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| A close up of a sign  Description automatically generated | **World Radiocommunication Conference (WRC-23) Dubai, 20 November - 15 December 2023** | |  |
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| PLENARY MEETING | | **Addendum 2 to Document 4-E** | |
|  | | **14 August 2023** | |
|  | | **Original: English** | |
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| Director, Radiocommunication Bureau | | | |
| REPORT OF THE DIRECTOR ON THE  ACTIVITIES OF THE RADIOCOMMUNICATION SECTOR | | | |
| PART 2 | | | |
| EXPERIENCE IN THE APPLICATION OF THE RADIO REGULATORY PROCEDURES AND OTHER RELATED MATTERS | | | |
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# 1 Introduction

This part of the Bureau’s report summarizes the experience of the Radiocommunication Bureau in administering the Radio Regulations (RR), including the difficulties and inconsistencies encountered in the application of the relevant provisions.

Most of the issues in this part can be considered under agenda item 9.2. As for the other issues that could not be associated with any specific agenda item, except agenda item 9.2, the Conference will be invited to consider appropriate mechanisms for fixing the problems reported, including the option of formulating suitable agenda item(s) for the next Conference. In considering WRC-23 agenda item 9.2, the following footnote in the WRC-23 agenda shall be taken into account: “This agenda sub-item is strictly limited to the Report of the Director on any difficulties or inconsistencies encountered in the application of the Radio Regulations and the comments from administrations.”

# 2 Preparation of the Radio Regulations (2020 edition)

## 2.1 General comments

The edition of the Radio Regulations reflecting the changes decided by WRC‑19 was published during the third quarter of 2020 in all ITU languages.

## 2.2 Errors, inconsistencies and out-of-date provisions

### 2.2.1 Typographical and other apparent errors (including incorrect references)

In the preparation of the 2020 edition of the RR, the Bureau has corrected the typographical errors that were noticed in the 2016 edition, and which were reported to WRC-19.

In addition, the Bureau introduced those consequential changes and amendments to the RR as necessitated by the decisions of WRC-19, for which the Bureau received explicit authorizations from WRC-19.

Subsequent to the publication of the 2020 edition, a number of typographical and other apparent errors in different languages were detected in that edition. These errors, as summarized in Table 1, are submitted to WRC‑23 in the appropriate format for their consideration, with a view to obtaining the necessary approval for correcting them in the forthcoming edition of the RR.

Table 1

List of typographical and other apparent errors discovered in the 2020 edition of the RR

| # | Language | Page | Incorrect or missing text | | Correct text | |
| --- | --- | --- | --- | --- | --- | --- |
| 1 |  | Vol. 1 | **Articles** | |  | |
| 1 | All | 73  (RR5-39) | **5.182** *Additional allocation:* in Western Samoa, the band 75.4-87 MHz is also allocated to the broadcasting service on a primary basis. | | **5.182** *Additional allocation:* in Samoa, the band 75.4-87 MHz is also allocated to the broadcasting service on a primary basis. | |
| 2 | E, F | 91 (RR5-57) | **5.286E** *Additional allocation:* in Cape Verde…, the bands 454-456 MHz and 459-460 MHz are also allocated to the mobile-satellite (Earth-to-space) service on a primary basis. (WRC-07) | | **5.286E** *Additional allocation:* in Cabo Verde…, the bands 454-456 MHz and 459-460 MHz are also allocated to the mobile-satellite (Earth-to-space) service on a primary basis. (WRC-07) | |
| 3 | S | 112 (RR5-78) | **5.388** Las bandas de frecuencias 1 885-2 025 MHz y 2 110-2 200 MHz están destinadas a su utilización, a nivel mundial, por las administraciones que deseen introducir las Telecomunicaciones Móviles Internacionales-2000 (IMT). Dicha utilización no impide la utilización de estas bandas de frecuencias por otros servicios a los que están atribuidas.  Las bandas de frecuencias deben ponerse a disposición de las IMT-2000 de acuerdo con lo dispuesto en la Resolución **212 (Rev.CMR-15)**\*. Véase también la Resolución **223 (Rev.CMR-15)**\*. (CMR-15) | | **5.388** Las bandas de frecuencias 1 885-2 025 MHz y 2 110-2 200 MHz están destinadas a su utilización, a nivel mundial, por las administraciones que deseen introducir las Telecomunicaciones Móviles Internacionales- (IMT). Dicha utilización no impide la utilización de estas bandas de frecuencias por otros servicios a los que están atribuidas.  Las bandas de frecuencias deben ponerse a disposición de las IMT de acuerdo con lo dispuesto en la Resolución **212 (Rev.CMR-15)**\*. Véase también la Resolución **223 (Rev.CMR-15)**\*. (CMR-15) | |
| 4 | E, F | 113 (RR5-79) | **5.389F** In Algeria, Cape Verde, …, the use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services. (WRC-19) | | **5.389F** In Algeria, Cabo Verde, …, the use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services. (WRC-19) | |
| 5 | E, A, C, S, F | 150  (RR5-116) | 5.509E In the frequency bands 14.50-14.75 GHz in countries listed in Resolution **163 (WRC‑15)** and 14.50‑14.8 GHz in countries listed in Resolution **164** **(WRC‑15)**, the location of earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall maintain a separation distance of at least 500 km from the border(s) of other countries unless shorter distances are explicitly agreed by those administrations. No. **9.17** does not apply. When applying this provision, administrations should consider the relevant parts of these Regulations and the latest relevant ITU‑R Recommendations.     (WRC‑15)  5.509F In the frequency bands 14.50-14.75 GHz in countries listed in Resolution **163 (WRC‑15)** and 14.50‑14.8 GHz in countries listed in Resolution **164 (WRC‑15)**, earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall not constrain the future deployment of the fixed and mobile services.     (WRC‑15) | | 5.509E In the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC‑15)** and 14.5‑14.8 GHz in countries listed in Resolution **164** **(WRC‑15)**, the location of earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall maintain a separation distance of at least 500 km from the border(s) of other countries unless shorter distances are explicitly agreed by those administrations. No. **9.17** does not apply. When applying this provision, administrations should consider the relevant parts of these Regulations and the latest relevant ITU‑R Recommendations.     (WRC‑15)  5.509F In the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC‑15)** and 14.5‑14.8 GHz in countries listed in Resolution **164 (WRC‑15)**, earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall not constrain the future deployment of the fixed and mobile services.     (WRC‑15) | |
| 6 | E (align other languages if necessary, F is correct) | 168  (RR5-134) | **5.551H** The equivalent power flux-density (epfd) produced in the frequency band 42.5-43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth), or in the broadcasting-satellite service operating in the frequency band 42-42.5 GHz, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time: | | 5.551H The equivalent power flux-density (epfd) produced in the frequency band 42.5-43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth) or in the broadcasting-satellite service, operating in the frequency band 42-42.5 GHz, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:  Correction to No.**5.551H:** the comma in the English text is not correctly placed. The comma should be removed from after “fixed-satellite service (space-to-Earth)” and a comma should be inserted after “broadcasting-satellite service” . | |
| 7 | E | 195 (RR9-1) | 6 **A.9.6** The provisions of Appendices **30**, **30A** and **30B** do not apply to non-geostationary service-satellite systems in the fixed-satellite. | | 6 **A.9.6** The provisions of Appendices **30**, **30A** and **30B** do not apply to non-geostationary satellite systems in the fixed-satellite service. | |
| 8 | R | 214 (PP11-4) | 11 **11.28.1** В случае спутниковых сетей или систем, не подлежащих процедуре координации в соответствии с разделом II Статьи **9**, администрация, считающая, что представленные изменения характеристик, первоначально опубликованных в соответствии с п. **9.2В**, могут создать неприемлемые помехи их существующим или планируемым спутниковым сетям или системам, может направить свои замечания заявляющей администрации. После этого обе администрации должны разрешить все трудности на основе сотрудничества.     (ВКР-12) | | 11 **11.28.1** In case of satellite networks or systems not subject to the coordination procedure under Section II of Article **9**, an administration believing that unacceptable interference may be caused to its existing or planned satellite networks or systems by submitted modifications to the characteristics initially published under No. **9.2B** may provide its comments to the notifying administration. Both administrations shall thereafter cooperate to resolve any difficulties.    (WRC‑12)  11 **11.28.1** В случае спутниковых сетей или систем, не подлежащих процедуре координации в соответствии с разделом II Статьи **9**, администрация, считающая, что представленные изменения характеристик, первоначально опубликованных в соответствии с п. **9.2В**, могут создать неприемлемые помехи их существующим или планируемым спутниковым сетям или системам, может направить свои замечания заявляющей администрации. После этого обе администрации должны сотрудничать для разрешения любых трудностей. | |
| 9 | R | 230 (PP13-2) | No.13.6 … В случае возникновения разногласий между заявляющей администрацией и Бюро Комитет должен внимательно исследовать этот вопрос, принимая во внимание представленные администрациями через Бюро дополнительные вспомогательные материалы, с соблюдением предельных сроков, установленных Комитетом. Применение этого положения не должно препятствовать применению других положений Регламента радиосвязи.     (ВКР‑19) | | No.13.6 … В случае  разногласий между заявляющей администрацией и Бюро Комитет должен внимательно исследовать этот вопрос, принимая во внимание представленные администрациями через Бюро дополнительные вспомогательные материалы, с соблюдением предельных сроков, установленных Комитетом. Применение этого положения не должно препятствовать применению других положений Регламента радиосвязи. (ВКР-19)  No.13.6 ….In case of disagreement between the notifying administration and the Bureau, the matter shall be carefully investigated by the Board, including taking into account submissions of additional supporting materials from administrations through the Bureau within the deadlines as established by the Board. The application of this provision shall not preclude the application of other provisions of the Radio Regulations. (WRC‑19)  No. 13 | |
| 10 | All | 243 (RR16-1) | No. 16.2 The international monitoring system comprises only those monitoring stations which have been so nominated by administrations in the information sent to the Secretary-General in accordance with Resolution ITU‑R 23 and the most recent version of Recommendation ITU‑R SM.1139. These stations may be operated by an administration or, in accordance with an authorization granted by the appropriate administration, by a public or private enterprise, by a common monitoring service established by two or more countries, or by an international organization.     (WRC‑15) | | No. 16.2 The international monitoring system comprises only those monitoring stations which have been so nominated by administrations in the information sent to the Secretary-General in accordance with Resolution ITU‑R 23-3 and the most recent version of Recommendation ITU‑R SM.1139. These stations may be operated by an administration or, in accordance with an authorization granted by the appropriate administration, by a public or private enterprise, by a common monitoring service established by two or more countries, or by an international organization.      (WRC‑15) | |
| 11 | E, A, C, S, F | 301 (RR22-21) | No. 22.40 Under assumed free-space propagation conditions, the power flux-density emitted by an earth station of a geostationary-satellite network not for feeder links for the broadcasting-satellite service in the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC‑15)** and 14.50-14.8 GHz in countries listed in Resolution **164 (WRC‑15)** shall not exceed the value of −76 dB(W/(m2 · 27 MHz)) at any point in the geostationary-satellite orbit.     (WRC‑15) | | No. 22.40 Under assumed free-space propagation conditions, the power flux-density emitted by an earth station of a geostationary-satellite network not for feeder links for the broadcasting-satellite service in the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC‑15)** and 14.5-14.8 GHz in countries listed in Resolution **164 (WRC‑15)** shall not exceed the value of −76 dB(W/(m2 · 27 MHz)) at any point in the geostationary-satellite orbit.      (WRC‑15) | |
| 12 | E | 425 (RR58-1) | **58.1** The provisions of the International Telecommunications Regulations, taking into account ITU-T Recommendations, shall apply. | | **58.1** The provisions of the International Telecommunication Regulations, taking into account ITU-T Recommendations, shall apply. | |
|  |  | **Vol. 2** | **Appendices** | |  | |
| 13 | All | AP  18-6  p.304 | *Specific notes*  … | | *Specific notes*  …  *ww)* (SUP - WRC-19)  …  *xx)* (SUP - WRC-19)  …  *zx)* (SUP - WRC-19) | |
| 14 | A | AP  42-1  p. 761 | A9A-A9Z | البحرين (مملكة) | A9A-A9Z | البحرين مملكة |
| 15 | C | AP  42-1  p. 761 | A9A-A9Z | 巴林国 | A9A-A9Z | 巴林王国 |
| 16 | All | AP  42-1,  p. 761 | CPA-CPZ | Bolivia (Republic of) | CPA-CPZ | Bolivia ( Plurinational State of) |
| 17 | E | AP  42-1,  p. 761 | D4A-D4Z | Cape Verde (Republic of) | D4A-D4Z | Cabo Verde (Republic of) |
| 18 | A | AP  42-1,  p. 761 | D4A-D4Z | الرأس الأخضر (جمهورية) | D4A-D4Z | جمهورية كابو فيردي |
| 19 | F | AP  42-1,  p. 761 | D4A-D4Z | Cap-Vert (République du) | D4A-D4Z | Cabo Verde (République de) |
| 20 | E | AP  42-1,  p. 761 | D6A-D6Z | Comoros (Union of) | D6A-D6Z | Comoros (Union of the) |
| 21 | A | AP  42-1,  p. 761 | D6A-D6Z | جزر القمر (اتحاد) | D6A-D6Z | اتحاد جزر القمر |
| 22 | C | AP  42-2,  p. 762 | EZA-EZZ | 土库曼斯坦共和国 | EZA-EZZ | 土库曼斯坦 |
| 23 | R | AP  42-2,  p. 762 | EZA-EZZ | Туркменистан  (Республика) | EZA-EZZ | Туркменистан |
| 24 | All | AP  42-2,  p. 762 | HAA-HAZ | Hungary (Republic of) | HAA-HAZ | Hungary |
| 25 | All | AP  42-2,  p. 762 | HGA-HGZ | Hungary (Republic of) | HGA-HGZ | Hungary |
| 26 | C | AP  42-2,  p. 762 | HVA-HVZ | 梵蒂冈 | HVA-HVZ | 梵蒂冈城国 |
| 27 | A | AP  42-3,  p. 763 | J5A-J5Z | غينيا-بيساو (جمهورية) | J5A-J5Z | جمهورية غينيا - بيساو |
| 28 | R | AP  42-3,  p. 763 | J5A-J5Z | Гвинея-Биссау  (Республика) | J5A-J5Z | Гвинея-Бисау  (Республика) |
| 29 | C | AP  42-3,  p. 763 | J6A-J6Z | 圣卢西亚岛 | J6A-J6Z | 圣卢西亚 |
| 30 | F | AP  42-3,  p. 763 | J8A-J8Z | Saint-Vincent-et-Grenadines | J8A-J8Z | Saint-Vincent-et-les-Grenadines |
| 31 | All | AP  42-4,  p. 764 | T5A-T5Z | Somali Democratic Republic | T5A-T5Z | Somalia (Federal Republic of) |
| 32 | C | AP  42-4,  p. 764 | T6A-T6Z | 阿富汗伊斯兰国 | T6A-T6Z | 阿富汗 |
| 33 | C | AP  42-5,  p. 765 | YAA-YAZ | 阿富汗伊斯兰国 | YAA-YAZ | 阿富汗 |
| 34 | A | AP  42-5,  p. 765 | YVA-YYZ | ﻓﻨﺰويلا (جمهورية ... البوليفارية) | YVA-YYZ | جمهورية فنـزويلا البوليفارية |
| 35 | C | AP  42-5,  p. 765 | YVA-YYZ | 委内瑞拉共和国 | YVA-YYZ | 委内瑞拉玻利瓦尔共和国 |
| 36 | E | AP  42-6,  p. 766 | Z3A-Z3Z | North Macedonia | Z3A-Z3Z | North Macedonia (Republic of) |
| 37 | A | AP  42-6,  p. 766 | Z3A-Z3Z | مقدونيا الشمالية | Z3A-Z3Z | جمهورية مقدونيا الشمالية |
| 38 | S | AP  42-6,  p. 766 | Z3A-Z3Z | Macedonia del Norte | Z3A-Z3Z | Macedonia del Norte (República de) |
| 39 | R | AP  42-6,  p. 766 | Z3A-Z3Z | Северная Македония | Z3A-Z3Z | Северная Македония (Республика) |
| 40 | E | AP  42-6,  p. 766 | 4JA-4KZ | Azerbaijani Republic | 4JA-4KZ | Azerbaijan (Republic of) |
| 41 | A | AP  42-6,  p. 766 | 4JA-4KZ | أذربيجان (جمهورية) | 4JA-4KZ | جمهورية أذربيجان |
| 42 | S | AP  42-6,  p. 766 | 4JA-4KZ | Azerbaiyana (República) | 4JA-4KZ | Azerbaiyán (República de) |
| 43 | F | AP  42-6,  p. 766 | 4JA-4KZ | Azerbaïdjanaise (République) | 4JA-4KZ | Azerbaïdjan (République d') |
| 44 | A | AP  42-6,  p. 766 | 4MA-4MZ | ﻓﻨﺰويلا (جمهورية ... البوليفارية) | 4MA-4MZ | جمهورية فنـزويلا البوليفارية |
| 45 | C | AP  42-6,  p. 766 | 4MA-4MZ | 委内瑞拉共和国 | 4MA-4MZ | 委内瑞拉玻利瓦尔共和国 |
| 46 | All | AP  42-6,  p. 766 | 5AA-5AZ | Libya | 5AA-5AZ | Libya (State of) |
| 47 | A | AP  42-6,  p. 766 | 5WA-5WZ | ساموا (دولة ... المستقلة) | 5WA-5WZ | دولة ساموا المستقلة |
| 48 | C | AP  42-6,  p. 766 | 5WA-5WZ | 西萨摩亚独立国 | 5WA-5WZ | 萨摩亚独立国 |
| 49 | All | AP  42-7,  p. 767 | 6OA-6OZ | Somali Democratic Republic | 6OA-6OZ | Somalia (Federal Republic of) |

### 2.2.2 Inconsistencies, provisions that are lacking clarity

2.2.2.1 There are still some inconsistencies in the 2020 edition of the Radio Regulations. Some of these inconsistencies are summarized in Table 2, with a view to bringing them to the attention of WRC‑23 which may wish to propose corrective action.

