁸ Including a computational precision of 0.05 dB.

⁹ $(C/N)_u$ is calculated as in Appendix 2 to Annex 4 to Appendix 30B.

¹⁰ The reference values within the service area are interpolated from the reference values at the test points.

¹¹ $(C/N)_d$ is calculated as in Appendix 2 to Annex 4 to Appendix 30B.

¹² $(C/N)_t$ is calculated as in Appendix 2 to Annex 4 to Appendix 30B.

¹³ Inclusive of the 0.05 dB computational precision.

in the frequency band 6 725-7 025 MHz (Earth-to-space), the pfd produced at the location in the geostationary-satellite orbit (GSO) of the potentially affected assignment under assumed free-space propagation conditions does not exceed $-201.0 - G_{Rx}$ dB(W/(m² · Hz)), where G_{Rx} is the relative space station uplink receive antenna gain of the potentially affected assignment at the location of the interfering earth station;

in the frequency bands 10.7-10.95 and 11.2-11.45 GHz (space-to-Earth), the pfd produced under assumed free-space propagation conditions does not exceed the threshold values shown below, anywhere within the service area of the potentially affected assignment:

$0 \leq \theta \leq 0.05$	-235.0	dB(W/(m ² · Hz))
$0.05 < \theta \leq 3$	$-235.0 + 20\log(\theta/0.05)$	dB(W/(m ² · Hz))
$3 < \theta \leq 5$	$-207.98 + 0.95 \cdot \theta^2$	dB(W/(m ² · Hz))
$5 < \theta \leq 6$	$-184.23 + 25\log(\theta/5)$	dB(W/(m ² · Hz))

where θ denotes nominal geocentric separation (degrees) between interfering and interfered with satellite networks;

in the frequency band 12.75-13.25 GHz (Earth-to-space), the pfd produced at the location in the GSO of the potentially affected assignment under assumed free-space propagation conditions does not exceed $-205.0 - G_{Rx}$ dB(W/(m² · Hz)), where G_{Rx} is the relative space station uplink receive antenna gain of the potentially affected assignment at the location of the interfering earth station.

In addition to the above, and as a consequence of the reduced coordination arc in 1) above as compared to that in Annex 3 to Appendix **30B**, the following limits shall be applied, instead of the limits contained in Annex 3 to Appendix **30B**, for submissions made under this Resolution.

Under assumed free-space propagation conditions, the pfd (space-to-Earth) of a proposed new allotment or assignment produced on any portion of the surface of the Earth shall not exceed:

- -131.4 dB(W/(m² · MHz)) in the frequency band 4 500-4 800 MHz; and
- -118.4 dB(W/(m² · MHz)) in the frequency bands 10.70-10.95 GHz and 11.20-11.45 GHz.

Under assumed free-space propagation conditions, the pfd (Earth-to-space) of a proposed new allotment or assignment shall not exceed:

- -140.0 dB(W/(m² · MHz)) towards any location in the GSO located more than 7° from the proposed orbital position in the frequency band 6 725-7 025 MHz; and
- -133.0 dB(W/(m² · MHz)) towards any location in the GSO located more than 6° from the proposed orbital position in the frequency band 12.75-13.25 GHz.

APPENDIX 2 TO ATTACHMENT 1 TO
RESOLUTION 170 (WRC-19)

Protection criteria for a new incoming network

Incoming network	Allotments or assignments to be protected	Protection criteria
Assignment applying the special procedure	Allotment in the Plan	Annex 4
	Assignment converted from allotment without modification	Annex 4
	Assignment converted from allotment with modification within the envelope of the allotment	Annex 4
	Assignment converted from allotment with modification outside the envelope of the allotment and the special procedure applied	Annex 4
	Assignment converted from allotment with modification outside the envelope of the allotment and the special procedure NOT applied	New criteria
	Former existing system	Annex 4
	Additional system for which the special procedure applied	Annex 4
	Additional system with frequency assignments recorded in the List until 22 November 2019 with service area limited to national territories for which the special procedure NOT applied	Annex 4
	Additional system with frequency assignments submitted under item 6.1 of Appendix 30B with service area limited to national territories for which the special procedure NOT applied	New criteria
	Additional system with frequency assignments with service area beyond national territories for which the special procedure NOT applied	New criteria
	Request under Article 7 but transferred to Article 6	Annex 4
	New allotment through the application of § 6.35	Annex 4
Conversion of allotment or new additional system for which the special procedure NOT applied	All	Annex 4

ATTACHMENT 2 TO RESOLUTION 170 (WRC-19)

**Number of Appendix 30B submissions that have been received by the
Radiocommunication Bureau**

Number of new submissions

	Request for conversion without change of initial allotment (national service area)	Request for conversion with changes within the envelope of initial allotment (national service area)	Request for conversion with changes outside the envelope of initial allotment (national service area)	Request for conversion with changes outside the envelope of initial allotment (supra national service area)	Request for additional use (national service area)	Request for additional use (with supra national service area and global coverage)	Total
F						103	103
HOL						33	33
RUS/IK						29	29
E						28	28
PNG						28	28
IND					12	14	26
CHN					8	15	23
G						21	21
UAE						19	19
ISR						17	17
RUS					9	7	16
QAT						12	12
ARS/ARB						10	10
LUX						10	10
S						8	8
B			2		2	3	7
D						6	6
INS					3	3	6
J						6	6
USA				1		5	6
BLR	1					4	5
CYP						5	5
BGD	1					3	4
IRN		1				3	4
MCO						4	4
MEX	1				3		4
MLA					1	3	4
TUR						4	4

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	Request for conversion without change of initial allotment (national service area)	Request for conversion with changes within the envelope of initial allotment (national service area)	Request for conversion with changes outside the envelope of initial allotment (national service area)	Request for conversion with changes outside the envelope of initial allotment (supra national service area)	Request for additional use (national service area)	Request for additional use (with supra national service area and global coverage)	Total
CAN			1			2	3
KAZ						3	3
BUL	1					1	2
HNG						2	2
LAO						2	2
NCG						2	2
NPL		1			1		2
VTN					1	1	2
ALG						1	1
ARM						1	1
BOL		1					1
CBG						1	1
ETH						1	1
GRC						1	1
IRQ						1	1
MNE	1						1
MNG	1						1
NOR						1	1
PAK						1	1
ROU	1						1
SDN	1						1
Total:	8	3	3	1	40	424	479

Number of suppressions

	2009-2019	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019*
ARS/ARB	11						3	1	1	1	2	3
BLR	1										1	
BUL	1					1						
CAN	2						1	1				
CHN	16						15					1
E	1											1
F	14						2	1			6	5
F/EUT	38	15	3	16	2	1			1			
G	9				1			6		1		1
HOL	5								3			2
IND	8			1				6	1			
ISR	4										2	2
KOR	10					10						
LBY	1			1								
LUX	26			1		4	13		2	5	1	
MCO	1					1						
MLA	1								1			
NOR	2						1	1				
PNG	6			3						1	1	1
RUS	12			2	1	1	5	1	2			
RUS/IK	9										6	3
S	4						2		1		1	
SDN	1											1
TUR	2										2	
UAE	4										1	3
USA	2					1		1				
VTN	2				1						1	
Total	193	15	3	24	5	19	42	18	12	8	24	23

* In 2019, the statistics stop at 30 September.