Table 2

Inconsistencies in the RR, provisions that are lacking clarity

| # | Language | Page | Nature of inconsistency | Possible corrective action |
| --- | --- | --- | --- | --- |
|  |  | Volume, page | ARTICLES/APPENDIX | ARTICLES/APPENDIX |
|  |  | Volume 1 | Article 5 | Article 5 |
| 1 | All | 40 (RR5-6) | Footnotes Nos. **5.54B** and **5.54C**, which refer to the additional allocation, are included in the row of meteorological aids service in the Table for the band 8.3-9 MHz. | To move the reference to Nos. **5.54B** and **5.54C** to the last row of the Table for the band 8.3-9 MHz, since these alternative allocations replaces all services of that band. |
| 2 | All | 46 (RR5-12) | Footnote No. **5.78** is included in the last row of the Table for the band 415-472 kHz in Regions 2 and 3, meaning that it applies to more than one service in that part of the table. In fact, it applies only to the aeronautical radionavigation service. | To move the reference to No. **5.78** in the table for the band 415-472 kHz in Regions 2 and 3 to the row containing the secondary allocation to the aeronautical radionavigation service. |
| 3 | All | 52 (RR5-18) | Footnote No. **5.112**, which refers to an additional allocation in a country of Region 3, is listed in the Table for the band 2 194-2 300 kHz in Region 1. | To remove No. **5.112** from the band 2 194-2 300 kHz in Region 1 of the Table of Frequency Allocations. |
| 4 | All | 56 (RR5-22) | Footnote No. **5.133** is included in the last row of the Table for the band 5 060-5 250 kHz in all Regions, meaning that it applies to more than one service in that part of the table. In fact, it applies only to the mobile, except aeronautical mobile, service. | To move the reference to No. **5.133** in the table for the band 5 060-5 250 kHz to the row containing the secondary allocation to the mobile, except aeronautical mobile, service. |
| 5 | All | 69 (RR5-35) | Footnote No. **5.166A**, which refers to different category of the amateur service, also applies to radiolocation service. However,itis included in the row, relating to secondary allocation of amateur service in the Table for the band 50-52 MHz in Region 1. | To move the reference to No. **5.166A** to the last row of the Table for the band 50-52 MHz in Region 1. |
| 6 | All | 69 (RR5-35) | Footnotes Nos. **5.169** and **5.169A**, which refer to the alternative allocation, are included in the row of amateur service in the Table for the band 50-52 MHz in Region 1. | To move the reference to Nos. **5.169** and **5.169A** to the last row of the Table for the band 50-52 MHz in Region 1, since these alternative allocations replaces all services of that band. |
| 7 | All | 73 (RR5-39)  76 (RR5-42) | Footnote No. **5.206** is included in the last rows of the Table for the bands 137-137.025 MHz, 137.025-137.175 MHz, 137.175-137.825 MHz and 137.825-138 MHz in all Regions, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the aeronautical mobile (OR) service. | To move the reference to No. **5.206** in the table for the bands 137-137.025 MHz, 137.025-137.175 MHz, 137.175-137.825 MHz and 137.825-138 MHz to the rows containing the secondary allocation to the mobile except aeronautical mobile (R) service. |
| 8 | All | 73 (RR5-39)  76 (RR5-42) | Footnote No. **5.208** is included in the last rows of the Table for the bands 137-137.025 MHz, 137.025-137.175 MHz, 137.175-137.825 MHz and 137.825-138 MHz in all Regions, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the mobile-satellite service. | To move the reference to No. **5.208** in the table for the bands 137-137.025 MHz, 137.025-137.175 MHz, 137.175-137.825 MHz and 137.825-138 MHz to the rows containing the allocation to the mobile-satellite (space-to-Earth) service. |
| 9 | All | 89 (RR5-55) | Footnote No. **5.269** is included in the last rows of the Table for the bands 420-430 MHz and 440-450 MHz in all Regions, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the radiolocation service. | To move the reference to No. **5.269** in the table for the bands 420-430 MHz and 440-450 MHz to the rows containing the secondary allocation to the radiolocation service. |
| 10 | All | 89 (RR5-55) | Footnote No. **5.278** is included in the last rows of the Table for the bands 430-432 MHz, 432-438 MHz and 438-440 MHz in Regions 2 and 3, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the amateur service. | To move the reference to No. **5.278** in the table for the bands 430-432 MHz, 432-438 MHz and 438-440 MHz in Regions 2 and 3 to the rows containing the secondary allocation to the amateur service. |
| 11 | All | 89 (RR5-55) | Footnote No. **5.285** is included in the last row of the Table for the band 440-450 MHz in all Regions, meaning that it applies to more than one service in that part of the table. In fact, it applies only to the radiolocation service. | To move the reference to No. **5.285** in the table for the band 440-450 MHz to the row containing the secondary allocation to the radiolocation service. |
| 12 | All | 89 (RR5-55) | Footnotes Nos. **5.287** and **5.288**, which refer only to the maritime mobile service, are included in the last row of the Table for the band 456-459 MHz in all Regions, meaning that they apply to more than one service in that part of the table. | To move the reference to Nos. **5.287** and **5.288** in the table for the band 456-459 MHz to the row containing the allocation to the mobile service. |
| 13 | All | 92 (RR5-58) | Footnotes Nos. **5.287** and **5.288**, which refer only to the maritime mobile service, included in the last row of the Table for the band 460-470 MHz in all Regions, meaning that they apply to more than one service in that part of the table. | To move the reference to Nos. **5.287** and **5.288** in the table for the band 460-470 MHz to the row containing the allocation to the mobile service. |
| 14 | All | 92 (RR5-58) | Footnote No. **5.290**, which refers only to the meteorological-satellite service (space-to-Earth), is included in the last row of the Table for the band 460-470 MHz in all Regions, meaning that it applies to more than one service in that part of the table. | To move the reference to No. **5.290** in the table for the band 460-470 MHz to the row containing the secondary allocation to the meteorological-satellite service (space-to-Earth). |
| 15 | All | 92 (RR5-58) | Footnote No. **5.292** is included in the last row of the Table for the band 470-512 MHz in Region 2, meaning that it applies to more than one service in that part of the table. In fact, it applies only to the mobile service. | To move the reference to No. **5.292** in the table for the band 470-512 MHz in Region 2 to the row containing the secondary allocation to the mobile service. |
| 16 | All | 94 (RR5-60) | Footnote No. **5.300** makes additional allocation of the band 582-790 MHz to the fixed and mobile, except aeronautical mobile, services on a **secondary basis** in Saudi Arabia, Cameroon, Egypt, United Arab Emirates, Israel, Jordan, Libya, Oman, Qatar, the Syrian Arab Republic and Sudan.. However, this footnote is included in the Table for the band 694-790 MHz, which is already allocated to themobile, except aeronautical mobile, service in Region 1, but on a **primary** basis. | The countries listed in the footnote may wish to modify No. **5.300** to indicate that additional allocation to mobile, except aeronautical mobile services on a secondary basis is applicable only to the band 582-694 MHz, while the secondary allocation to the fixed service is made for the entire band 582-790 MHz.  Alternatively, footnote No. **5.300** may be modified to retain only a secondary allocation to mobile, except aeronautical mobile services in the band 582-694 MHz. In addition, another footnote could be established, containing additional allocation of the band 582-790 MHz to the fixed service on a secondary basis in these countries. |
| 17 | All | 94 (RR5-60) | Footnote No. **5.305** makes an additional allocationofthe frequency band 606-614 MHz to the radio astronomy service on a **primary** basis in China. However, footnote No. **5.306** makes an additional allocationofthe frequency band 608-614 MHz to the radio astronomy service on a **secondary** basis in Regions 1 and 3. Consequently, in the band 608 – 614 MHz the allocation to the radio astronomy service in China is on a primary basis by No. **5.305** and secondary basis by No. **5.306**. | To modify No. **5.306**, to exempt China from this secondary allocation. A possible example is “**5.306** *Additional allocation:* in Region 1, except in the African Broadcasting Area (see Nos. **5.10** to **5.13**), and  in Region 3, except in China and India, the band 608-614 MHz is also allocated to the radio astronomy service on a secondary basis.”.  *Editor’s note: for the addition of India, see the explanations for No.* ***5.307*** *below* |
| 18 | All | 94 (RR5-60) | Footnote No. **5.307**, makes an additional allocationofthe frequency band 608-614 MHz to the radio astronomy service on a **primary** basis in India. However, footnote No. **5.306** makes an additional allocationofthe frequency band 608-614 MHz to the radio astronomy service on a **secondary** basis in Regions 1 and 3. Consequently, in the band 608 – 614 MHz the allocation to the radio astronomy service in India is on a primary basis by No. **5.307** and secondary basis by No. **5.306**. | To modify No. **5.306** to exempt India from this secondary allocation. A possible example is “**5.306** *Additional allocation:* in Region 1, except in the African Broadcasting Area (see Nos. **5.10** to **5.13**), and  in Region 3, except in China and India, the band 608-614 MHz is also allocated to the radio astronomy service on a secondary basis.”. |
| 19 | All | 94 (RR5-60) | Footnote No. **5.308**,makes an additional allocationofthe frequency band 614-698 MHz to mobile service on a **primary** basis in Belize, Colombia and Guatemala. However, it is included in the Table with respect to the band  614-698 MHz which is already allocated to themobile service, but on a **secondary** basis in Region 2. | To change the type of No. **5.308** from “Additional allocation” to “Different category of service”. In addition, to move the reference to No **5.308** in the table for the band 614-698 MHz in Region 2 to the row containing a secondary allocation to the mobile service. |
| 20 | All | 92 (RR5-58) | Footnote No. **5.309** is included in the last rows of the Table for the bands 614-698 MHz and 698-806 MHz in Region 2, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the fixed service. | To move the reference to No. **5.309** in the table for the bands 614-698 MHz and 698-806 MHz in Region 2 to the rows containing the secondary allocation to the fixed service. |
| 21 | All | 96 (RR5-62) | Footnote No. **5.325** is included in the last rows of the Table for the bands 890-902 MHz, 902-928 MHz and 928-942 MHz in Region 2, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the radiolocation service. | To move the reference to No. **5.325** in the table for the bands 890-902 MHz, 902-928 MHz and 928-942 MHz in Region 2 to the rows containing the secondary allocation to the radiolocation service. |
| 22 | All | 96 (RR5-62) | Footnote No. **5.326** is included in the last rows of the Table for the band 902-928 MHz in Region 2, meaning that it applies to more than one service in that part of the table. In fact, it applies only to the mobile, except aeronautical mobile, service. | To move the reference to No. **5.326** in the table for the band 902-928 MHz in Region 2 to the row containing the secondary allocation to the mobile, except aeronautical mobile, service. |
| 23 | All | 96 (RR5-62) | Footnote No. **5.327** is included in the last row of the Table for the band 890-942 MHz in Region 3, meaning that it applies to more than one service in that part of the table. In fact, it applies only to the radiolocation service. | To move the reference to No. **5.327** in the table for the band 890-942 MHz in Region 3 to the row containing the secondary allocation to the radiolocation service. |
| 24 | All | 104 (RR5-70) | Names of Kuwait and Syrian Arab Republic are listed in footnotes Nos. **5.355** and **5.359**, which both refer to an additional allocation of the frequency bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz to the fixed service, despite the fact that the category of fixed service is a secondary in No. **5.355** and a primary in No. **5.359**. | The administrations of Kuwait and Syrian Arab Republic may wish to modify Nos. **5.355** or **5.359** formaking clear on which category, primary or secondary, the frequency bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are allocated to the fixed service in their countries. |
| 25 | All | 106 (RR5-72) | Footnote No. **5.369** is included in the last rows of the Table for the bands 1 610-1 610.6 MHz, 1 610.6-1 613.8 MHz, 1 613.8-1 621.35 MHz and 1 621.35-1 626.5 MHz in Region 3, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the radiodetermination-satellite service (Earth-to-space). | To move the reference to No. **5.369** in the table for the bands 1 610-1 610.6 MHz, 1 610.6-1 613.8 MHz, 1 613.8-1 621.35 MHz and 1 621.35-1 626.5 MHz in Region 3 to the rows containing the secondary allocation to the radiodetermination-satellite service (Earth-to-space). |
| 26 | All | 109 (RR5-75) | Footnote No. **5.382**, which refers to the different category of service, is listed in the Table for the band 1 690-1 700 MHz in Region 1, despite the fact that it also contains the provision for allocation to a country in Region 3. The relevant additional allocation to some countries in Regions 2 and 3 is included in footnote No. **5.381**. | To move the part of footnote No. **5.382**, which refers to Region 3, to the relevant footnote No. **5.381** which deals with additional allocation in Regions 2 and 3 as follows:  **5.382** *Different category of service:* in Saudi Arabia… Yemen, the allocation of the frequency band 1 690-1 700 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **5.33**).  **5.381** *Additional allocation:* in Afghanistan, Cuba, India, Iran (Islamic Republic of) and Pakistan, the band 1 690-1 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis, and in the Dem. People’s Rep. of Korea the frequency band 1 690-1 700 MHz is also allocated to the fixed service on a primary basis (see No. **5.33**) and to the mobile, except aeronautical mobile, service on a secondary basis. |
| 27 | All | 111 (RR5-77)  114 (RR5-80) | Footnote No. **5.388** refers to an IMT identification of the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz. This footnote is included in the last rows of the Table for the bands 1 710-1 930 MHz, 1 930-1 970 MHz, 1 970-1 980 MHz, 1 980-2 010 MHz, 2 010-2 025 MHz, 2 110-2 120 MHz, 2 120-2 160 MHz, 2 160-2 170 MHz and 2 170-2 200 MHz in all Regions, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the mobile service. | To move the reference to No. **5.388** in the table for the bands 1 710-1 930 MHz, 1 930-1 970 MHz, 1 970-1 980 MHz, 1 980-2 010 MHz, 2 010-2 025 MHz, 2 110-2 120 MHz, 2 120-2 160 MHz, 2 160-2 170 MHz and 2 170-2 200 MHz to the rows containing the primary allocation to the mobile service. |
| 28 | All | 122 (RR5-88) | Footnote No. **5.429F** refers to an IMT identification of the frequency band 3 300-3 400 MHz in Lao P.D.R., the Philippines and Viet Nam in Region 3, despite the fact that this frequency band is not allocated to the mobile service to these countries. | The three administrations may wish to either delete their names from No. **5.429F** or attempt to join the allocation to the mobile service made for some Region 3 countries by No. **5.429** or No. **5.429E**. |
| 29 | All | 124 (RR5-90) | Footnote No. **5.433**, which refers to an allocation in the band 3 400-3 600 MHz in Regions 2 and 3, is also listed in the Table for the band 3 600-3 700 MHz in Region 2. | To remove No. **5.433** from the band 3 600-3 700 MHz in Region 2 of the Table of Frequency Allocations. |
| 30 | All | 124 (RR5-90) | Footnote No. **5.435**, which refers only to the radiolocation service, is included in the last row of the Table for the band 3 600-3 700 MHz in Region 3, meaning that it applies to more than one service in that part of the table. | To move the reference to No. **5.435** in the table for the band 3 600-3 700 MHz to the row containing the secondary allocation to the radiolocation service in Region 3. |
| 31 | All | 126 (RR5-92) | Footnote No. **5.443** is included in the last row of the Table for the band 4 800-4 990 MHz in all Regions, meaning that it applies to more than one service in that part of the table. In fact, it applies only to the radio astronomy service. | To move the reference to No. **5.443** in the table for the band 4 800-4 990 MHz to the row containing the secondary allocation to the radio astronomy service. |
| 32 | All | 131 (RR5-97) | Footnote No. **5.454** is included in the last row of the Table for the band 5 650-5 725 MHz in all Regions, meaning that it applies to more than one service in that part of the table. In fact, it applies only to the space research service. | To move the reference to No. **5.454** in the table for the band 5 650-5 725 MHz to the row containing the secondary allocation to the space research service. |
| 33 | All | 137 (RR5-103) | Footnote No. **5.477** is included in the last rows of the Table for the bands 9 800-9 900 MHz and 9 900-10 000 MHz in all Regions, meaning that it applies to more than one service in those parts of the table. In fact, it applies only to the fixed service. | To move the reference to No. **5.477** in the table for the bands 9 800-9 900 MHz and 9 900-10 000 MHz to the rows containing the secondary allocation to the fixed service. |
| 34 | All | 163 (RR5-129) | Footnote No. **5.546**, which refers to the different category of service in some countries of Region 1 and 3, is listed in the Table for the band 31.5-31.8 GHz in Region 1 only. This footnote lists the name of Iran (Islamic Republic of) in Region 3. | To add the reference to No. **5.546** in the Table for the band 31.5-31.8 GHz in Region 3. |
| 35 | All | 168 (RR5-134) | Footnote No. **5.551F** refers to different category of service with respect to allocation of the band 41.5-42.5 GHz to the mobile services in Japan on a primary basis. However, the band 41-42.5 GHz is allocated to the land mobile service on primary basis and aeronautical mobile and maritime mobile services on secondary basis in Region 3. | The Administration of Japan may wish to modify No. **5.551F** by replacing “mobile service” by “aeronautical and maritime services” to the text of footnote as follows:  **5.551F** *Different category of service*: in Japan, the allocation of the band 41.5-42.5 GHz to the aeronautical mobile and maritime mobile services is on a primary basis (see No. **5.33**). |
| 36 | All | 181 (RR5-147) | Footnote No. **5.562D**, makes an additional allocationofthe frequency bands 128-130 GHz, 171-171.6 GHz, 172.2-172.8 GHz and 173.3-174 GHz to the radio astronomy service on a primary basis in Korea (Rep. of). However, the band 123-130 GHz in the Table is already allocated to radio astronomy service on a secondary basis in all Regions. | The Administration of Korea (Rep. of) may wish to remove the band 128-130 GHz from footnote No. **5.562D** and to introduce a new “Different category of service” footnote for Korea (Rep. of) upgrading radio astronomy service to primary in the band 128-130 GHz. |
|  |  | **Volume 1** | **Article 11** | **Article 11** |
| 37 | All |  | Footnote 27 to No. **11.44C** makes reference to “A.4.b.5.c…in Table A of Annex 2 to Appendix 4”, which existed in the previous version of the RR, but was changed to A.4.b.4.i at WRC-19 with an augmented text. A.4.b.5 is indicated as “Not used” in the latest version of the RR. | Replace A.4.b.5.c with new reference to argument of perigee A.4.b.4.i |
| 38 | All | 223 (RR11-13) | Footnote 36 to No. **11.49** makes reference to “A.4.b.5.c…in Table A of Annex 2 to Appendix 4”, which existed in the previous version of the RR, but was changed to A.4.b.4.i at WRC-19 with an augmented text. A.4.b.5 is indicated as “Not used” in the latest version of the RR. | Replace A.4.b.5.c with new reference to argument of perigee A.4.b.4.i |
|  |  | **Volume 2** | **Appendix 4 (Annex 1, Table 2)** | **Appendix 4 (Annex 1, Table 2)** |
| 39 | All | 60 (AP4-34) | Item identifier 1.14.k: a commitment that the level of unwanted power density into the HAPS ground station antenna in the band 31.3-31.8 GHz does not exceed −83 dB(W/200 MHz). It applies to HAPS ground station only. | To move “+” to the column “Receiving station in the bands listed in Nos. 5.457, 5.534A, 5.543B, 5.550D and 5.552A for the application of No. 11.9”.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 1.14.k | a commitment that the level of unwanted power density into the HAPS ground station antenna in the band 31.3-31.8 GHz does not exceed −83 dB(W/200 MHz) … (see Resolution **167 (WRC‑19)**)  Required in the band 31-31.3 GHz |  |  |  | **+** | 1.14.k | |
| 40 | All | 227 (AP7-79) | Table 8a contains a column for the broadcasting-satellite service in the frequency band 620-790 MHz, which was previously allocated through No. **5.311A**. | Suppress the column for the broadcasting-satellite service in the frequency band 620-790 MHz, because No. **5.311A** was suppressed by WRC-19. |
| 41 | All | 279 (AP17-7) | The Table of frequencies in Part A of Appendix 17 does not contain any overlapping bands having both Note *p)* and the Notes *i)*, *j)*, *n)* and *o)*, however Notes *i)*, *j)*, *n)* and *o)* are referred in Note *p)*. | To delete reference to Notes *i)*, *j)*, *n)* and *o)* from Note *p)* to eliminate the inconsistency. |
| 42 | All | 728 (AP30B-6) | §6.14 refers to paragraph 2.3 of Annex 4 to Appendix **30B**. However, Annex 4 was modified by WRC-19 and its paragraph 2.3 was renumbered but this reference was not updated. | Replace “containing the change in the values referred to in paragraph 2.3 of Annex 4 to  Appendix **30B**” with “containing the change in the calculated overall aggregate (*C*/*I*)*agg* value referred to in paragraph 2.1 of Annex 4 to Appendix **30B**”. |
|  |  | **Volume 3** | **Resolutions** | **Resolutions** |
| 43 | All | RES35-2 | Resolution **35 (WRC-19)**  Noting that for the purpose of this resolution:  - in second bullet starting with the term “ notified orbital plane” … and forth bullet refers reference to “A.4.b.5.c…in Table A of Annex 2 to Appendix 4”, which existed in the previous version of the RR, but was changed to A.4.b.4.i at WRC-19 with an augmented text. A.4.b.5 is indicated as “Not used” in the latest version of the RR. | Replace A.4.b.5.c with new reference to argument of perigee A.4.b.4.i |

### 2.2.3 Outdated provisions

The 2020 edition of the RR contains several provisions, which make reference to past dates. The concerned provisions are now obsolete.

Table 3 contains a list of some RR texts that may require updates and they are brought to the attention of WRC‑23, for consideration and for undertaking appropriate updates, where required.

Table 3

Texts in the RR that may require updates

| # | Page | Current RR text that may require update | Possible course of action |
| --- | --- | --- | --- |
|  | Volume 1, ARTICLE 5 | | |
| 1 | 113 (RR5-79) | No. **5.389F** In Algeria… Tunisia, the use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services. (WRC-19) | To review the footnote, since the reference to 1 January 2005 is outdated with respect to the development of the services concerned. |
| 2 | 114 (RR5-80) | No. **5.415A** No. **9.21** in the band 2500-2520 MHz is not applicable since 1 January 2005. | Remove footnote No. **5.415A** from table of frequency allocation in Region 3 in the band 2500-2520 MHz. |
| 3 | 116 (RR5-82) | 5.413 In the design of systems in the broadcasting-satellite service in the bands between 2 500 MHz and 2 690 MHz, administrations are urged to take all necessary steps to protect the radio astronomy service in the band 2 690‑2 700 MHz. | To reflect the fact that there is no allocation to the broadcasting-satellite service in the frequency band 2670-2690 MHz any longer.  5.413 In the design of systems in the broadcasting-satellite service in the bands between 2 500 MHz and 2 670 MHz, administrations are urged to take all necessary steps to protect the radio astronomy service in the band 2 690‑2 700 MHz. |
| 4 | 119 (RR5-85) | 5.419 When introducing systems of the mobile-satellite service in the band 2 670-2 690 MHz, administrations shall take all necessary steps to protect the satellite systems operating in this band prior to 3 March 1992. The coordination of mobile-satellite systems in the band shall be in accordance with No. **9.11A**. | To reflect the fact that there are no longer any satellite systems operating in this band prior to 3 March 1992 recorded in the MIFR, except for one that is recorded under No. **8.4**.  5.419 The coordination of mobile-satellite systems in the frequency band 2 670-2 690 MHz shall be in accordance with No. **9.11A**. |
| 5 | 136 (RR5-102) | No. 5.461A The use of the band 7 450-7 550 MHz by the meteorological-satellite service (space-to-Earth) is limited to geostationary-satellite systems. Non-geostationary meteorological-satellite systems in this band notified before 30 November 1997 may continue to operate on a primary basis until the end of their lifetime.     (WRC-97)  There are no non-geostationary meteorological-satellite systems notified before 30 November 1997. | Remove “ Non-geostationary meteorological-satellite systems in this band notified before 30 November 1997 may continue to operate on a primary basis until the end of their lifetime.” |
| 6 | 156 (RR5-122) | No. **5.523A** The use of the bands 18.8-19.3 GHz (space-to-Earth) and 28.6-29.1 GHz (Earth-to-space) by geostationary and non-geostationary fixed‑satellite service networks is subject to the application of the provisions of No. **9.11A** and No. **22.2** does not apply. Administrations having geostationary-satellite networks under coordination prior to 18 November 1995 shall cooperate to the maximum extent possible to coordinate pursuant to No. **9.11A** with non-geostationary-satellite networks for which notification information has been received by the Bureau prior to that date, with a view to reaching results acceptable to all the parties concerned. Non-geostationary-satellite networks shall not cause unacceptable interference to geostationary fixed-satellite service networks for which complete Appendix **4** notification information is considered as having been received by the Bureau prior to 18 November 1995. (WRC-97)  The sentence “Administrations having geostationary-satellite networks under coordination prior to 18 November 1995 shall cooperate to the maximum extent possible to coordinate pursuant to No. **9.11A** with non-geostationary-satellite networks for which notification information has been received by the Bureau prior to that date, with a view to reaching results acceptable to all the parties concerned” refers to non-GSO networks for which notification information was received prior to 18 November 1995. However there are currently no such non-GSO networks in these frequency bands. | To remove from No. **5.523A** the sentence “Administrations having geostationary-satellite networks under coordination prior to 18 November 1995 shall cooperate to the maximum extent possible to coordinate pursuant to No. **9.11A** with non-geostationary-satellite networks for which notification information has been received by the Bureau prior to that date, with a view to reaching results acceptable to all the parties concerned.” |
| 7 | 211 (RR11-1) | 6  A.11.6 If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication specified in Nos. **11.28** and **11.43** and the corresponding entries in the Master Register under Nos. **11.36**, **11.37**, **11.38**, **11.39**, **11.41**, **11.43B**or **11.43C**, as appropriate, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the entries specified in the publication in question no longer have to be taken into consideration by the Bureau and other administrations and that any resubmitted notice shall be considered to be a new notice. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482 unless the payment has already been received. See also Resolution **905 (WRC-07)\*\*\*\***.      (WRC-07)    \*\*\*\* *Note by the Secretariat:* This Resolution was abrogated by WRC-12. | 6  A.11.6 If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication specified in Nos. **11.28** and **11.43** and the corresponding entries in the Master Register under Nos. **11.36**, **11.37**, **11.38**, **11.39**, **11.41**, **11.43B** or **11.43C**, as appropriate, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the entries specified in the publication in question no longer have to be taken into consideration by the Bureau and other administrations and that any resubmitted notice shall be considered to be a new notice. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482 unless the payment has already been received.  Resolution **905 (WRC-07)** was abrogated by WRC-12 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 8 | 406 (RR52-12) | No. **52.200** 4) One of the frequencies which coast stations are required to be able to use (see No. **52.197**) is printed in heavy type in the List of Coast Stations and Special Service Station (List IV) to indicate that it is the normal working frequency of the stations. Supplementary frequencies, if assigned, are shown in ordinary type. (WRC-07)] | The heavy type format is no longer used in List IV, therefore the possible SUP of No. **52.200** may be considered. |
| 9 | 411 (RR52-17) | No. **52.247** § 103 A coast station in the port operations service in an area where 156.8 MHz is being used for distress, urgency or safety shall, during its working hours, keep an additional watch on 156.6 MHz or another port operations frequency indicated in heavy type in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)] | The heavy type format is no longer used in List IV, therefore the reference to ‘in heavy type’ may need to be removed from No. **52.247**. |
| 10 | 412 (RR52-18) | No. **52.248** § 104 A coast station in the ship movement service in an area where 156.8 MHz is being used for distress, urgency and safety shall, during its working hours, keep an additional watch on the ship movement frequencies indicated in heavy type in the List of Coast Stations and Special Service Stations (List IV). (WRC-07) | The heavy type format is no longer used in List IV, therefore the reference to ‘in heavy type’ may need to be removed from No. **52.247** |
| 11 | 127 (AP5-7)  128 (AP5-8) | Reference to Resolution **901** needs to be updated from WRC-07 to WRC-15 | Reference to Resolution **901** needs to be updated from WRC-07 to WRC-15 in TABLE 5-1 of Appendix **5** to No. 9.7 . |
| 12 | 133 (AP5-13) | Removal of suppressed footnote No. **5.417A** reference in 9.11 table of Appendix **5**. | Remove No.**5.417A** from TABLE 5-1 columns Frequency bands (and Region) of the service for which coordination is sought and Threshold/condition |
| 13 | 443 (AP30-1) | 1 The Regions 1 and 3 List of additional uses is annexed to the Master International Frequency Register (see Resolution **542** (**WRC-2000**)\*\*). (WRC-03)  \*\* Note by the Secretariat: This Resolution was abrogated by WRC-03. | 1 The Regions 1 and 3 List of additional uses is annexed to the Master International Frequency Register.  Resolution **542** (**WRC-2000**) was abrogated by WRC-03 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 14 | 446 (AP30-4) | 1.8 *Regions 1 and 3 List of additional uses (hereafter called in short the “List”)*: The List of assignments for additional uses in Regions 1 and 3 as established by WRC-2000 (see Resolution **542 (WRC-2000)**\*), as updated following the successful application of the procedure of § 4.1 of Article 4. (WRC-03)  \_\_\_\_\_\_\_\_\_\_\_\_\_\_  \* *Note by the Secretariat*: This Resolution was abrogated by WRC-03. | 1.8 *Regions 1 and 3 List of additional uses (hereafter called in short the “List”)*: The List of assignments for additional uses in Regions 1 and 3 as established by WRC-2000, as updated following the successful application of the procedure of § 4.1 of Article 4.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_  Resolution **542** (**WRC-2000**) was abrogated by WRC-03 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 15 | 449 (AP30-7) | 4.1.3 …. An assignment in the List shall lapse if it is not brought into use within eight years after the date of receipt by the Bureau of the relevant complete information5. A proposed new or modified assignment not included in the List within eight years after the date of receipt by the Bureau of the relevant complete information shall also lapse5.      (WRC‑07)  5 The provisions of Resolution **533 (Rev.WRC‑2000)**\*apply.     (WRC‑03)  \* *Note by the Secretariat*: This Resolution was abrogated by WRC‑12. | 4.1.3 …. An assignment in the List shall lapse if it is not brought into use within eight years after the date of receipt by the Bureau of the relevant complete information. A proposed new or modified assignment not included in the List within eight years after the date of receipt by the Bureau of the relevant complete information shall also lapse.    Resolution **533** (**Rev.WRC-2000**) was abrogated by WRC-03 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 16 | 456 (AP30-14) | 4.2.6 …. Modifications to that Plan shall lapse if the assignment is not brought into use within eight years after the date of receipt by the Bureau of the relevant complete information14. A request for a modification that has not been included in that Plan within eight years after the date of receipt by the Bureau of the relevant complete information shall also lapse14.     (WRC‑07)  14 The provisions of Resolution **533 (Rev.WRC‑2000)**\*\* apply.     (WRC‑03)  \*\* *Note by the Secretariat:* This Resolution was abrogated by WRC‑12. | 4.2.6 …. Modifications to that Plan shall lapse if the assignment is not brought into use within eight years after the date of receipt by the Bureau of the relevant complete information. A request for a modification that has not been included in that Plan within eight years after the date of receipt by the Bureau of the relevant complete information shall also lapse.    Resolution **533** (**Rev.WRC-2000**) was abrogated by WRC-03 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 17 | 461 (AP30-19) | 18 If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication specified in § 5.1.6 and the corresponding entries in the Master Register under § 5.2.2, 5.2.2.1, 5.2.2.2 or 5.2.6, as appropriate, and the corresponding entries included in the Plan on and after 3 June 2000 or in the List, as appropriate, after informing the administration concerned. The Bureau shall inform all administrations of such action. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482 unless the payment has already been received. See also Resolution **905 (WRC-07)**\*. (WRC-07)  \* Note by the Secretariat: This Resolution was abrogated by WRC-12. | 18 If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication specified in § 5.1.6 and the corresponding entries in the Master Register under § 5.2.2, 5.2.2.1, 5.2.2.2 or 5.2.6, as appropriate, and the corresponding entries included in the Plan on and after 3 June 2000 or in the List, as appropriate, after informing the administration concerned. The Bureau shall inform all administrations of such action. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482 unless the payment has already been received.  Resolution **905 (WRC-07)** was abrogated by WRC-12 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 18 | 587 (AP30A-1) | 1 The Regions 1 and 3 List of additional uses is annexed to the Master International Frequency Register (see Resolution **542** (**WRC-2000**)\*\*). (WRC-03)  \*\* Note by the Secretariat: This Resolution was abrogated by WRC-03. | 1 The Regions 1 and 3 List of additional uses is annexed to the Master International Frequency Register. (WRC-23)  Resolution **542** (**WRC-2000**) was abrogated by WRC-03 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 19 | 590 (AP30A-4) | 1.10 *Regions 1 and 3 feeder-link List of additional uses (hereafter called in short the “feeder-link List”)*: The list of assignments for additional uses in Regions 1 and 3 as established by WRC-2000 (see Resolution **542 (WRC-2000)**\*), as updated following the successful application of the procedure of § 4.1 of Article 4. (WRC-03)  \_\_\_\_\_\_\_\_\_\_\_\_\_\_  \* *Note by the Secretariat*: This Resolution was abrogated by WRC-03. | **1.10** *Regions 1 and 3 feeder-link List of additional uses (hereafter called in short the “feeder-link List”)*: The list of assignments for additional uses in Regions 1 and 3 as established by WRC-2000, as updated following the successful application of the procedure of § 4.1 of Article 4. (WRC‑23)  \_\_\_\_\_\_\_\_\_\_\_\_\_\_  Resolution **542** (**WRC-2000**) was abrogated by WRC-03 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 20 | 593 (AP30A-7) | 4.1.3 …. An assignment in the feeder-link List shall lapse if it is not brought into use within eight years after the date of receipt by the Bureau of the relevant complete information. A proposed new or modified assignment not included in the List within eight years after the date of receipt by the Bureau of the relevant complete information7 shall also lapse.     (WRC‑19)  7 The provisions of Resolution **533 (Rev.WRC‑2000)**\* apply.     (WRC‑03)  \* *Note by the Secretariat*: This Resolution was abrogated by WRC‑12. | 4.1.3 …. An assignment in the feeder-link List shall lapse if it is not brought into use within eight years after the date of receipt by the Bureau of the relevant complete information. A proposed new or modified assignment not included in the List within eight years after the date of receipt by the Bureau of the relevant complete information shall also lapse.     (WRC‑23)    Resolution **533** (**Rev.WRC-2000**) was abrogated by WRC-03 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 21 | 600 (AP30A-14) | 4.2.6 …. Modifications to that Plan shall lapse if the assignment is not brought into use within eight years after the date of receipt by the Bureau of the relevant complete information17 A request for a modification that has not been included in that Plan within eight years after the date of receipt by the Bureau of the relevant complete information17 shall also lapse.     (WRC‑07)  17 The provisions of Resolution **533 (Rev.WRC‑2000)**\* apply.     (WRC‑03)  \* *Note by the Secretariat*: This Resolution was abrogated by WRC‑12. | 4.2.6 …. Modifications to that Plan shall lapse if the assignment is not brought into use within eight years after the date of receipt by the Bureau of the relevant complete information. A request for a modification that has not been included in that Plan within eight years after the date of receipt by the Bureau of the relevant complete information shall also lapse.     (WRC‑23)    Resolution **533** (**Rev.WRC-2000**) was abrogated by WRC-03 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 22 | 726 (AP30B-4) | 1 If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication specified in § 6.7 and/or 6.23 and the corresponding entries in the List under § 6.23 and/or 6.25, as appropriate, and reinstate any allotments back into the Plan after informing the administration concerned. The Bureau 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 the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482, unless the payment has already been received. See also Resolution **905 (WRC-07)**\*.  \* Note by the Secretariat: This Resolution was abrogated by WRC-12. | 1 If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication specified in § 6.7 and/or 6.23 and the corresponding entries in the List under § 6.23 and/or 6.25, as appropriate, and reinstate any allotments back into the Plan after informing the administration concerned. The Bureau 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 the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482, unless the payment has already been received.  Resolution **905 (WRC-07)** was abrogated by WRC-12 and its reference for historical purposes has been retained in the Radio Regulations for a considerable period of time. |
| 23 | 762 (AP42-2) | AP 42 – Note 1 - Res 99 (Rev. Busan, 2014) | Resolution 99 was revised by the Plenipotentiary Conference, Dubai, 2018. Revise to read Resolution 99 (Rev. Dubai, 2018) |

### 2.2.4 Updates resulting from changes in countries names

In June 2022, the ITU Secretary-General has received a memorandum from the United Nations Department for General Assembly and Conference Management informing about the change of the official designation of the “Republic of Turkey” to the “Republic of Türkiye”.

As a result, the references to “Turkey” need to be updated as indicated in Table 4 below.

Table 4

Texts in the RR that require updates of some country names

| # | Page | Current RR text that may require update | Possible course of action |
| --- | --- | --- | --- |
|  | Volume 1, ARTICLE 5 | | |
| 1 | 36 | **5.3** *Region 1:* Region 1 includes … the whole of the territory of Armenia … Turkey …. | To replace the name “Turkey” by “Türkiye” in this footnote |
| 2 | 36 | **5.5** *Region 3:* Region 3 includes the area … except any of the territory of Armenia … Turkey … | To replace the name “Turkey” by “Türkiye” in this footnote |
| 3 | 37 | **5.14** The “European Broadcasting Area” … parts of the territories of Iraq … Turkey … lying outside the above limits are included in the European Broadcasting Area. (WRC-07) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 4 | 51 | **5.98** *Alternative allocation:* in Armenia … Turkey, the frequency band 1 810-1 830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-15) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 5 | 68 | **5.161B** *Alternative allocation:* in Albania … Turkey … frequency band 42-42.5 MHz is allocated to the fixed and mobile services on a primary basis. (WRC-19) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 6 | 70 | **5.164** *Additional allocation:* in Albania … Turkey, the frequency band 47-68 MHz…(WRC-19) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 7 | 77 | **5.211** *Additional allocation:* in Germany … Turkey, the frequency band 138-144 MHz is also allocated to the maritime mobile and land mobile services on a primary basis. (WRC-19) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 8 | 79 | **5.221** Stations of the mobile-satellite service in the frequency band 148-149.9 MHz shall not cause harmful  interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania … Turkey … (WRC-19) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 9 | 90 | **5.276** *Additional allocation:* in Afghanistan … Turkey … the frequency band 430-440 MHz is also allocated to the fixed service  on a primary basis ... (WRC-15) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 10 | 93 | **5.296** *Additional allocation:* in Albania… Turkey …the frequency band 470-694 MHz is also allocated on a secondary basis to the land mobile service…(WRC-19) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 11 | 98 | **5.331** *Additional allocation:* in Algeria … Turkey …the band 1 215-1 300 MHz is also allocated to the radionavigation service on a primary basis… (WRC-19) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 12 | 115 | **5.395** In France and Turkey, the use of the band 2 310-2 360 MHz by the aeronautical mobile service for telemetry .... (WRC-03) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 13 | 161 | **5.536B** In Algeria … Turkey … earth stations operating in the Earth exploration-satellite service in the frequency band 25.5-27 GHz ... (WRC-19) | To replace the name “Turkey” by “Türkiye” in this footnote |
| 14 | 164 | **5.546** *Different category of service:* in Saudi Arabia … Turkey, the allocation of the frequency band 31.5-31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis … (WRC-19) | To replace the name “Turkey” by “Türkiye” in this footnote |
|  | Volume 2, APPENDICES | | |
| 15 | 146 | **AP5-26**  NOTE 9 - Instead of the values in the Table, the pfd coordination thresholds of −142.5 dB(W/m2) in 4 kHz and −124.5 dB(W/m2) in 1 MHz for the MSS and −152 dB(W/m2) in 4 kHz and −128 dB(W/m2) in 1 MHz for the RDSS shall apply in Albania … Turkey … (WRC-19) | To replace the name “Turkey” by “Türkiye” in Note 9 |
| 16 | 393 | **AP27-27**  **27**/100 *Regional and Domestic Air Route Area – 1* (RDARA-1)  From the North Pole … up to the Turkish border. Then along the border between Turkey … Thence along the Black Sea Coast of Turkey … | To replace the name “Turkey” by “Türkiye” in No. **27**/100 |
| 17 | 394 | **AP27-28**  **27**/104 *Sub-Area 1D*  From the junction of the borders of Ukraine … up to the Turkish border. Then along the border between Turkey … Thence along the Black Sea Coast of Turkey … | To replace the name “Turkey” by “Türkiye” in No. **27**/104 |
| 18 | 395 | **AP27-29**  **27**/106 *Regional and Domestic Air Route Area – 2* (RDARA-2)  From the North Pole … to the Black Sea coast of Turkey. Along the Black Sea coast of Turkey to the junction of the borders of Turkey and Georgia. Thence along borders between Turkey … | To replace the name “Turkey” by “Türkiye” in No. **27**/106 |
| 19 | 396 | **AP27-30**  **27**/109 *Sub-Area 2C*  From the point … to the Black Sea coast of Turkey. Along this coastline to the junction of the border between Turkey and Georgia. Thence along the borders between Turkey… | To replace the name “Turkey” by “Türkiye” in No. **27**/109 |
| 20 | 397 | **AP27-31**  **27**/117 *Regional and Domestic Air Route Area – 5* (RDARA-5)  From the point … Then along the border between Turkey … Then along the northern border of the Islamic Republic of Iran and Turkey … (WRC-19) | To replace the name “Turkey” by “Türkiye” in No. **27**/117 |
| 21 | 398 | **AP27-32**  **27**/118 *Sub-Area 5A*  From the point … along the border between Turkey … and the border between Iraq and Turkey … | To replace the name “Turkey” by “Türkiye” in No. **27**/118 |
| 22 | 398 | **AP27-32**  **27**/119 *Sub-Area 5B*  From the point … Thence east along the borders between Turkey and Syrian  Arab Republic and Turkey and Iraq … Then along the northern border of the Islamic Republic of Iran and Turkey … | To replace the name “Turkey” by “Türkiye” in No. **27**/119 |
| 23 | 764 | **AP42-4**  TAA-TCZ Turkey | To replace the name “Turkey” by “Republic of Türkiye” in the Table of allocation of international call sign series |
| 24 | 765 | **AP42-5**  YMA-YMZ Turkey | To replace the name “Turkey” by “Republic of Türkiye” in the Table of allocation of international call sign series |
|  | Volume 3, RESOLUTIONS | | |
| 25 | 153 | **RES163-1**  *resolves*  that earth stations in Regions 1 and 2 in the frequency band 14.5-14.75 GHz in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall be operated only in the following countries: Algeria… Turkey… | To replace the name “Turkey” by “Türkiye” in *resolves* |
| 26 | 430 | **RES608-2**  *recognizing*  *b)* that, up to the end of WRC-2000, use of the RNSS in the frequency band 1 215-1 260 MHz was subject only to the constraint that no harmful interference was caused to the radionavigation service in Algeria… Turkey… | To replace the name “Turkey” by “Türkiye” in *recognizing b)* |

# 3 Experience in the application of the radio regulatory procedures

This section summarizes the experiences of the Bureau in the application of the procedures referred to in Articles, Appendices, Resolutions and Recommendations of the RR, where appropriate. It also contains summaries on some of the issues raised at RRB meetings which, in the opinion of the RRB, may require consideration by WRC-23.

## 3.1 Articles of the Radio Regulations

### 3.1.1 Article 1 of the Radio Regulations

**3.1.1.1 Amateur-satellite service (Nos. 1.56 and 1.57)**

The Bureau has received some satellite networks operating in the amateur-satellite service (class of station EA) where the information provided for the operating agency (item A.3.a of Appendix **4**) of these satellite networks seemed to indicate that it may not be an amateur entity and it could even sometimes be a commercial operator.

The Bureau drew the attention of the notifying administrations to the definitions of Nos. **1.56** and **1.57** of the Radio Regulations:

**1.56** *amateur service:* A *radiocommunication service* for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

**1.57** *amateur-satellite service:* A *radiocommunication service* using *space stations* on earth *satellites* for the same purposes as those of the *amateur service*.

The Bureau requested the concerned Administrations to identify more explicitly the purpose and the satellite operator for those satellite networks. The concerned Administrations provided the necessary explanations for the purpose of the satellite network and confirmed that it will operate the satellites as it is described in the definition.

In addition to raising questions about the long-terme availability of spectrum resources allocated to the amateur-satellite service, the improper use of the amateur-satellite service may also have negative financial consequences for the Union in terms of cost recovery under Council Decision 482, since submissions in the amateur-satellite service are exempted from fees. Therefore the Bureau intends to more systematically check compliance of the submissions with the conditions set forth in Nos. **1.56** and **1.57**.

The Conference is invited to note this course of action.

Besides, the Bureau received notices of non-geostationary satellite systems intended to operate frequency assignments in the amateur-satellite service while orbiting the Moon. The Bureau has issued an unfavourable finding for these assignments because the definition of the amateur-satellite service in No. **1.57** restricts this service to space stations on earth satellites.

Noting the technical advances in the amateur-satellite service, the Conference may wish to remove the limitation of the amateur-satellite service to earth satellites only, as follows:

**1.57** *amateur-satellite service*: A *radiocommunication service* using *space stations* for the same purposes as those of the *amateur service*.

**3.1.1.2 TT&C frequencies and other associated spectrum requirements for non-GSO satellite systems providing In-Orbit Servicing**

Since WRC-19, contributions were submitted to ITU-R Working Party 4A to review the regulatory provisions and address possible TT&C frequencies for non-GSO In Orbit Servicing (IOS) satellite systems. IOS is performed by a spacecraft to maintain, repair, upgrade, refuel or de-orbit a space asset while it is in orbit or to de-orbit or re-orbit a space debris object. These activities require the IOS servicer spacecraft to approach, rendezvous and dock with the space asset or space debris object. Types of IOS include active debris removal, end-of-life, and life extension services.

Due to a lack of studies, Working Party 4A agreed to not to proceed with this issue as a topic under WRC-23 agenda item 7 but the following text was included in the Working Party 4A Chairman’s report:

“*Following discussions within WP 4A, the ITU-BR indicated that satellites providing in-orbit services can downlink data gathered through on-board sensors operating in other radiocommunications services through feeder links (see RR No.* ***1.115****) operating in the FSS as per RR No.* ***1.21****. It was also clarified that, as a consequence of this use of the FSS, such satellites may carry out TT&C operations in frequency bands allocated to the FSS, as indicated in No.* ***1.23*** *of the Radio Regulations.”*

The Conference is invited to note the conclusion of ITU-R Working Party 4A.

The Bureau also received enquiries from administrations about a specific IOS scenario, where the servicer spacecrafts will be launched into an orbit that is a few hundred kilometres above the geostationary satellite orbit, where the spacecraft will not be stationary with respect to the Earth and will communicate with a network of ground stations and will stay in that orbit for a period of up to a year. After that, these servicer spacecrafts will connect with a geostationary satellite, and may either remain docked for the rest of the lifetime of the spacecraft, or detached after having served the first geostationary satellite and move on to serve another geostationary satellite in other orbital location.

The Bureau informed the administration that, for the part of the mission where the spacecraft will not be stationary with respect to the Earth and will be communicating with earth stations, API and notification for this non-geostationary satellite network are required to cover this phase of the operation. Commenting and coordinating under No. **9.3** will be required. Even if the satellite network will be operated under No. **4.4**, there is still a requirement to submit an API and notification. While docked to a target geostationary satellite, it will be considered a geostationary satellite, and can make use of the frequency filed by the target geostationary satellite. If that target geostationary satellite does not have filing covering these frequencies, there will be a need to submit a new filing for a geostationary satellite network, and this will have to be a request for coordination, followed by a notification. If there is no plan to use these frequency bands anymore after the anchoring to the target satellite, this coordination request will not be needed.

The Conference is invited to note the proposed regulatory approach for the above-described IOSscenario.

### 3.1.2 Article 4 of the Radio Regulations

At WRC-19, the Bureau reported about the increased use of No. **4.4** for satellite networks not subject to coordination. Since this trend continued since 2019, the Bureau regularly kept the Radio Regulations Board informed of the relevant developments. This has led the Board to include this topic in its Report under Resolution **80 (Rev.WRC-07)** (see section 4.14 of [Document WRC23/50](https://www.itu.int/md/R23-WRC23-C-0050/en)). In order to avoid duplicating the consideration of these issues, the Bureau does not repeat the topics addressed by the Board in this report but would like to raise to the Conference another, more specific issue related to the application of No. **4.4**.

**3.1.2.1 Application of No.4.4 in the Appendix 30B frequency bands**

§**4.2** ofArticle 4Appendix **30B** stipulates that:

“4.2 The Member States of the Union shall not change the characteristics, or bring into use assignments to fixed-satellite service stations, or stations in the other services to which these frequency bands are allocated, except as provided for in the Radio Regulations and the appropriate Articles and Annexes of this Appendix.”

Section 2 of the Rules of Procedure on No. **4.4** “Emissions in bands where uses other than those authorized are prohibited” does not list the frequency bands of Appendix **30B**, notably because the frequency bands of the Appendix **30B** are shared with other services.

In the application of No. 4.2 of Appendix **30B**, the Bureau understands the application of No. **4.4** to be acceptable for the cases listed below:

* Radio astronomy stations: radio astronomy is a passive service that does not involve the transmission of radio waves in its allocated bands, so the use of these bands does not cause interference to any other service. At present, radio astronomy utilizes the electromagnetic spectrum at frequencies from below 1 MHz to about 1 000 GHz, a range set primarily by the limitations of available technology. In principle, the entire radio spectrum is of scientific interest to the radio astronomy service.
* Earth exploration-satellite (passive) and space research (passive) services in consideration of the Rules of Procedure on No. **5.458**: while No. **5.458** states that “In the band 6 425-7 075 MHz, passive microwave sensor measurements are carried out over the oceans. In the band 7 075-7 250 MHz, passive microwave sensor measurements are carried out. Administrations should bear in mind the needs of the Earth exploration-satellite (passive) and space research (passive) services in their future planning of the bands 6 425-7 075 MHz and 7 075-7 250 MHz.”, the Rule of Procedure on this provision clarifies that there is no allocation to the Earth exploration-satellite (passive) and space research (passive) services in the frequency bands 6 425-7 075 MHz and 7 075-7 250 MHz. Notification of frequency assignments to the Earth exploration-satellite (passive) and space research (passive) services in these frequency bands will be considered by the Bureau not to be in conformity with the Table of Frequency Allocations.
* Recording of FSS space-to-Earth assignments for non-GSO MSS feeder links exceeding Article 21 limits in the frequency band 6725-7025 MHz: considering that the allocation exists for the service in the Appendix **30B** frequency band, an excess of the pfd limit may be recorded under No. **4.4** without infringing § 4.2 of Appendix **30B**.
* Recording of non-GSO FSS space-to-Earth assignments exceeding Article 21 limits in the frequency bands 10.7-10.95 GHz and 11.2-11.45 GHz: considering that the allocation exists for the service in the Appendix **30B** frequency band, an excess of the pfd limits may be recorded under No. **4.4** without infringing § 4.2 of Appendix **30B**.

The Conference is invited to confirm the Bureau’s application of § 4.2of Appendix **30B** with respect to the use of No. **4.4** in the Appendix **30B** frequency bands, i.e. the Bureau does not accept the application of No. **4.4** in these frequency bands except for the four cases listed above.

### 3.1.3 Article 5 of the Radio Regulations

**3.1.3.1 No. 5.218A**

WRC-19 introduced No. **5.218A** allowing the use of the frequency band 148-149.9 MHz in the space operation service (Earth-to-space) by non-geostationary-satellite systems with short-duration missions under certain conditions.

One of the conditions is that transmitting earth stations in such non-geostationary satellite systems shall ensure that the power flux-density does not exceed −149 dB (W/(m2.4 kHz)) for more than 1% of time at the border of the territory of some countries. In case this power flux-density limit is exceeded, agreement under No. **9.21** is required to be obtained from those countries.

The compliance with this trigger limit is to be verified by the Bureau on receipt of the notification of the earth station. While the pfd limit has been established, the methodology to derive the pfd value was not specified.

With respect to the percentage of time specified in the pfd limit, the Bureau wishes to note that similar provisions establishing pfd limits in the context of a ground propagation path also specify percentages of time (see Nos. **5.166B**, **5.430A**, **5.431B**, etc.) between stations, either stationary or moving. In particular, the language of this provision is very similar to the one found in Nos. **5.430A**, **5.431B**, **5.432A**, **5.432B**. The Bureau understands that, in these provisions, the percentage of time refers to an input parameter in the ground path propagation model (such as the ones found in Recommendations ITU-R P.452, P.1812, etc.) describing the percentage of average year for which the calculated signal level is exceeded. Similar parameter is also used in Appendix **7**.

However, when dealing with a non-geostationary satellite system in low earth orbit, which consists of one or a few satellites, the time of visibility of those satellites that can be seen from the earth station (and consequently the time when the earth station will be transmitting) will be reduced and may go below 1 % for a satellite at very low altitudes. In this regard, it is unclear as to whether this percentage of time can also be referred to visibility statistics in a non-GSO link between earth station and any non-GSO satellite. In case, indeed, visibility statistics need to be taken into account and to compute the duty cycle, the analytical methods described in Recommendations ITU-R S.1257 or S.1325 could be used.

Finally the Bureau notes that the existence of a power limit is a justification for us to highlight the fact that there should not be a coordination procedure when an hard limit is met.

The Conference is invited to request the relevant ITU-R Study Group to develop a methodology to calculate pfd under No. **5.218A** while considering the following aspects:

a) Extension of Appendix **7** methodology to this 148-149.9 MHz frequency band and to the space operations service for 1% of time.

b) Whether the percentage of time refers to propagation model or visibility statistics of a non-GSO system.

c) Whether to include the duty cycle of the transmitting earth station in the new methodology to be elaborated.

**3.1.3.2 Case of application of No. 9.21 leaving potentially affected administrations with no means to submit comments (Nos. 5.228AC and 5.474A)**

There are provisions in Radio Regulations, for example Nos. **5.228AC** or **5.474A**, whereby the use of certain frequency bands by a space service is subject to agreement to be obtained under No. **9.21** from specific countries. The requirement to obtain agreement under No. **9.21** means thatthe frequency assignments to this space service will be subject to Section II of Article **9**, instead of Section I. However, the comments under No. **9.52** to the request for coordination under No. **9.21** are limited only to those specific countries.

Other administrations which are not listed in those provisions would not be able to make comments under No. **9.52**, although these administrations may have satellite networks or systems which already obtained agreements to use those frequency bands and are registered in the MIFR and would have been able to send such comments related to satellite networks or systems under No. **9.3** if No. **9.21** would not have been activated. Moreover, these administrations may not be able to comment under No. **9.52.1**, as these frequency assignments are subject to Section II of Article **9**, i.e. to No. **9.21** with specific administrations.

Taking into account the fact that coexistence between space stations is ensured by the application of either Section I or Section II of Article **9** and that the inclusion of the requirement to apply No. **9.21** only with respect to certain countries consequently deactivates Section I for the other administrations, these latter administrations do not have any regulatory means to provide comments related to their satellite networks or systems with respect to incoming frequency assignments to space stations for which the requirement to obtain agreement under No. **9.21** is limited to a list of countries.

The Conference may wish to review this situation and take appropriate corrective measures.

The Conference is invited to consider modifying No. **9.52.1**, as follows, to allow commenting procedures for administrations whose satellite networks or systems may affect or be affected by an incoming frequency assignment to a space station that is only subject to Section II of Article **9** with respect to terrestrial services or to a number of predetermined countries.

**9.52.1** An administration believing that unacceptable interference may be caused to its existing or planned satellite networks or systems not subject to the coordination procedure under Section II of Article **9** or subject to this Section only with respect to terrestrial services or to a number of predetermined countries may send its comments to the requesting administration. A copy of these comments may also be sent to the Bureau. Such comments shall however not by themselves constitute a disagreement under No. **9.52**. Thereafter, both administrations shall endeavour to cooperate in joint efforts to resolve any difficulties, with the assistance of the Bureau, if so requested by either of the parties, and shall exchange any additional relevant information that may be available.

**3.1.3.3 No. 5.264B**

At WRC-19, under agenda item 1.2, a new footnote No. **5.264A** was approved, establishing in-band power limits applicable to earth stations transmissions in the frequency bands 401-403 MHz in order to ensure the operation of existing and future systems that usually implement low or moderate output powers for mobile-satellite service (MSS), Earth exploration-satellite service (EESS) and meteorological satellite service (MetSat) systems.

Furthermore, a new footnote No. **5.264B** was approved to provide exemption from provision of No. **5.264A** to non-geostationary satellite systems in the meteorological satellite service and the Earth exploration satellite service for which complete notification information has been received by the Bureau before 28 April 2007.

There is an existing non-GSO satellite system, i.e. the METEOR‑3M satellite system, in the meteorological satellite service for which complete notification information was received by the Bureau on 28 April 2007. The METEOR‑3M satellite system has the maximum e.i.r.p. of earth stations of 12 dBW in the frequency band 401.898-402.522 MHz.

In view of the above, the Conference is invited to confirm that No. **5.264B** applies to notification information which has been received by the Bureau on or before 28 April 2007.

**5.264B** Non-geostationary satellite systems in the meteorological-satellite service and the Earth exploration satellite service for which complete notification information has been received by the Bureau on or before 28 April 2007 are exempt from provisions of No. **5.264A** and may continue to operate in the frequency band 401.898- 402.522 MHz on a primary basis without exceeding a maximum e.i.r.p. level of 12 dBW.

**3.1.3.4 Use of the space research allocation in the band 14.5-14.8 GHz**

Following the new allocation to the fixed-satellite service decided by WRC-15 in the band 14.5-14.8 GHz and subject to a number of conditions such as a minimum antenna diameter of 6 meters, a pfd limit at certain altitudes, separation distance from the border(s) and service areas limited only to countries listed in Resolutions **163 (WRC-15**) and **164 (WRC-15)**, the Bureau has received requests for coordination for the use of the secondary allocation of the space research (Earth-to-space), which include parameters different from previously recorded for the service in these bands such as lower antenna gain of earth stations and greater use of typical earth stations. In some cases, these parameters of the space research earth stations are identical to those of earth stations in the fixed-satellite service contained in the same notice except antennal diameters and service areas. This evolution of the technical parameters of the space research service may have an impact on the sharing environment of the band 14.5-14.8 GHz.

This information was included into Section 3.1.2.4 of Part 2 of the Report from the Director of the Bureau to WRC-19 on the activities of the Radiocommunication Sector (see Addendum 2 to [Document CMR19/4](https://www.itu.int/md/R16-WRC19-C-0004/en)).

WRC-19 Seventh Plenary Meeting included the following paragraph in the Minutes as a decision of the Conference (see Sections 4.5 to 4.7 of [Document CMR19/568](https://www.itu.int/md/R16-WRC19-C-0568/en)):

*“****Space research allocation in 14.5-14.8 GHz***

*Having discussed Section 3.1.2.4 of Document*[*4 (Add.2)*](https://www.itu.int/dms_pub/itu-r/md/16/wrc19/c/R16-WRC19-C-0004!A2!MSW-E.docx)*, Committee 5 concluded that the Conference should instruct the Director of the Radiocommunication Bureau to monitor the use of the space research allocation in the frequency band 14.5-14.8 GHz, and should invite ITU-R to study the evolution of the technical parameters of systems in the space research service and the associated sharing environment of the same frequency band.”*

Following this instruction, the Bureau has submitted a detailed analysis to Working Party 4A ([Document 4A/61](https://www.itu.int/md/R19-WP4A-C-0061/en)) in September 2020.

However, no conclusion has been yet developed in this regard by ITU-R Study Group 4. Therefore, the Bureau continued to monitor status and present updated statistics in this section.

Since November 2015, the Bureau started receiving new satellite networks in the space research service in this frequency band. The Bureau received 114 submissions with space-research-service assignments under secondary status. The number of submissions since WRC-19 has doubled compared to the number during the period 2015-2019. It should be particularly noted that all these submissions contain FSS frequency assignments in either the band 14.5-14.75 GHz or the band 14.5-14.8 GHz. 102 of these networks are submitted by one administration.

Analysis conducted in Document 4A/61 further indicated that the emission bandwidth as well as power-spectral densities of assignments in the secondary space research service tends to correspond more to FSS emissions.

Statistics for submissions received by year is given in Figure 1 below.

FIGURE 1

Number of networks received each year (2015-2022) with secondary SRS assignments



The Conference may wish to study this situation further.

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### 3.1.4 Article 9 of the Radio Regulations

*General observations about the challenges raised by the increased number of non-geostationary satellite systems*

The sharp increase in the number and complexity of filings for non-GSO satellite networks subject to coordination could be traced back to mid-2013. This trend continues today with satellite systems consisting of tens of thousands of satellites to more than 485 000 satellites with multiple configurations (up to 5) that have been published in CR/C special sections (see table below). APIs for non-GSO satellite networks using frequency bands not subject to coordination and containing thousands of satellites have also been received.

| No. | Notice ID | AMS | Date of receipt | ADM | Station | Category | Units | Configurations |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 119520219 | A | 17.09.2019 | CAN | TELSTAR-LEO | C2 | 1404 (1,2) | 2 |
| 2 | 119520228 | A | 07.10.2019 | USA | USASAT-NGSO-3N | C2 | 45193 (1,2) | 2 |
| 3 | 119520229 | A | 07.10.2019 | USA | USASAT-NGSO-3M | C2 | 45193 | 1 |
| 4 | 119520230 | A | 07.10.2019 | USA | USASAT-NGSO-3O | C2 | 45193 (1,2) | 2 |
| 5 | 119520231 | A | 07.10.2019 | USA | USASAT-NGSO-3P | C2 | 45193 (1,2) | 2 |
| 6 | 119520232 | A | 07.10.2019 | USA | USASAT-NGSO-3Q | C2 | 45193 (1,2) | 2 |
| 7 | 119520233 | A | 07.10.2019 | USA | USASAT-NGSO-3R-1 | C2 | 45193 (1,2) | 2 |
| 8 | 119520234 | A | 07.10.2019 | USA | USASAT-NGSO-3R-2 | C2 | 45193 (1,2) | 2 |
| 9 | 119520235 | A | 07.10.2019 | USA | USASAT-NGSO-3R-3 | C2 | 45193 (1,2) | 2 |
| 10 | 119520236 | A | 07.10.2019 | USA | USASAT-NGSO-3S-1 | C2 | 45193 (1,2) | 2 |
| 11 | 119520237 | A | 07.10.2019 | USA | USASAT-NGSO-3S-2 | C2 | 45193 (1,2) | 2 |
| 12 | 119520238 | A | 07.10.2019 | USA | USASAT-NGSO-3S-3 | C2 | 45193 (1,2) | 2 |
| 13 | 119520239 | A | 07.10.2019 | USA | USASAT-NGSO-3T-1 | C2 | 45193 (1,2) | 2 |
| 14 | 119520240 | A | 07.10.2019 | USA | USASAT-NGSO-3T-2 | C2 | 45193 (1,2) | 2 |
| 15 | 119520241 | A | 07.10.2019 | USA | USASAT-NGSO-3T-3 | C2 | 45193 (1,2) | 2 |
| 16 | 119520242 | A | 07.10.2019 | USA | USASAT-NGSO-3U-1 | C2 | 45193 (1,2) | 2 |
| 17 | 119520243 | A | 07.10.2019 | USA | USASAT-NGSO-3U-2 | C2 | 45193 (1,2) | 2 |
| 18 | 119520244 | A | 07.10.2019 | USA | USASAT-NGSO-3V-1 | C2 | 45193 (1,2) | 2 |
| 19 | 119520245 | A | 07.10.2019 | USA | USASAT-NGSO-3V-2 | C2 | 45193 (1,2) | 2 |
| 20 | 119520246 | A | 07.10.2019 | USA | USASAT-NGSO-3W-1 | C2 | 45193 (1,2) | 2 |
| 21 | 119520247 | A | 07.10.2019 | USA | USASAT-NGSO-3W-2 | C2 | 45193 (1,2) | 2 |
| 22 | 119520264 | M | 22.10.2019 | CAN | CANPOL-2 | C2 | 702 (1,2) | 2 |
| 23 | 119520391 | A | 19.12.2019 | HOL | HOL-NGSO1-B-S | C1 | 16 (1,2) | 2 |
| 24 | 120520125 | A | 17.07.2020 | F | F-SAT-NG-13 | C2 | 56052 (1),  369 (2) | 2 |
| 25 | 120520172 | A | 11.09.2020 | CHN | GW-2 | C2 | 8093 (1-4) | 4 |
| 26 | 120520184 | A | 06.10.2020 | D | KBSAT-NGSO-1 | C2 | 69980 | 1 |
| 27 | 120520244 | A | 17.12.2020 | D | D-NGSO-1120-1 | C1 | 53820 | 1 |
| 28 | 121520018 | M | 22.01.2021 | F | MCSAT-2 LEO-2 | C2 | 15600 | 2 |
| `29 | 121520025 | M | 04.02.2021 | NOR | STEAM-1 | C1 | 12312 (1), 24624 (2,3) | 3 |
| 30 | 121520026 | M | 04.02.2021 | NOR | STEAM-2 | C2 | 50216 (1),  22050 (2) | 2 |
| 31 | 121520061 | M | 30.03.2021 | PNG | M5L2SAT | C1 | 66528 | 1 |
| 32 | 121520071 | A | 04.05.2021 | D | KBSAT-NGSO-P | C2 | 43324 (1-5) | 5 |
| 33 | 121520090 | A | 10.06.2021 | ISR | RAFANET-1 | C1 | 39 (1-4) | 4 |
| 34 | 121520106 | A | 16.06.2021 | USA | USASAT-NGSO-2A | C1 | 304 (1-4) | 4 |
| 35 | 121520122 | M | 29.06.2021 | USA | USASAT-NGSO-2A | C1 | 7560 (1-4) | 4 |
| 36 | 121520147 | A | 19.08.2021 | CAN | TELSTAR-LEO-2 | C1 | 235486 | 1 |
| 37 | 121520158 | M | 09.09.2021 | NOR | STEAM-2B | C1 | 12222 (1,2)  38876 (3) | 3 |
| 38 | 121520159 | M | 10.09.2021 | USA | USASAT-NGSO-3D | C1 | 15822 (1),  50108 (2) | 2 |
| 39 | 121520182 | A | 02.11.2021 | G | TARD-1S | C1 | 3924 (1,3), 3928 (2,4) | 4 |
| 40 | 121520194 | M | 09.11.2021 | LUX | LUX-N1-2 | C1 | 40 (1-3) | 3 |
| 41 | 121520196 | A | 20.11.2021 | D | MARS-K1 | C1 | 41602 | 1 |
| 42 | 121520197 | A | 20.11.2021 | D | MARS-K2 | C1 | 41602 | 1 |
| 43 | 121520199 | A | 30.11.2021 | F | MCSAT-2-LEO-1QV | C1 | 83700 | 1 |
| 44 | 121520229 | A | 15.12.2021 | D | ATHENE-1 | C2 | 22665 (1,2) | 2 |
| 45 | 122520059 | A | 22.05.2022 | D | MARS-K3 | C1 | 45550 (1,2) | 2 |
| 46 | 122520060 | A | 22.05.2022 | D | MARS-K4 | C1 | 45550 (1,2) | 2 |
| 47 | 122520085 | A | 18.07.2022 | NOR | STEAM-1B | C1 | 25485 | 1 |
| 48 | 122520087 | A | 20.07.2022 | CAN | TELSTAR-LEO-3 | C1 | 233998 | 1 |
| 49 | 122520110 | A | 30.08.2022 | PNG | M3L2SAT | C1 | 51474 | 1 |
| 50 | 122520125 | A | 31.08.2022 | F | HIBLEO-XL-1 | C2 | 54300 | 1 |
| 51 | 122520146 | A | 07.10.2022 | F | F-SAT-NG-15\_A | C1 | 485640 | 1 |
| 52 | 122520147 | A | 08.10.2022 | D | D-LEG1-2 | C1 | 3347 (1,2) | 2 |
| 53 | 122520163 | A | 03.11.2022 | CHN | CSN-L3 | C2 | 6360 (1-4) | 4 |
| 54 | 123520058 | A | 22.02.2023 | USA | ATOZSAT | C1 | 27616 | 1 |
| 55 | 123520029 | A | 03.04.2023 | USA | USASAT-NGSO-3X | C1 | 95542 | 1 |

The Bureau has noted that the increase in usage of non-geostationary satellite systems has consequently resulted in a number of new questions or challenges in the application of the coordination and notification procedures for these systems (i.e. Articles **9** and **11** but also Articles **21** and **22** or Resolutions **76, 769** or **770**).

Examples of such open questions will be considered by WRC-23 under agenda item 7, Topics A, B, G or J.

**Splitting a non-geostationary satellite system into several filed systems**

Other questions include the practice of splitting a non-geostationary satellite system into several filed systems, which may affect the effectiveness of single-entry epfd limits contained in Article **22** to protect geostationary systems or have an impact in the implementation of Resolution **76 (Rev.WRC-15)**.

In particular, it should be noted that this issue was studied by WRC-03 under its agenda item 1.19 “to consider regulatory provisions to avoid misapplication of the non-GSO FSS single-entry limits in Article **22** based on the results of ITU-R studies carried out in accordance with Resolution **135 (WRC-2000)**”. The CPM report related to this agenda item is contained in section 3.1 of Chapter 3 of the CPM report for WRC-03 (see [https://www.itu.int/md/R00-CPM-SP-0001/en](https://urldefense.com/v3/__https:/www.itu.int/md/R00-CPM-SP-0001/en__;!!NiYMbFKv!M5nTCCaK30XXejy7qtduvl1PonjS-XHCl1r4Sc1HyhB9Bkjryq2278r4OfD8bHimgGWpUyzN0csdC6tlUSZReG6VYfpH-EiBtc8$)):

“3.1        Agenda item 1.19

"to consider regulatory provisions to avoid misapplication of the non-GSO FSS single-entry limits in Article **22** based on the results of ITU-R studies carried out in accordance with Resolution **135 (WRC‑2000)**"

3.1.1 Summary of technical and operational studies

WRC‑2000 established in Article **22** single-entry epfd limits to be met by non-GSO FSS systems in certain parts of the frequency range 10.7-30.0 GHz to protect GSO FSS and GSO BSS networks.

The verification of conformance with the single entry epfd limits contained in Tables **22-1** to **22‑3** (inclusive) of Article **22** forms an important part of the regulatory examination of any notice for a non-GSO FSS system, performed by the Radiocommunication Bureau under No. **11.31**, as referenced in Sections 2.6 to 2.6.6 of the Rules of Procedure.

Thus, the only reason for misapplication of these single entry epfd limits by artificially splitting or combining non-GSO FSS systems, will be to lower the epfd levels and therefore to get a favourable finding status as a result of this regulatory examination.

3.1.2 Analysis of the results of studies

The regulatory examination of any notice for stations in space services performed by BR under No. **11.31** includes, *inter alia*, conformity with mandatory provisions in Articles **21** and **22**, most of which deal with pfd which could be misapplied by artificially splitting and combining systems.

Furthermore, a limit, similar to those given in Table **22-3**, applicable to non-GSO FSS systems is contained in No. **22.5A** also, but that has not attracted any such concerns on possible misapplication.

The problem covered by agenda item 1.19 is not new or specific to certain non-GSO FSS systems.

3.1.3 Method to satisfy this agenda item

The problem raised by Resolution **135** (**WRC‑2000**) is not new or specific to certain non-GSO FSS systems. No difficulties have been experienced so far with similar limits, which could be similarly misapplied. The current Radio Regulations are adequate.

No further studies are required therefore insofar as *"invite ITU-R"* section of Resolution **135** (**WRC‑2000**) is concerned the Resolution may be suppressed.

3.1.4 Regulatory and procedural considerations

No further specific regulatory action is required.”

This CPM text states that “the only reason for misapplication of these single entry epfd limits by artificially splitting or combining non-GSO FSS systems, will be to lower the epfd levels and therefore to get a favourable finding status as a result of this regulatory examination” and concludes that “No difficulties have been experienced so far with similar limits, which could be similarly misapplied”.

The Conference may have to reassess this conclusion in light of recent practices.

**Bringing into use of non-geostationary satellite systems**

Section 3.1.4.7 of this report describes another open issue affecting the bringing into use of non-geostationary satellite systems and is linked with the usage of a single satellite to bring into use multiple non-geostationary satellite systems (this practice has to be also studied in the context of application of Resolution **35 (WRC-19)**).

**Modifications of coordination requests of non-geostationary satellite systems while retaining the initial date of protection**

Another open regulatory question relates to the modifications of coordination requests of non-geostationary satellite systems while retaining the initial date of protection. The question of the methodology to examine such modifications is addressed in section 3.1.4.11. All modifications received so far by the Bureau are based on analyses showing that the modifications do not increase the interference potential of the system into other relevant systems and on a commitment not to require more protection than the initial coordination request. The Bureau is investigating means to keep track of the parameters of this initial coordination request on the long term since they represent the reference parameters for assessing the protection requirements of the modified non-geostationary system. A possible option would be to maintain a separate reference database.

The Conference is invited to provide guidance to the Bureau on this aspect.

**Validation of data items of notices**

Non-GSO satellite systems have additional data elements specified in Appendix **4** of the Radio Regulations compared to GSO satellite networks (orbital elements, phase angles of each satellite within each orbital plane, links between beams and orbits/satellites, orientation angles of beams, satellite antenna gain and spreading loss as a function of elevation angle, maximum and average beam peak eirp, etc.), which add to the complexity of the coordination examination.

For those non-GSO satellite systems that are subject to epfd limits contained in RR Article **22**, even more orbital parameters are required, including verifying whether the space station uses station-keeping to maintain a repeating ground track, and if the space station uses station-keeping to maintain a repeating ground track, the time in seconds that it takes for the constellation to return to its starting position, i.e. such that all satellites are in the same location with respect to the Earth and each other, specific precession rate etc.. In addition, several additional parameters are required for the calculation of epfd limits, such as the pfd/eirp masks, information on the exclusion zone etc.

Along with these additional data requirements, administrations often submit large amounts of descriptions in the form of notes from administrations, for which the Bureau has to analyse, examine and translate for publication in the special sections. Therefore the time required for the treatment for completeness and correctness of these complex non-geostationary satellite systems is significantly different. In order to study the cost-recovery aspects of this trend, the ITU Council decided to establish an Expert Group on Decision 482.

The Conference is invited to note that the processing and examination of these complex non-geostationary satellite systems has a financial impact on the work of the Union.

**Regulatory examinations**

Two main technical examinations have to be carried out when examining complex non-GSO filings under No. **9.35**/**11.31**, i.e. examining compliance with limits contained in Articles **21** and **22**.

**Examination of limits contained in Article 21**

Similarly to GSO satellite networks, the power flux-density (pfd) for non-GSO satellite systems is calculated from a unique orbital longitude towards the Earth’s surface at varying angles of arrival to determine the pfd excess for each frequency assignment if it had only one altitude for all satellites across all planes. One non-GSO satellite would then be sufficient to compute pfd levels for the entire constellation.

However, when non-GSO satellite systems have more than one altitude within the constellation, pfd calculations need to be performed for each of the different altitudes. If there is a pfd excess for one altitude, an unfavourable finding has to be given for this case, which implies that the beam would need to be split in order to represent the relationship between orbits and beams correctly and that groups will also have to be split in order to give findings to the frequency assignments accordingly.

Furthermore, some of the larger non-GSO satellite filings received had an unprecedented scale of complexity in terms of varying altitude and beam configuration which went beyond the capacity of the corresponding tables in the SNS database and had to be treated manually using other means, especially concerning modifications to coordination requests of non-GSO satellite systems.

In addition, when the non-GSO satellite system is notified with a single orbital altitude, it is still possible to indicate specifically which orbital planes or even distinct satellites will be operating with specific beams. In terms of regulatory examination, the work carried out to take into consideration such specific beam/orbit links may involve complexity levels similar to that of an examination of a non-GSO satellite system having different orbital altitudes.

Noting that, in the past, the orbital configuration of non-GSO filings was rather simple, the pfd examination was performed manually. However, in light of the increase in complexity of non-GSO filings, the Bureau has been improving internal tools to automate the pfd examination process.

**Examination of limits contained in Article 22**

The examination of compliance with the epfd limits contained in several provisions of Article **22** involves the actual calculation of the epfd levels produced by the frequency assignments. The overall process consists in several tasks:

1. Preparation of input data

1.1. Completeness examination when the data is received (including an exchange with administration, requests for clarifications etc.)

1.2. XML mask validation

1.3. SNS data validation

1.4. epfd validation scenario preparation

2. Computation of the epfd levels

3. Analysis and processing of the results

4. Publication of epfd results

The examination of the cases requiring longer run-time entails additional workload but the same steps apply. Factors affecting processing time for epfd examination include: the total number of different scenarios, number of applicable limits, and number of satellites used in each scenario.

In addition to these tasks, three main supporting activities are carried out:

A. Assistance to administrations

B. Maintenance and technical support of epfd validation software

C. Creation, maintenance and technical support of computer-aided tools

It has to be noted that a number of non-geostationary satellite systems subject to epfd limits contained in Article **22** are also subject to coordination No. **9.7B**. To establish coordination requirements under this provision, the epfd validation software has to calculate epfd levels for more than 40 very large earth stations. Since these earth stations have very large antennas (more than 10 meters in diameter) with antenna beamwidth of less than 0.2 degrees, the algorithm requires large amount of timesteps in the calculations to make sure that in-line events are obtained. For large constellations, this requires a very significant time to complete, even longer than Article **22** calculations. However, the issue of very long calculation time to review coordination requirements under No.**9.7B** has been resolved following the adoption of a static method in Recommendation ITU-R S.1714 calculation methodology.

**Submission of multiple masks in the same frequency band**

In several cases of examination under Nos. **22.5C**, **22.5D** and **22.5F**, the Bureau found that multiple pfd or e.i.r.p. masks are submitted to be applied in the same frequency band. Multiple masks are provided to model transmissions in different type of the links (e.g. user links, feeder-link, service link etc.) or different earth station diameters.

While understanding the intention of administrations to have flexibility at the stage of coordination without deciding which particular link type or earth station type should be in operation in each frequency band, the Bureau notes the following:

– In accordance with Nos. **22.5C** and **22.5F**, the epfd produced by the emissions from all the space stations of a non-geostationary satellite system shall be calculated and checked against the limits in Tables **22-1A** to **22-1E** and **22-3**, and in accordance with No. **22.5D**, the epfd produced by the emissions from all earth stations in a non-geostationary satellite system shall be calculated and checked against the limit contained in Table **22-2**. These limits are applicable to a system as a whole. Providing individual examination for each link or earth station type does not allow verifying compliance with a single entry limit in case such links or earth station types are to be operated simultaneously in the same frequency band.

– The methodology of Recommendations ITU-R S.1503-2 and ITU-R S.1503-3 does not allow combining in epfd calculation multiple masks in the same frequency band (except the cases when such masks are applicable to different orbits) or multiple different operating parameters applicable to the same frequency band (exclusion zone angle, density of earth station etc.) to verify compliance with a single-entry EPFD limit in Article **22**.

– Multiple examinations for each frequency band would require the Bureau to process, examine and publish different sets of unique epfd data and may increase the publication time. In this regard, the Bureau considers whether submitting this data in a manner similar to submitting multiple mutually exclusive configurations is more appropriate since it would recover the cost associated with the multiple processing.

Therefore, the Bureau was contacting these administrations requesting to provide a single e.i.r.p. or pfd mask for a frequency range taking into account the emissions from all earth/space stations (various antenna sizes, antenna patterns, tracking strategies, etc.). Multiple e.i.r.p. or pfd masks for the same frequency range were accepted only if they apply to different orbital configurations, or different satellite orbits and satellites.

The Conference is invited to endorse the abovementioned practice.

On the basis of this above-described process, three main elements are resource-intensive: preparation of input data for the examination of compliance with epfd limits contained in Article **22**, software developments and software maintenance.

In general, the workload of the Bureau in this area of activity has considerably increased. This has also contributed to increasing the processing time of coordination requests for both geostationary and non-geostationary satellite networks beyond the regulatory time limit of four months.

The Conference may therefore wish to consider regulatory solutions to the issue of exceptionally large and complex non-geostationary satellite filings.

#### 3.1.4.1 Changes by WRC-19 to No. 9.1

WRC-19 modified No. **9.1** such that, for notification submitted at the same time as an API, it is considered with an official date of receipt not earlier than four months after the date of publication of the advance publication information, which has been reduced from six months previously. This revision came into effect on 1st January 2020 and was implemented from that date, and the Bureau had not encountered any difficulties with this. This change had been beneficial, especially to operators of small satellites for which the project lifecycle is very much shorter than those for traditional satellites.

#### 3.1.4.2 Changes by WRC-19 to No. 9.2B

WRC-19 modified No. **9.2B** to reduce the treatment period for the Bureau to publish the complete information sent under Nos. **9.1** and **9.2** from 3 months to 2 months. This revision came into effect on 1st January 2020, and for those notices where the information was complete and correct, the Bureau had been able to publish them within the shortened period of 2 months. For those notices where clarifications are requested from the administration, the period of 2 months may not have been achieved since 30 days are given for the response from the administration.

#### 3.1.4.3 Application of No. 9.3 in the frequency bands 2 025 2 110 MHz (Earth-to-space) and 2 200 2 290 MHz (space-to-Earth)

The Bureau issued the Circular Letter [CR/420](https://www.itu.int/md/R00-CR-CIR-0420/en) of 31 August 2017 on the application of No. **9.3** of the Radio Regulations in the bands 2 025‑2 110 MHz (Earth-to-space) and 2 200‑2 290 MHz (space-to-Earth). The Circular Letter CR/420 was triggered by the fact that an increasing number of submissions for Advance Publication Information under No. **9.1** of the Radio Regulations contain generic information. In particular, there was a trend to submit the whole allocated space operation band (2 025-2 110 MHz and 2 200‑2 290 MHz) in the Advanced Publication Information (API). In addition, some submissions declared the whole Earth surface as a service area and declared no specific Earth stations (only typical ones). Such a lack of specific information in the API makes the cooperation process under Nos. **9.3** and **9.4** of the Radio Regulations longer and more difficult. Faced with such generic APIs, commenting administrations can make equally generic comments, or request more detailed information from the notifying administration.

The Bureau understands that it may be necessary to submit a wider frequency range at the API stage due to anticipated difficulties in arriving at final agreed operating frequencies based on the coordination results. The Bureau cannot reject filings just because the frequency range is too large, as long as a filing complies with the Radio Regulations.

The Bureau invites administrations to pay more attention to the information provided for such operation at the API stage and refrain to use generic parameters, especially, avoid filing for the entire band, whenever possible. The Bureau encourages administrations to try to avoid submitting global service area with typical earth stations, but identify associated specific TT&C earth stations, such that the API could be as precise as possible and faithfully represent the satellite project.

Working Party (WP) 7B has initiated a working document towards a Preliminary Draft New Recommendation ITU-R SA. [2GHz SOS CHAR] on “Technical and operational characteristics of the space operation service (SOS) systems that use the 2 025-2 110 MHz (Earth-to-space) (space-to-space) and 2 200-2 290 MHz (space-to-Earth) (space-to-space) frequency bands” for assessing interference and for conducting sharing studies (see Annex 3 to [Document 7B/246](https://www.itu.int/md/R19-WP7B-C-0246/en)).

#### 3.1.4.4 Proposal for the removal of advance publication information for satellite networks subject to coordination under section II of Article 9

WRC-15 removed the requirement for administrations to submit the advance publication information for satellite networks that are subject to coordination procedure under Section II of Article 9. In its place is No. 9.1A which requires the Bureau to extract some information from the request for coordination and make them available as an advance publication. The Bureau has been publishing this information in an API/C special section.

Considering that all coordination requests are available “as-received” very quickly after the notice has been received by the Bureau, and the frequency bands can be consulted easily from the [“as-received” webpage](https://www.itu.int/ITU-R/space/asreceived/Publication/AsReceived), publishing the advance publication information separately may not be useful any longer.

In addition, the Bureau clearly publishes the expiry date for bringing into use of all frequency assignment groups in the CR/C special section for a coordination request. An example is shown below:

Table

Description automatically generated

Since the notice is submitted under No. 9.30, the Conference is invited to consider the removal of the advance publication information for satellite networks subject to coordination under Section II of Article 9. Consequential changes to the Radio Regulations are shown below.

ARTICLE 9

Procedure for effecting coordination with or obtaining agreement of other administrations

9.30 Requests for coordination made under Nos. 9.7 to 9.14 and 9.21 shall be sent by the requesting administration to the Bureau, together with the appropriate information listed in Appendix 4 to these Regulations. Any additional frequency bands subsequently added to the request for coordination or a modification to the request for coordination involving a change of the orbital location for a space station using the geostationary-satellite orbit will be given a new date of receipt with respect to the application of No. **11.44**, **11.44.1** and **11.48**.

ARTICLE 11

Notification and recording of frequency assignments

11.44 The notified date[[1]](#footnote-1)23, [[2]](#footnote-2)24, [[3]](#footnote-3)25of bringing into use of any frequency assignment to a space station of a satellite network or system shall be not later than seven years following the date of receipt by the Bureau of the relevant complete information under No. **9.1** or 9.2 in the case of satellite networks or systems not subject to Section II of Article **9** or under No. **9.30** in the case of satellite networks or systems subject to Section II of Article **9**. Any frequency assignment not brought into use within the required period shall be cancelled by the Bureau after having informed the administration at least three months before the expiry of this period.     (WRC‑19)

11.44A A notice not conforming to No. 11.44 shall be returned to the notifying administration with a recommendation to restart the advance publication procedure under No. **9.1** or **9.2**, orto restart the coordination procedure under No. **9.30**.

11.48 If, after the expiry of the period of seven years from the date of receipt of the relevant complete information referred to in No. **9.1** or **9.2** in the case of satellite networks or systems not subject to Section II of Article **9** or in No. **9.30** in the case of satellite networks or systems subject to Section II of Article **9**, the administration responsible for the satellite network has not brought the frequency assignments to stations of the network into use, or has not submitted the first notice for recording of the frequency assignments under No. **11.15**, or, where required, has not provided the due diligence information pursuant to Resolution **49 (Rev.WRC‑19)**, as appropriate, the corresponding information published under Nos.  **9.2B** and **9.38**, as appropriate, shall be cancelled, but only after the administration concerned has been informed at least six months before the expiry date referred to in Nos. **11.44** and **11.44.1** and, where required, § 10 of Annex 1 of Resolution **49** **(Rev.WRC‑19)**[[4]](#footnote-4)31.     (WRC‑19)

APPENDIX 4 (REV.WRC 19)

**Consolidated list and tables of characteristics for use in the**

**application of the procedures of Chapter III**

ANNEX 2

**Characteristics of satellite networks, earth stations  
or radio astronomy stations**

**Removal of the column in Annex 2 of Appendix 4:** Advance publication of a non-geostationary-satellite network or system subject to coordination under Section II of Article 9

|  |  |
| --- | --- |
| A.13.a | the reference and number of the advance publication information in accordance with No. 9.**1** |

APPENDIX 5 (REV.WRC‑19)

**Identification of administrations with which coordination is to be effected or agreement sought under the provisions of Article 9**

**1** For the purpose of effecting coordination under Article **9**, except in the case under No. **9.21**, and for identifying the administrations with which coordination is to be effected, the frequency assignments to be taken into account are those in the same frequency band as the planned assignment, pertaining to the same service or to another service to which the frequency band is allocated with equal rights or a higher category[[5]](#footnote-5)1 of allocation, which might affect or be affected, as appropriate, and which are:      (WRC‑15)

*a)* in conformity with No. **11.31**[[6]](#footnote-6)2; and

*b)* either recorded in the Master International Frequency Register (Master Register) with a favourable finding with respect to No. **11.32**; or

*c)* recorded in the Master Register with an unfavourable finding with respect to No. **11.32** and a favourable finding with respect to No. **11.32A** or No. **11.33**, as appropriate; or

*cbis)*recorded in the Master Register under No. **11.41**; or     (WRC‑03)

*d)* coordinated under the provisions of Article **9**; or

*e)* included in the coordination procedure with effect from the date of receipt[[7]](#footnote-7)3 by the Radiocommunication Bureau, in accordance with No. **9.34**, of those characteristics specified in Appendix **4** as mandatory or required, or from the date of dispatch, in accordance with No. **9.29**, of the appropriate information listed in Appendix **4**; or      (WRC‑15)

*f)* where appropriate, in conformity with a world or regional allotment or assignment plan and the associated provisions;

*g)* for terrestrial radiocommunication stations or earth stations operating in the opposite direction of transmission[[8]](#footnote-8)4 and, in addition, operating in accordance with these Regulations, or to be so operated prior to the date of bringing the earth station assignment into service, or within the next three years from the date of dispatch of coordination data under No. **9.29**, whichever is the longer, or from the date of the publication referred to in No. **9.38**, as appropriate.     (WRC‑2000)

RESOLUTION 49[[9]](#footnote-9)1 (Rev.WRC‑19)

Administrative due diligence applicable to some satellite radiocommunication services

resolves

that the administrative due diligence procedure contained in Annex 1 to this Resolution shall be applied for a satellite network or satellite system of the fixed-satellite service, mobile-satellite service or broadcasting-satellite service for which the request for coordination under Nos. **9.30**, or for which the request for modifications of the Region 2 Plan under Article 4, § 4.2.1 *b)* of Appendices **30** and **30A** that involve the addition of new frequencies or orbit positions, or for which the request for modifications of the Region 2 Plan under Article 4, § 4.2.1 *a)* of Appendices **30** and **30A** that extend the service area to another country or countries in addition to the existing service area, or for which the request for additional uses in Regions 1 and 3 under § 4.1 of Article 4 of Appendices **30** and **30A**, or for which the submission under Appendix **30B** is received, with the exception of submissions of new Member States seeking the acquisition of their respective national allotments[[10]](#footnote-10)2 for inclusion in the Appendix **30B** Plan,

ANNEX 2 TO RESOLUTION 49 (Rev.WRC‑19)

**A Identity of the satellite network**

*a)* Identity of the satellite network

*b)* Name of the administration

*c)* Country symbol

*d)* Reference to the request for modification of the Region 2 Plan or for additional uses in Regions 1 and 3 under Appendices **30** and **30A**; or reference to the information processed under Article 6 of Appendix **30B (Rev.WRC‑19)**

*e)* Reference to the request for coordination (not applicable for Appendices **30**, **30A** and **30B**)

*f)* Frequency band(s)

*g)* Name of the operator

*h)* Name of the satellite

*i)* Orbital characteristics.

RESOLUTION 552 (REV.WRC‑19)

Long-term access to and development in the frequency band   
21.4-22 GHz in Regions 1 and 3

Annex 1 to Resolution 552 (rev.WRC‑19)

8 Within 30 days after the end of the seven-year period following the date of receipt by BR of the relevant complete information under Nos. **9.30**, and after the end of the three-year period following the date of suspension under No. **11.49**, if the complete information under this Resolution is not yet received by BR, the corresponding frequency assignments shall be cancelled by BR, which subsequently informs the administration accordingly.

Annex 2 to Resolution 552 (rev.WRC‑19)

**A Information to be submitted**

1 Identity of the satellite network

*a)* Identity of the satellite network

*b)* Name of the notifying administration

*c)* Orbital characteristics

*d)* Reference to the request for coordination

*e)* Reference to the notification, when available

*f)* Frequency band(s) included in the relevant special sections of the satellite network

*g)* First date of bringing into use[[11]](#footnote-11)1

*h)* Regulatory status

– Satellite network under operation (only data listed in § 2 shall be provided), or

– Satellite network suspended (only data listed in § 3 shall be provided)

RESOLUTION 553 (REV.WRC 15)

Additional regulatory measures for broadcasting-satellite networks in the frequency band and 21.4-22 GHz in Regions 1 and 3 for the enhancement of equitable access to this frequency band

ATTACHMENT TO RESOLUTION 553 (rev.WRC‑15)

8 Upon receipt of the information under § 6 above, administrations seeking assistance in applying this special procedure shall submit a request for coordination together with the appropriate information listed in Appendix **4** to these Regulations.

9 Administrations not seeking the assistance of the Bureau may submit a request for coordination together with the appropriate information listed in Appendix **4** to these Regulations5 at the same time as submitting the information under § 4.

#### 3.1.4.5 The use of inter-satellite links of a geostationary space station communicating with a non-geostationary space station

No. **9.2** specifies that the use of inter-satellite links of a geostationary space station communicating with a non-geostationary space station which are not subject to the coordination procedure under Section II of Article **9**, will require the application of the advance publication procedure, referring to No. **9.1**. However, No. **9.7** specifies a coordination procedure for a station in a satellite network using the geostationary-satellite orbit in respect of any other satellite network using that orbit. Similar text is used in Table 5-1 of Appendix **5**. There is therefore a need to specify this particular exception of coordination for a geostationary space station in these provisions.

The Conference is invited to consider amendment to No. **9.7** and Table 5-1 of Appendix **5** to make it clear that there is an exception for the use of inter-satellite links of a geostationary space station communicating with a non-geostationary space station which are not subject to the coordination procedure under Section II of Article **9**, as follows:

9.7 *a)* for a station in a satellite network using the geostationary-satellite orbit, in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a plan, with the exception of coordination between earth stations operating in the opposite direction of transmission, and also with the exception of the use of inter-satellite links of a geostationary space station communicating with a non-geostationary space station where the need for coordination is not explicitly stipulated in a footnote to the Table of Frequency Allocations.

TABLE 5-1     (Rev.WRC‑19)

Technical conditions for coordination

(see Article 9)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference of Article 9 | Case | Frequency bands (and Region) of the service for which coordination is sought | Threshold/condition | Calculation  method | Remarks |
| No. **9.7** GSO/GSO | A station in a satellite network using the geostationary-satellite orbit (GSO), in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a Plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a Plan, with the exception of the coordination between earth stations operating in the opposite direction of transmission, and also with the exception of the use of inter-satellite links of a geostationary space station communicating with a non-geostationary space station where the need for coordination is not explicitly stipulated in a footnote to the Table of Frequency Allocations | 1) 3 400-4 200 MHz 5 725-5 850 MHz (Region 1) and 5 850-6 725 MHz 7 025-7 075 MHz | i) Bandwidth overlap, and  ii) any network in the fixed-satellite service (FSS) and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±7° of the nominal orbital position of a proposed network in the FSS |  | With respect to the space services listed in the threshold/condition column in the frequency bands in 1), 2), 2*bis*), 3), 3*bis*), 4), 5), 6), 7) and 8), an administration may request, pursuant to No. **9.41**, to be included in requests for coordination, indicating the networks for which the value of Δ*T*/*T* calculated by the method in § 2.2.1.2 and 3.2 of Appendix **8** exceeds 6%. When the Bureau, on request by an affected administration, studies this information pursuant to No. **9.42**, the calculation method given in § 2.2.1.2 and 3.2 of Appendix **8** shall be used |
| 2) 10.95-11.2 GHz 11.45‑11.7 GHz  11.7-12.2 GHz  (Region 2) 12.2-12.5 GHz  (Region 3) 12.5‑12.75 GHz (Regions 1 and 3) 12.7‑12.75 GHz (Region 2) and  13.75‑14.8 GHz | i) Bandwidth overlap, and  ii) any network in the FSS or broadcasting-satellite service (BSS), not subject to a Plan, and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±6° of the nominal orbital position of a proposed network in the FSS or BSS, not subject to a Plan  iii) in the frequency band 14.5-14.8 GHz any network in the space research service (SRS) or FSS not subject to a Plan and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±6° of the nominal orbital position of a proposed network in the SRS or FSS not subject to a Plan |

#### 3.1.4.6 Splitting frequency assignments, where a single operational assignment may have to be represented by two assignments in the MIFR (one in CR/C and another one in API)

WRC-15 decided to modify the procedure for submitting a request for coordination of frequency assignments for satellite network or system subject to coordination procedure under Section II of Article **9**. Submitting an advance publication information (API) for such frequency assignments is not required anymore, but the Bureau shall make available, using the basic characteristics of the coordination request, a general description of the network or system for advance publication in a Special Section (see section 3.1.4.4 above).

Currently, when the Bureau receives in a coordination request frequency assignments with a bandwidth overlapping frequency bands with two different regulatory regimes (i.e. subject to coordination and not subject to coordination), the Bureau will propose to the notifying administration the following actions:

* modify the frequency assignment which is partially subject to coordination and partially not subject to coordination by reducing the bandwidth and/or adjusting the assigned frequency, as required, so that the whole of the frequency band of the frequency assignment is within a frequency band subject to coordination procedure in the coordination request for the publication under a CR/C special section; and
* for the portion of the frequency band of the assignment that is not subject to coordination, informs the administration that they should submit the frequency band in the format of an API to be published under an API/A special section.

The Conference is invited to consider the above practice and provide guidance to the Bureau on the approach to be adopted with respect to frequency assignments where a single frequency assignment with a bandwidth overlapping frequency bands with two different regulatory regimes (i.e. subject and not subject to coordination under Section II of Article 9).

#### 3.1.4.7 Modifications to existing coordination request of non-geostationary satellite system with the purpose of bringing into use

The Bureau has reported to the 87th meeting of the RRB held in July 2021 on its experience of processing of modification requests of non-geostationary satellite systems with the intent of adding an additional orbital plane.

In general, for the purpose of bringing into use of frequency assignments when corresponding actual orbital characteristics are different from the ones submitted for coordination, the Bureau is witnessing two different approaches:

1. Modifications to the request of coordination aimed to align all orbital characteristics with the ones used for bringing into use of corresponding frequency assignments. Such modifications contain a request to maintain the date of protection of the original coordination request and provide the necessary information to apply the Rules of Procedure on No. **9.27**. The determination of whether or not the date of protection can be retained will depend on the information and justification provided, but such an approach appears to be fully in line with the provisions of Article **9** and the associated Rules of Procedure.
2. Modifications to coordination requests limited to the addition of one satellite in one orbital plane. The intent behind these modifications seems to add the orbital parameters of the spacecraft planned to be used for bringing into use the non-geostationary satellite system. Such modifications do not contain a request to maintain the date of protection and the notifying administration is aware that a new date of protection will be given to the frequency groups associated with the new orbital plane while existing frequency groups associated with orbital planes previously submitted will see their date of protection unchanged. Since the main intent of this addition is to be able to comply with Nos. **11.44C** or **11.44D** thanks to the launch of a first satellite, whereas the long-term operations of the non-geostationary satellite system will rely on the previously submitted frequency assignments, the new date of protection limited to frequency groups associated with the new orbital plane is not affecting the regulatory status of the main set of frequency assignments of the system.

The second approach raises the question of the integrity of the non-geostationary satellite system with regards to its interference potential or sensitivity with respect to other satellite networks and systems. For example, in the case where the satellite system is subject to epfd limits contained in Article **22**, the addition of this satellite shall be accompanied with pfd and e.i.r.p. masks applicable to the entire system so that the compliance with the epfd limits can be checked for the entire system, i.e. initial submission and modification, as mandated by Article **22**.

This practice also raises the question whether a spacecraft having the capability of transmitting or receiving the frequency assignment described in the modification is complying with the requirements of Nos. **11.44C** or **11.44D** for the other groups of frequency assignments. This question is directly related to the efficient use of the orbit/spectrum resources since it is always possible to add an orbital plane to an existing non-geostationary satellite system and therefore it could be possible to bring into use any non-geostationary satellite system with any kind of non-geostationary satellite, provided its characteristics are added to the initial description of the system.

The Radio Regulations Board subsequently agreed with the proposed practice of the Bureau and specifically that the epfd limits should be verified for entire non-geostationary satellite systems, which is in conformity with the provisions of the Radio Regulations and the associated rules of procedure. The Board decided to include this topic in its Report under Resolution **80 (Rev.WRC‑07)** (see section 4.12 of [Document WRC23/50](https://www.itu.int/md/R23-WRC23-C-0050/en)). Additional information on this issue is provided in this section.

Cases presented in Table 1 below provide several examples on possible variations of orbital characteristics used in second approach.

Table 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Case | Original apogee/perigee/inclination | Additional plane apogee/perigee/inclination | Subject to Resolution 35 (WRC-19) | Subject to Nos. 22.5C/D/F |
| 1 | 1015/1015/98.98 | 999.42/932.3/99.4 | Yes | Yes |
| 2 | 1000/1000/99.5 | 1003.8/996.4/99.5 | Yes | Yes |
| 3 | 48435/23137/90,  1248/1248/37.4\* | 1003.8/996.4/99.5 | Yes | Yes |
| 4 | 850/850/86 | 533/519/97.5 | No | No |
| 8062/8062/0 | Yes | No |

\* Orbital planes with that characteristics were not submitted under Article **11**.

Cases 1 and 2 above, as it appears, were submitted to avoid any challenge on orbit characteristics tolerances studied under Agenda Item 7 of WRC-23. Cases 3 and 4 on another hand are introducing a completely different orbital plane and raise the issue of spectrum and orbit reservation and the efficient use of frequencies and the non-geostationary orbit.

For Case 3, nevertheless, since it is subject to Resolution **35 (WRC-19)**, it should be noted that, in order for the system to maintain retain its originally submitted frequency assignments, the orbital planes associated with these orbital frequency assignments need to be deployed in compliance with Resolution **35 (WRC-19)**. In case the orbital planes originally submitted for coordination are not deployed, the corresponding frequency assignments will be suppressed.

The Bureau intends to address that matter on a case-by-case basis. In the event of a doubt, the Bureau would first ask the administration concerned for clarification but might have to bring particular cases to the Radio Regulations Board for decision.

Given that most cases would probably be confirmed based on the milestone approach under Resolution **35 (WRC-19)**, the Bureau would report to the Board any cases not covered by the milestone-based approach outlined in that Resolution, should they arise.

The Conference is invited to confirm or otherwise this course of action outlined by the Bureau.

#### 

#### 3.1.4.8 Application of RR No. 9.19 to terrestrial services

RR No. **9.19** is related to coordination of transmitting terrestrial stations vis-à-vis typical earth station included in the service area of a space station in the broadcasting-satellite service in the bands shared with equal rights between these services, i.e. in the following bands: 1 452-1 492 MHz, 2 310-2 360 MHz, 2 520-2 670 MHz, 11.7-12.75 GHz, 17.7-17.8 GHz, 40.5-42.5 GHz and 74-76 GHz.

Currently, the threshold values are available only for transmitting IMT stations notified with nature of service “IM” in the band 1 452-1 492 MHz, as contained in Resolution **761**, and the band 11.7-12.7 GHz, as contained in Annex 3 of RR Appendix **30**. For all other bands the Bureau uses the Rules of Procedure on RR No. **9.19** establishing the criteria for coordination as a frequency overlap and the coordination distance of 1 200 km with respect to the territories on which typical BSS earth stations are located.

This distance was chosen from Table 3 of Appendix **7** to the RR as the maximum coordination distance for propagation mode (1) for frequencies below 60 GHz. It is a very conservative coordination distance that might overestimate real needs for coordination and result in considerable coordination burden for the administrations notifying transmitting terrestrial stations.

WRC-23 may wish to invite the relevant ITU-R Study Groups to develop more specific criteria for establishing coordination requirements under No. **9.19** in the above-mentioned bands.

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#### 3.1.4.9 Comments relating to application of RR No. 9.21 to terrestrial services

The RR contain 44 footnotes referring to RR No. **9.21** that are applicable to terrestrial services: RR Nos. **5.61**, **5.87A**, **5.92**, **5.93**, **5.123**, **5.177**, **5.181**, **5.190**, **5.197**, **5.225A**, **5.251**, **5.252**, **5.259**, **5.279**, **5.292**, **5.293**, **5.295**, **5.296A**, **5.297**, **5.308**, **5.308A**, **5.309**, **5.312A**, **5.316B**, **5.322**, **5.323**, **5.325**, **5.326**, **5.341A**, **5.341C**, **5.346**, **5.346A**, **5.410**, **5.429D**, **5.429F**, **5.430A**, **5.431A**, **5.431B**, **5.432B**, **5.434**, **5.441B**, **5.447,** **5.482** and **5.553A**. The Bureau would like to draw the Conference’s attention to the two aspects of the application of these footnotes by administrations.

Firstly, during the reporting period of 2019-2023, the requests for the application of the procedure under RR No. **9.21** were related only to RR Nos. **5.177, 5.316B,** **5.430A** and **5.441B** (from the 44 footnotes mentioned above).

Secondly, the criteria for identification of affected administrations required for the application of the RR No. **9.21** procedure are fully or partially available in the footnotes, e.g. RR No. **5.225A**, in the WRC Resolutions, e.g. Resolution **749 (Rev.WRC-19)**, or in the relevant Rules of Procedures, except for seven footnotes: RR Nos. **5.181**, **5.190**, **5.197**, **5.251**, **5.259**, **5.279** and **5.482**, where no methodology and criteria for identification of affected administrations is available yet.

If WRC-23 approves new footnotes referencing RR No. **9.21**, the Conference is invited to give instructions to the relevant Study Groups to develop them, in order to enable the Bureau to properly apply the RR No. **9.21** procedure.

##### 3.1.4.9.1 Simulation of the examination of RR No. 9.21 notices using digital elevation models

As WRC-19 instructed the Bureau to simulate the examination of RR No. **9.21** notices in the non-planned bands using digital elevation models (DEM),see the Minutes of fourth Plenary meeting (Doc. [CMR-19/237](https://www.itu.int/md/R16-WRC19-C-0237/en)), the Bureau has implemented a corresponding simulation program.

The simulation was carried out over available 1 127 coordination requests submitted under RR No. **5.430A** for IMT base stations in the frequency band 3 400-3 600 MHz. To make a comparation between the power flux density (pfd) values produced over the DEM and those produced over the smooth Earth (SE) assumption, the calculation was performed at the border of neighbouring countries for every 10-degrees azimuth step for each of 1 450 operations (transmitter and antenna). The SRTM3 (Shuttle Radar Topography Mission 3-arc second) terrain data were used as the basic terrain data and ASTER (Advanced Spaceborne Thermal Emission and Reflection radiometer 1-arc second) terrain data – as supplements for the areas where SRTM3 data were not available (i.e. north of 60 degrees North and south of 56 degrees South).

The results of simulations show that the use of the DEM in identification of potentially affected Administration may provide more accurate results under RR No. **9.21**, while there was no difference between the results identified over DEM and SE for 929 assignments out of total 1 127. The Bureau has been continuing the evaluation of specific DEM models for incorporation in its software.

The Conference may wish to instruct the Bureau to continue the simulation of using the terrain data in the RR No. **9.21** examinations, determine the particular DEM for implementation in Bureau’s software and report the results to the Radio Regulations Board for a possible inclusion of the DEM in the examination software through a relevant rule of procedure.

#### 3.1.4.10 Application of Articles 9 and 11 with respect to space systems not using artificial earth satellite

Article **1** defines “satellite system” and “satellite network” as using one or more artificial earth satellite as follows:

No. 1.111 *satellite system:  A space system using one or more artificial earth satellites.*

Furthermore, the definition of satellite network makes reference to satellite system and implies the use of both artificial earth satellite and earth stations:

No. 1.112 *satellite network:  A satellite system or a part of a satellite system, consisting of only one satellite and the cooperating earth stations.*

These terminologies are used widely in Articles **9** and **11** as well as in associated provision of the Radio regulations, i.e. Appendix **4**.

In this regard, a question may be raised as to whether the procedures of Articles **9** and **11** should apply to systems or networks operating artificial satellites having reference body other than Earth (Moon, Mars, Sun etc.) or operating without a reference body.

While recognizing that coordination procedures in Article **9** have been developed for satellite network/systems since the beginning of the establishment of the coordination procedures, following the expansion of space activities, it should be noted that the procedures have also been applied to space systems which are not using artificial earth satellites.

The Conference may consider including a note in Articles **9** and **11** and Appendix **4** to make it clear that those provisions also apply to space systems not using artificial earth satellites. A example of the note could read as follows:

*For application of the provision of this Article (i.e. Articles 9 and 11 and Appendix 4), the provisions applicable to satellite systems shall also be applicable to space systems not using artificial earth satellite.*

#### 3.1.4.11 Modifications to coordination requests of non-geostationary satellite systems submitted under Rule of Procedure on No. 9.27

Since 2017, the Bureau has steadily received modifications of coordination requests of non-geostationary satellite systems.

In this context, for the consideration of modifications to the original constellation submissions and the impact on the original date of receipt of the filings, the Bureau was using the guiding principles of the Rule of procedure on No. **9.27** for dealing with the modifications, i.e. coordination is not required when the nature of the change is such as not to increase the interference to, or the protection required from, the assignments of another administration, as specified in Appendix **5** of the Radio Regulations.

In the absence of appropriate criteria or calculation methods to verify that there is no increase of interference or protection, the Bureau was requesting that technical justifications be provided by the notifying administration in order to make its findings and publish them.

Calculations were provided in the form of cumulative distribution functions of the interference level, expressed as an interference-to-noise (I/N) ratio for varying percentages of time and locations into the subsequently filed non-GSO FSS systems.

When the modifications have a potential to result in an increase of the interference caused to the network to be modified, the Bureau was accepting that the responsible administration was committing to not requiring any more protection from other non-GSO systems or very large earth stations subject to No. **9.7A** than that required for the original parameters.

##### 3.1.4.11.1 Statistics on submission under Rule of Procedure on No. 9.27

As of mid-2023 the Bureau has processed and published 17 modifications of request for coordination of non-GSO systems maintaining original date of receipt, including 14 modifications requiring simultaneous examination under Article **22** epfd limits.

The overall processing time from the date of receipt to the date of publication takes on average 13 months (4 and 23 months corresponding to minimum and maximum).

Such extensive processing time can be explained by several factors:

1) In almost all the cases when such technical justification is submitted, the Bureau found that the list of the system/networks examined was not complete. Some systems were in the process of processing and examination by the Bureau and were not yet published and available in BR IFIC. In such cases, the Bureau was accepting additional submission of complementary analysis for the missing networks without impact on the date of receipt if a reply was received within 30 days from the date of inquiry.

2) For cases subject to Article **22** epfd limits, examination was carried out under Article **22** at the same time ahead of the existing queue for Article **22** examinations for two reasons:

* both the regulatory examination and publication deadlines for such coordination requests had to be respected, and
* both the examination under Article **22** and the identification under RR No. **9.7B** needed to be completed to be able to conclude whether the original date of protection could be maintained in accordance with paragraph 2.4 of the Rule of Procedure on RR No. **9.27**.

##### 3.1.4.11.2 Experience on processing of submissions under Rule of Procedure on No. 9.27

For the verification of calculations submitted to justify the absence of increase of interference, the Bureau was requiring that:

1. A representative set of geographical test-points is used characterized by the latitude (e.g., 0, 30, 60 degrees). It should be noted that selection of test latitudes should be justified.

2. Default parameters are used in case they are missing in a victim system submission (minimum elevation angle, tracking strategy etc.).

In case the analysis should include the consideration of potentially affected victim GSO links under No. **9.12A**, the analysis may be provided with respect to the list of representative earth stations each having its distinct characteristics instead of addressing interference to each individual GSO network because GSO space stations have the same orbital characteristics and similar characteristics of antennas of earth stations.

For the cases involving the coordination under No. **9.7B** in accordance with the Rule of Procedure, no increase of interference is demonstrated by comparing CDF of epfd with respect to each large earth station potentially affected by the modifications.

For 3 modification requests, the Bureau found that there is an increase of interference and in all these cases the notifying administration of a non-GSO has informed the Bureau that coordination was initiated and completed with administration responsible for the interfered-with very large earth station. On that basis the date of receipt was maintained for the modification of the non-GSO satellite systems.

It should be noted that the finding by the Bureau to maintain original date of receipt is subject to the application of No. **14.1** where any administration may request a review of a finding when it believes that there will be an increase of interference.

As of mid-2023 there are 2 cases submitted under this provision to the Bureau involving non-geostationary interfered-with satellite systems. One case was resolved by clarifying simulation assumptions and another case is still under study pending further clarifications.

##### 3.1.4.11.3 Possible development of a methodology

The Bureau also notes the studies ongoing within Working Party 4A on review of Recommendation ITU-R S.1526-1 to include a methodology to assess the change in interference environment in relation to No. **9.12** of the Radio Regulations when the characteristics of non-GSO FSS systems are modified.

The Bureau believes that it will be useful to develop such a methodology, including additional considerations, and in particular:

1. To precise interference criteria I/N: certain I/N values (e.g. 0 dB and above) can be considered as already harmful for the case when interference is calculated from original frequency assignments. Therefore, there may be no need to compare CDF I/N curves for high I/N values. Similarly, such comparison may not be useful for very low I/N values (e.g. -20 dB and below) since the level of interference is anyway negligible.
2. How to model interference from non-active satellites/earth stations considering that their precise pointing is unknown etc.

The Bureau hopes that administrations will actively contribute to the ITU-R studies on this matter. In the meantime, the Conference is invited to consider agreeing on a range of I/N values where the situations between the original and modified submissions should be compared (e.g. from -20 dB to 0 dB or a larger range if considered more appropriate).

### 3.1.5 Article 11 of the Radio Regulations

#### 3.1.5.1 Notification of stations at sea

Resolution **1 (Rev.WRC-97)** of the Radio Regulations resolves “that, unless specifically stipulated otherwise by special arrangements communicated to the Union by administrations, any notification of a frequency assignment to a station shall be made by the administration of the country on whose territory the station is located”.

This Resolution does not describe the notification of a frequency assignment to a station that is located at sea outside the territory of any country. The current Rule of Procedure on Resolution **1** does not have such description either.

Due to commercial and scientific activities at sea supported by radiocommunications, the Bureau has been receiving the notification of frequency assignments to stations of terrestrial and space services located on platforms at sea outside territorial waters for many years. It may be noted that more than 15 000 frequency assignments to terrestrial stations located on such platforms have been registered in the Master Register since 1982.

For terrestrial services, the Bureau accepts the notification of radio stations on platforms at sea, if a notice contains the abbreviation “PLA” in the field the Station Name (“PLA” is specified as a platform in the Preface). No other check of the platform location vis-à-vis the notifying administration or its exclusive economic zone is made. However, the examination of the stations located in disputed areas is temporarily suspended pending the updates of the Rule of Procedure on Resolution **1**.

For space services, when a frequency assignment to an FSS earth station on artificial islands, installations and structures in an exclusive economic zone is notified by an administration which is internationally recognized as the coastal state of that exclusive economic zone (EEZ), the Bureau considers the notification information receivable and processes the notification in accordance with Article **11**. There is so far no comprehensive map of exclusive economic zones internationally agreed. Also, the borders between overlapping EEZ are under discussions in many instances, which may further complicates verification of a station location vis-à-vis the EEZ of the notifying administration. In response to the receipt by the Bureau of notification of FSS earth stations located in the sea, the Bureau’s approach has been therefore to accept and process such notifications of earth stations if they are installed on fixed artificial objects in the exclusive economic zone of the notifying administration where no international dispute exists.

Frequency assignments to stations of terrestrial and space services located on platforms at sea are examined according to all relevant provisions of the RR and regional agreements. If the results of the examination under No. **11.31** and other applicable examinations are favourable, the assignments are recorded in the MIFR, similarly to any other station located within a national territory. Such assignments obtain the status of international recognition according to No. **8.3** and are taken into account in the examination of other frequency assignments.

It may be noted that the notification of a frequency assignment to stations located on platforms at sea outside territorial waters was reported to WRC-15, see sub-section 3.2.3.3 of the Director’s Report to WRC-15, [Document 4 (Add.2)](https://www.itu.int/md/R15-WRC15-C-0004/en), without any decision of that Conference. During the studies under agenda item 1.1 of WRC-23, the issue was discussed in ITU-R Working Party 5D. In addition, the Bureau has received a number of requests to clarify the notification and examination of such stations.

The Conference may wish to further address this issue and provide necessary guidance to the administrations and the Bureau.

#### 3.1.5.2 Registration of mobile stations of terrestrial services in the MIFR

The preparations to WRC-23 agenda item 1.1 and the associated discussions in WP5D and CPM23‑2 raised the question whether a radiocommunication service, for which there are no associated frequency assignments registered in the MIFR, is eligible for protection. This question arises from the provisions of RR No. **8.1**, stating “*rights and obligations of administrations in respect of frequency assignments shall be derived from the recording of those assignments in the MIFR*”.

Pursuant to RR No. **11.14** the registration of individual mobile stations in the MIFR, e.g., ships or aircraft, is prohibited:

***11.14*** *Frequency assignments to ship stations and to mobile stations of other services, to stations in the amateur service, to earth stations in the amateur-satellite service, and those to broadcasting stations in the high-frequency bands allocated to the broadcasting service between 5 900 kHz and 26 100 kHz which are subject to Article* ***12*** *shall not be notified under this Article.*

Consequently, frequency assignments for the aircraft-to-aircraft, ship-to-ship and aircraft-to-ship radiocommunication links cannot be registered in the MIFR even if an administration wishes to do so.

Furthermore, standalone radio systems and onboard communication applications, such as radioaltimeters, airborne weather radar or UHF maritime onboard communication stations, cannot be registered either. This may lead to the conclusion that such systems and their corresponding radiocommunication services have no rights for protection from interference.

It may be noted that the registration of stations in the aeronautical mobile and maritime mobile services is possible, but only in the form of receiving and transmitting land stations communicating with ships or aircraft operating within their service areas, under RR Nos. **11.2** and **11.9**.

In this case, a transmitting land station (coast stations in the maritime mobile service or aeronautical land stations in the aeronautical mobile service) is notified using T12 notice type, with indication of the geographical coordinates of the land station, its parameters and a service area, in which the associated receiving ship or aircraft stations may operate. In the same manner, a receiving land station is notified using T13 notice type, describing the radio link from transmitting mobile stations to the associated receiving land station.

However, when the usage of the aeronautical mobile and maritime mobile services is limited to communications between aircraft or ships only, frequency assignments for such applications cannot be registered in the MIFR. As a result, the protection of these services in international waters or airspace is put under question.

For the sake of completeness of information, it should be noted that some aeronautical and maritime frequencies having standard worldwide application are recorded in the MIFR in the form of common frequencies, pursuant to RR No. **11.13**, without specifying the notifying administration.

In order to address that concern and make the provisions of RR Nos. **8.1** and **11.14** fully consistent, WRC-23 may allow the notification to the MIFR of frequency assignments to:

1. *the aircraft-to-aircraft, ship-to-ship and aircraft-to-ship radiocommunication links;*
2. *standalone aircraft and ship applications.*

In this context, RR No. **11.14** might need to be changed to enable the notification of such stations, for example:

*11.14 Frequency assignments to mobile stations, except ship, aircraft, radiolocation and radionavigation mobile stations, to stations in the amateur service, to earth stations in the amateur-satellite service, and those to broadcasting stations in the high-frequency bands allocated to the broadcasting service between 5 900 kHz and 26 100 kHz which are subject to Article 12 shall not be notified under this Article.*

WRC-23 may wish to allow such notification and recording in the MIFR on a provisional basis, subject to confirmation by WRC-27.

Immediately after WRC-23, the Bureau would develop new notice types to accommodate the applications listed in *a)* and *b)* above and prepare necessary proposals for amendments to Appendix **4** with a view to approve those amendments at WRC-27.

The new notice types would be similar to the existing T12 and T13 notices, with the exception of the coordinates of a land station, which will be replaced by the area of operation of mobile stations.

The Conference is invited to consider this subject, make necessary regulatory changes and provide necessary guidance to the administrations and the Bureau to enable the notifications of the radio stations listed in *a)* and *b)* above.

#### 3.1.5.3 Commenting procedure under No. 11.28.1

In accordance with No. **9.2**, for satellite networks not subject to coordination, with respect to modifications, only the following will require the application of the advance publication procedure:

* modification of the orbital location for a space station using the geostationary-satellite orbit,
* the modification of the reference body for a space station using a non-geostationary-satellite orbit,
* the use of an additional frequency band,
* the modification of the direction of transmission for a space station.

The above changes are published in an API/A special section of the BR IFIC (No. **9.2B**).

For any other changes to the API, there is no obligation to submit a modification to the API, and the changes to the characteristics can be done directly in the notification for recording under No. **11.2**. An administration believing that unacceptable interference may be caused to its existing or planned satellite networks or systems by submitted modifications to the characteristics initially published under No. **9.2B** may provide its comments to the notifying administration under No. **11.28.1**. These comments are exchanged between the administrations concerned, there is no requirement of using the Bureau’s commenting software Spacecom to submit, there is no requirement for a publication of these comments, and there is no time-limit for the communication of these comments.

The Bureau has received enquiries from administrations as to why these comments are not published, especially to changes that may impact other administrations such as the expansion of the service area (item C.11.a of Appendix **4**).

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| --- |
| The Conference is invited to consider the following possibilities with respect to the application of No. **11.28.1**:   * Comments provided under No. **11.28.1** should be provided to a notifying administration with copy to the Bureau within [2] months from the date of publication of the information under No. **11.28**. The Bureau will publish the list of comments received on its website. * Consider adding additional parameters to No. **9.2** that will require an application of the advance publication procedure. This includes the increase of service area, changes to orbital parameters for a non-geostationary-satellite orbit, etc. |

#### 3.1.5.4 Period for bringing into use changes made under No. 11.43A

No. **11.44** provides 7 years for bringing into use the frequency assignments from the date of receipt of the advance publication information or receipt of the request for coordination.

However, in accordance with No. **11.43A**, any change to the characteristics of an assignment that has been recorded and confirmed as having been brought into use shall be brought into use within five years from the date of the notification of the modification.

Prior to 1st January 2017, No. **9.1** required that a coordination request can only be considered as received at the earliest 6 months after the date of receipt of the information for advance publication information where coordination is required by Section II of Article **9**. Since modifications under No. **11.43A** does not require an advance publication information, submission of a modification under No. **11.43A** was exempt from this minimum delay of 6 months.

However, since 1st January 2017, the request for coordination and the notification can be submitted and considered received on the same day as long as complete information is provided. This implies that the frequency assignments for the satellite network have a maximum period of 7 years to be brought into use from the date of receipt of the request for coordination.

Following the removal of the 6-month minimum period between the API and the coordination, there may not be a benefit to invoke the procedure of No. **11.43A** for the submission of modification to assignments already recorded.

The Conference is invited to consider if the five years for bringing the assignments into use specified in No. **11.43A** should be changed to seven years, to be consistent with the period provided under No. **11.44**.

#### 3.1.5.5 Reminders under Nos. 11.44B, 11.44C, 11.44D and 11.44E

Reminders by the Bureau of a regulatory deadline are common in the Radio Regulations.

Such a reminder is for example sent under No. **11.44**. Noting the usefulness of these reminders for notifying administrations, the Bureau also sends reminders concerning the regulatory deadline under Nos. **11.44B**, **11.44C**, **11.44D**, and **11.44E**. Concerning Nos. **11.44B** and **11.44C**, the Bureau also sends a reminder that the notifying administration shall inform the Bureau within 30 days of the end of the 90-day period that a space station having the capability to transmit or receive the frequency assignment brought into use, has been deployed for a continuous period of 90 days.

The Conference is invited to note this course of action by the Bureau.

#### 3.1.5.6 Implementation of No. 11.48, Resolution 552 (Rev.WRC-19) and Resolution 49 (Rev.WRC-19)

The administration responsible for a satellite network has to provide, where required, the due diligence information pursuant to Resolution **552 (Rev.WRC-19)** within 30 days after the end of the 7-year regulatory period following the date of receipt by the Bureau of the relevant complete information under No. **9.1A**. If the due diligence information is not provided, then the corresponding information published under Nos. **9.1A** and **9.38**, as appropriate, will be cancelled.

WRC-19 also modified §4 of Annex 1 to Resolution **49 (Rev.WRC-19)** and extended the submission of due diligence information to no later than 30 days following the end of the period established as a limit to bringing into use in No. **11.44** similar to Resolution **552 (Rev.WRC-19)**. However, the additional 30 days was not appropriately reflected in No. **11.48** resulting in an inconsistency between No. **11.48** and §4 of Annex 1 to Resolution **49 (Rev.WRC-19)**.

Unlike Resolution **49** **(Rev.WRC-19)**, there is no requirement in the Radio Regulations for the Bureau to send a reminder six months before the expiry of the regulatory period if the administration responsible for the satellite network has not submitted the due diligence information under Resolution **552 (Rev.WRC-19)**. Nevertheless, the Bureau, under its own initiative, sends a reminder under this Resolution in the form of a biannual Circular Telegram together with Bureau’s advance notice referred to in Nos. **11.44/11.44.1** and in §10 of Annex 1 to Resolution **49 (Rev. WRC-19)** so that the responsible administration do not overlook submission of due diligence information within regulatory time limit which otherwise could result in the cancellation of their frequency assignments.

The following suggested modifications is to align No. **11.48** with §4 of Annex 1 to Resolution **49 (Rev.WRC-19)** and reflect the Bureau’s action of sending reminders before the expiry of the regulatory period for both Resolution **552 (Rev.WRC-19)** and Resolution **49 (Rev.WRC-19)**

11.48 If, after the expiry of the period of seven years from the date of receipt of the relevant complete information referred to in No. **9.1** or **9.2** in the case of satellite networks or systems not subject to Section II of Article **9** or in No. **9.1A**in the case of satellite networks or systems subject to Section II of Article **9**, the administration responsible for the satellite network has not brought the frequency assignments to stations of the network into use, or has not submitted the first notice for recording of the frequency assignments under No. **11.15**, the corresponding information published under Nos. **9.1A**, **9.2B** and **9.38**, as appropriate, shall be cancelled, but only after the administration concerned has been informed at least six months before the expiry date referred to in Nos. **11.44** and **11.44.1.**

If, 30 days after the expiry of the period of seven years from the date of receipt of the relevant complete information referred to in No. **9.1A**, the administration responsible for the satellite network has not provided, where required, the due diligence information pursuant to Resolution **49 (Rev.WRC-19)** or **Resolution 552 (Rev.WRC-19)**, as appropriate, the corresponding information published under Nos. **9.1A** and **9.38**, as appropriate, shall be cancelled, but only after the administration concerned has been informed at least six months before the expiry date referred to in Nos. **11.44** and **11.44.1**.

With such amendments to No. 11.48, No. 11.48.1 would not be necessary any longer and could be suppressed.

The Conference is invited to consider the modification of the regulatory text above to align No. **11.48** and § 4 of Annex 1 to Resolution **49** as described above.

### 3.1.6 Article 13 of the Radio Regulations

#### 3.1.6.1 Update of orbital parameters of non-geostationary satellite networks or systems as a result of the application of No. 13.6

When notified of the bringing into use, bringing back into use, or the extension of the period of validity of frequency assignments to a space station in a non-geostationary satellite orbit network or system, the Bureau verifies and consults the notifying administration as needed under the procedure of No.**13.6** to ascertain that a space station with the capability of transmitting or receiving that frequency assignment has been deployed and maintained on one of the notified orbital plane(s) of the non-geostationary satellite network or system, in accordance with Nos.**11.44C**, **11.44D**.

With the interest to ensure that the Master International Frequency Register (MIFR) reflects the actual use of the frequency and orbits, and considering that most small satellites make use of frequency assignments that are not subject to coordination, the Bureau adopts the following practice for non-geostationary satellite network or system not subject to coordination under Section II of Article **9**. For these networks, when the enquiry concludes that the actual orbit of the space station deviates more than 10% from the characteristics of the notified orbital plane based on the altitude of the apogee (item A.4.b.4.d of Appendix **4**), the altitude of the perigee (A.4.b.4.e) and inclination (A.4.b.4.a), after consultation and with the agreement of the notifying Administration, the Bureau updates the orbital information in the MIFR to the actual values and publishes the modification in a Part II-S of a BR IFIC.

The Conference is invited to note the Bureau’s approach and the fact that the trigger values to update the orbital information may evolve in the future depending on additional information, including from potential ITU-R studies.

### 3.1.7 Article 15 of the Radio Regulations

#### 3.1.7.1 Overview of continuing cases of harmful interference affecting space services and reported to the Bureau

During the 4-year period considered in this report (June 2019 – May 2023), a total amount of 13.98 GHz of spectrum/orbit resource has been affected by harmful interference reported to the Bureau by Administrations, also requesting assistance under No. **13.2** in several cases.

Geostationary satellite networks in the FSS and BSS represent 73 % of the total affected bandwidth, with various causes of interference: technical/operational failures, coordination not fully completed, unauthorized use and the concerning continuous existence of unnecessary emissions as defined in No. **15.1** of the Radio Regulations.

In some instances, escalation up to the Radio Regulations Board was needed as well as support from Administrations operating space radio monitoring facilities and having signed with ITU a Memorandum of Understanding in the framework of PP Resolution 186 (Rev.Bucharest, 2022). Support from these Administrations was obtained in order to geolocate the source of harmful interference, which contributed to the resolution of some pending cases. The Bureau also convened meetings among concerned Administrations in the resolution of the cases.

In one case, the notifying administration of the satellite network identified as the source of harmful interference informed the notifying administration of the interfered-with satellite that the interfering satellite network is being operated under Article 48 of the Constitution.

The Conference is invited to highlight the provisions of No. **15.1** and call administrations to exercise their utmost goodwill in addressing and solving interference cases.

Non-geostationary satellite networks in the EESS (passive) in the 1400-1427 MHz frequency band (where No. **5.340** applies) were repeatedly affected by harmful interference, representing 23 % of the total affected bandwidth reported to the Bureau. The main causes of interference are two-fold:

1. Unwanted emissions from radars and other radio devices operating in adjacent bands and exceeding levels contained in Resolution **750 (Rev.WRC-19)**,

2. Unauthorized use of CCTV wireless devices making illegal use of the passive band in contradiction with No. **5.340** of the Radio Regulations.

Multiple sources of interference were located within the territories of 45 Administrations, according to the reports submitted to the Bureau during the last 4-year period.

Concerning unwanted emissions causing harmful interference, the Conference is invited to urge administrations to implement the recommended levels contained in Resolution **750 (Rev.WRC-19)** asa means to prevent the occurrence of harmful interference.

Concerning unauthorised uses causing harmful interference and noting that No. **5.340** globally applies to the frequency band 1 400 – 1 427 MHz, with no exception, the Conference is invited to request administrations to ensure that no commercial radio devices able to operate in this frequency band are manufactured, sold, exported, imported or marketed on their territory, in addition to prohibiting their operations.

Another case that draws a particular attention of the Bureau concerns the harmful interference affecting the radionavigation satellite service, representing 3.3% of the total spectrum/orbit resource affected during this 4-year period. Due to its critical nature as a safety service, a series of actions were initiated and are detailed in section 3.1.7.2.

A few cases of harmful interference affecting MSS and Radioastronomy services were also reported.

#### 3.1.7.2 Harmful interference to receivers of the radionavigation satellite service in the 1559 – 1610 MHz frequency band

Following its initial report to the 2019 World Radiocommunication Conference, the Radiocommunication Bureau has been informed, through its online Satellite Interference Reporting and Resolution System (SIRRS), of a significant number of cases of harmful interference to the radionavigation-satellite service (RNSS) in the 1 559 – 1 610 MHz frequency band affecting receivers onboard aircrafts and causing degradation or total loss of the service for passenger, cargo and humanitarian flights. In some cases, this has also led to misleading information provided by RNSS receivers to pilots.

Based on in-flight monitoring of air transport category aircraft GNSS receivers by one major aircraft manufacturer, 10 843 radio-frequency interference events were detected globally in 2021. Most of these events occurred in the Middle East region, but several events were also detected in the European, North American and Asian regions.

The Bureau has noted with great concern the increasing number and range of impact of such harmful interference on safety-of-life radiocommunication services used for the navigation of aircraft (see No. **4.10**[[12]](#footnote-14)).

In accordance with RR No. **13.2**, the Bureau reported such cases to the Radio Regulations Board (RRB), together with its recommendations.

At its 89th meeting in March 2022, the RRB considered the situation and instructed the Bureau to issue a circular letter to the Member States to disseminate its decisions and other background information about the prevention of harmful interference to RNSS receivers.

Following this instruction, the Bureau issued Circular Letter [CR/488](https://www.itu.int/md/R00-CR-CIR-0488/en) which summarizes the RRB’s decisions on the issue and formulates recommendations to Member States concerning mitigation of harmful interference to the radionavigation-satellite service, as presented below:

**The relevant decisions of the 89th RRB meeting**

In accordance with No. **13.2**, the Board decided to request Member States to ensure that their operating agencies complied with the applicable provisions of the ITU legal instruments, as emphasized below:

• “*All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Member States or of recognized operating agencies, or of other duly authorized operating agencies which carry on a radio service, and which operate in accordance with the provisions of the Radio Regulations.*” (Article 45 of the ITU Constitution)

• “*to take the steps required to prevent the transmission or circulation of false or deceptive distress, urgency, safety or identification signals, and to collaborate in locating and identifying stations under their jurisdiction transmitting such signals.*”(Article 47 of the ITU Constitution)

• “*1 Member States retain their entire freedom with regard to military radio installations.*

*2 Nevertheless, these installations must, so far as possible, observe statutory provisions relative to giving assistance in case of distress and to the measures to be taken to prevent harmful interference, and the provisions of the Administrative Regulations concerning the types of emission and the frequencies to be used, according to the nature of the service performed by such installations.*

*3 Moreover, when these installations take part in the service of public correspondence or other services governed by the Administrative Regulations, they must, in general, comply with the regulatory provisions for the conduct of such services.*” (Article 48 of the ITU Constitution)

• “*Recognizing that transmissions on distress and safety frequencies and frequencies used for the safety and regularity of flight (see Article 31 and Appendix 27) require absolute international protection and that the elimination of harmful interference to such transmissions is imperative, administrations undertake to act immediately when their attention is drawn to any such harmful interference.*” (RR No. **15.28**)

The Board further decided to request Member States to continue to exercise their utmost goodwill and mutual assistance in the application of the provisions of Article 45 of the Constitution and of Section VI of Article **15** of the Radio Regulations.

**Recommendations on prevention and mitigation of harmful interference to RNSS**

With respect to unnecessary transmissions, which represent one of the important sources of interference to RNSS, the Bureau would like to point out that the use of devices commonly referred as “GNSS jammers” or any other illegal interfering equipment, which may cause harmful interference to aircraft, are prohibited by provision No. **15.1** of the Radio Regulations:

*15.1 § 1 All stations are forbidden to carry out unnecessary transmissions, or the transmission of superfluous signals, or the transmission of false or misleading signals, or the transmission of signals without identification (except as provided for in Article* ***19****).*

Consequently, Administrations are urged to apply necessary measures at national level to avoid the commercialisation, proliferation and use of illegal transmitters.

In addition, the administrations are encouraged to consider the following additional measures to address this critical issue:

1. reinforcing navigation systems resilience to interference;
2. increasing collaboration between radio regulatory and enforcement authorities;
3. reinforcing civil-military coordination to address interference risks associated with RNSS testing and conflict zones;
4. increasing coordination between aviation, military and radio-regulatory authorities;
5. retaining essential conventional navigation infrastructure for contingency support in case of RNSS outages, and developing mitigation techniques for loss of services.

The above measures were decided by the International Civil Aviation Organization (ICAO) at its 40th Assembly in October 2019 and disseminated by ICAO State Letter AN 7/5-20/89 dated 28 August 2020 . They were also ratified at its 41st Assembly on September-October 2022.

The Bureau encouraged Administrations to disseminate this information among their different operating agencies to raise awareness of the situation and to remind them of their obligation to prevent any harmful interference in accordance with ITU’s Legal Instruments.

Despite the measures taken by the Radio Regulations Board and the Bureau, received reports indicate that the number of global incidents observed by one major aircraft manufacturer in 2021 (10843 RFI events) increased to 49605 in 2022, i.e. 4.6 times with respect to the situation reported in 2021.

Another monitoring system based on ADS-B has recorded 127610 flights affected by radio frequency interference between 17 October 2022 and 19 June 2023.

According to flight data recording by the International Air Transport Organization (IATA), the global distribution of GPS loss events between August 2021 and December 2022 is depicted below:

A map of the world

Description automatically generated

This global map shows that interference to RNSS is not limited to areas near zones of armed conflicts, and that the risk of impacting safety and regularity of flights at en-route altitudes is spread all over the world.

The Conference is invited to adopt a Resolution urging Member States to take actions to prevent and mitigate harmful interference affecting RNSS.

### 3.1.8 Article 19 of the Radio Regulations

No. **19.1** indicates that “All transmissions shall be capable of being identified either by identification signals or by other means1.” Footnote 1 refers to No. **19.1.1**, which explains that “In the present state of the technique, it is recognized nevertheless that the transmission of identifying signals for certain radio systems (e.g. radiodetermination, radio relay systems and space systems) is not always possible.”

It should be noted that the inclusion of space systems in No. **19.1.1** has been decided by the Extraordinary Administrative Radio Conference to allocate frequency bands for space radiocommunication purposes held in Geneva from 7 October to 8 November 1963 and this footnote was never reviewed or modified during 60 years.

Noting the increasing number of non-geostationary satellite systems across all frequency ranges as well as the transitory nature of radio interference created by such systems (especially when compared to geostationary systems), the capability of transmissions from non-geostionary satellite systems of being identified could simplify the identification of the interfering source in case of interference. Moreover, satellite technology has considerably evolved in 60 years since 1963 and transmitting identifying signals for space systems is now technically feasible (see Recommendation ITU-R S.2062-0 for an example of such techniques).

The Conference is invited to remove space systems from No. **19.1.1** as follows, in order to facilitate the identification of transmissions of these systems and the timely resolution of interference events.

**19.1.1** In the present state of the technique, it is recognized nevertheless that the transmission of identifying signals for certain radio systems (e.g. radiodetermination, radio relay systems) is not always possible.”

### 3.1.9 Article 21 of the Radio Regulations

#### 3.1.9.1 Verification of the No. 21.5 limit for IMT stations with active antenna systems

#### With respect to Bureau’s experience in the application of the No. 21.5 limit for IMT stations with active antenna systems, see sub-section 4.3.2 of Part 1 of the Director’s Report to WRC-23.

#### 3.1.9.2 PFD scaling factor to be applied to non-GSO FSS constellations with 1000 or more space stations operating in the 17.7 – 19.3 GHz frequency band

The Bureau drew the attention of the WRC-19 on this issue through the Director’s report (see § 3.1.7.2 of Document 4(Add.2)), that studies performed before WRC-2000 have not addressed cases of non-GSO satellite systems having more than 1 000 satellites, and that the linear increase of X for N>288 may lead to values that render extremely difficult to meet these pfd limits and may therefore invite artificial split of single systems.

WRC-19 decided the matter as follows (see Document [CMR-19/569](https://www.itu.int/md/R16-WRC19-C-0569/en)):

First, a call for studies by ITU-R of the appropriateness of the equations contained in RR No. **21.16.6** for large non-GSO satellite systems (e.g. such as those having more than 1 000 satellites). The results of the studies can be considered by WRC-23 under standing agenda item 7 if an Issue under this agenda item has been included in the CPM-23 report.

Second, an *instructs to the Radiocommunication Bureau* to issue qualified favorable findings under RR Nos. **9.35**/**11.31** when examining compliance of frequency assignments to non-GSO FSS satellite systems with RR Article **21** pfd limits applicable in the frequency band 17.7-19.3 GHz if the notifying administration requests it to do so. Such practice shall apply to non-GSO FSS satellite systems for which coordination requests have been received from 23 November 2019 until the last day of WRC-23.

In response to the call for studies by WRC-19, Working Party 4A has undertaken studies to evaluate the appropriateness of the scaling factor and has conclusively decided that the current equations in RR No. **21.16.6** are inappropriate when applied to non-GSO constellations of *N* >1 000.

Due to the fact that studies were on-going, an issue under WRC-23 agenda item 7 was not approved at the May 2022 meeting on this topic.

However, during its June-July 2023 meeting, ITU-R Working Party 4A concluded that the equations from RR No. **21.16.6** that apply to non-GSO satellite systems with more than 1 000 satellites are inappropriate and agreed three possible approaches, together with their associated qualifications, to correct the equation in RR No. **21.16.6** (see Annex 21 to [Document 4A/978](https://www.itu.int/md/R19-WP4A-C-0978/en), especially section 5 describing the three possible approaches). Working Party 4A noted that updates of the scaling factor equations should focus on the maximum potential visibility of the non-GSO system space stations. Based on an initial review, the Bureau would be in a position to implement any of the three possible approaches described in section 5 of Annex 21 of [Document 4A/978](https://www.itu.int/md/R19-WP4A-C-0978/en), if adopted by WRC-23.

With regards to the second point of the WRC-19 decision, the Bureau has received 5 requests for which qualified favourable findings have been given accordingly.

|  |  |  |  |
| --- | --- | --- | --- |
| Adm | Satellite name | Number of satellites | Date of receipt |
| D | KBSAT-NGSO-1 | 3236 | 06.10.2020 |
| LUX | OMNIA-1 | 4409 | 21.05.2021 |
| LUX | OMNIA-2 | 1765 | 21.05.2021 |
| LUX | OMNIA-3 | 4609 | 21.05.2021 |
| USA | USASAT-NGSO-10 | 5110 | 20.10.2021 |

Since WRC-19 has indicated that qualified favorable finding should be applicable until the last day of WRC-23, the Bureau expects that WRC-23 will provide further guidance on the application of No. **21.16.6**. If no guidance is provided, the Bureau will consider that this provision remains applicable and previously established qualified favorable findings will be reviewed in application of this provision.

The Conference is invited to provide guidance to the Bureau on the approach to apply No. **21.16.6**.

#### 3.1.9.3 Applicability of Article 21 pfd limits in the 37.5-40 GHz and 40.5-42.5 GHz frequency bands to non-geostationary satellite systems operating with 100 or more satellites

There has been a significant increase in the number of notifications for recording in the MIFR of non-GSO satellite systems in the frequency bands 37.5-40 GHz and 40.5-42.5 GHz since 2019 (these notifications were first received during WRC-19 in the context of decisions taken under WRC-19 agenda item 1.6 but notifications continued to be sent after WRC-19). Moreover, a large number of these filings consist of non-GSO satellite systems that have more than 99 satellites per satellite system as shown in the Tables 1 and 2 below.

Table 1

Numbers of FSS and MSS non-GSO satellite systems notified   
in the frequency bands 37.5-40 GHz and 40.5-42.5 GHz

|  |  |  |
| --- | --- | --- |
| Number of notifications | Number of satellites in the  non-GSO system | |
| **≤ 99** | **> 99** |
| 2016 | - | 1 |
| 2017 | 2 | 2 |
| 2018 | - | 1 |
| 2019 | 3 | 23 |
| 2020 | 5 | 9 |
| 2021 | 2 | 20 |
| 2022 | 0 | 3 |
| **Total** | **15** | **59** |

Table 2

Size of notified non-GSO satellite systems

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Total number of satellites per non-GSO system | ≤ 99 | 100-199 | 200-499 | 500-1 000 | > 1 000 |
| Numbers of filings | 12 | 6 | 12 | 9 | 32 |

The current pfd limits in Article **21** that are applicable to non-GSO satellite systems in the frequency bands 37.5-40 GHz and 40.5-42 .5 GHz are shown in Table 3 below.

Table 3

**Article 21 pfd limits applicable to non-GSO satellite systems   
in the frequency bands 37.5-40 GHz and 40.5-42.5 GHz**

| Frequency band | Service | Limit in dB(W/m2) for angles of arrival (δ) above the horizontal plane | | | Reference bandwidth | |
| --- | --- | --- | --- | --- | --- | --- |
| 0°-5° | 5°-25° | 25°-90° |
| 37.5-40 GHz | Fixed-satellite (non-geostationary-satellite orbit)  Mobile-satellite (non-geostationary-satellite orbit) | −120 11, 21 | −120 + 0.75(δ − 5) 11, 21 | −105 11, 21 | 1 MHz | |
| 40.5-42 GHz | Fixed-satellite (non-geostationary-satellite orbit)  Broadcasting-satellite  (non-geostationary-satellite orbit) | −115 11, 21 | −115 + 0.5(δ − 5) 11, 21 | −105 11, 21 | 1 MHz |
| 42-42.5 GHz | Fixed-satellite (non-geostationary-satellite orbit)  Broadcasting-satellite  (non-geostationary-satellite orbit) | −120 11, 21 | 5°-25° | −105 11, 21 | 1 MHz |
| −120 + 0.75(δ − 5) 11, 21 |

The pfd limits in Article **21** for the 37.5-40 GHz and 40.5-42.5 GHz frequency bands applicable to FSS, MSS and BSS non-GSO satellite systems are associated with Footnote 11, i.e No. **21.16.4**, that states :

*11* ***21.16.4*** *The values given in this table entry shall apply to emissions of space stations of non-geostationary satellites in systems operating with 99 or fewer satellites. Further study concerning the applicability of these values is necessary in order to apply them to systems operating with 100 or more satellites.     (WRC‑2000)*

When examining compliance with pfd limits under No. **11.31**, the Bureau applies these limits to all satellite systems without knowing exactly how many satellites will be in operation and assumes that the pfd limits for non-GSO satellite systems operating with 100 or more satellites should not be less stringent than those with 99 or fewer satellites.

Taking into consideration the increase in the number of notified non-GSO satellite systems in the above-mentioned frequency bands, many of which have more than 99 satellites, a review of the applicability of the current Article **21** pfd limits in the frequency bands 37.5-40 GHz and 40.5-42.5 GHz for non-GSO satellite systems operating with more than 99 satellites may be relevant and the Bureau submitted a contribution to ITU-R Working Party 4A (see [Document 4A/66](https://www.itu.int/md/R19-WP4A-C-0066/en)) for its further study on this matter in September 2020.

The Bureau will continue to apply the Article **21** pfd limits in the frequency bands 37.5-40 GHz and 40.5-42.5 for all satellite systems until such time the studies on this matter are concluded.

When examining compliance with pfd limits under No. **11.31** for the 37.5-40 GHz and 40.5-42.5 GHz frequency bands applicable to FSS, MSS and BSS non-GSO satellite systems, the Bureau will continue to apply, as explained above, the Article **21** limits to all satellite systems and assume that the pfd limits for non-GSO satellite systems operating with 100 or more satellites should not be less stringent than those with 99 or fewer satellites, unless advised otherwise by the Conference.

### 3.1.10 Article 22 of the Radio Regulations

#### 3.1.10.1 Shielded zone of the Moon (Nos. 22.22 to 22.25)

The Bureau has seen an increasing number of satellite network submissions with reference body of the Moon. Some of these filings include descriptions that there are space stations as well as stations on the Moon.

Nos. **22.22** to **22.25** establish the requirements for the protection of radio astronomy observations and to other users of passive services in the shielded zone of the Moon.

For non-geostationary systems or networks where the reference body is not the Earth, there is no requirement to provide orbital parameters. Therefore, for non-geostationary systems or networks with a reference body of the Moon, if there is no information regarding the locations of the stations on the Moon, it is not possible to carry out an analysis of the interference situation. Furthermore, there is no data item concerning a commitment from the notifying administration that these provisions are being complied with.

The Bureau has taken the initiative to request all administrations submitting non-geostationary satellite systems or networks for advance publication with a reference body of the Moon to provide a description on how their satellite network or system will comply with these requirements. On receipt of this information, the Bureau includes them in the publication of the BR IFIC.

For the following satellite networks, the Bureau has received replies from the notifying administrations which provided confirmation of plans to be compliant with RR Nos. **22.22** to **22.25**:

|  |  |  |
| --- | --- | --- |
| Notifying administration | Satellite network name | Notice ID |
| CHN | DSLWP | 117545349 |
| CHN | LUNAR CTDRS-1 | 117545331 |
| CHN | LUNAR S-SAT | 117545441 |
| CHN | CENTISPACE-4 | 122545286 |
| G | IOMSAT-HAL | 121545276 |
| G | IOMSAT-L1 | 120545060 |
| G | SPACECOMMS-L1 | 120545137 |
| IND | LMI3 | 121545147 |
| J | HAKUTO-R-L1 | 119545040 |
| J | SLIM\_LEV-1-2 | 122545313 |
| UAE | ELM-1 | 122545268 |
| USA | LUNAR LTE DEMO | 122545209 |
| USA | LUNAR NODE-1 | 121545040 |
| USA | LUNAR TRAILBLAZER | 122545101 |
| USA | VIPER | 121545176 |
| USA | LUNAR FLASHLIGHT | 118545131 |
| USA | USA-LUNAR-1 | 121545201 |

For the following network, no response was received from the notifying administration after the deadline for response, even though the Bureau had sent a reminder:

|  |  |  |
| --- | --- | --- |
| **Notifying administration** | **Satellite network name** | **Notice ID** |
| ISR | SPACEIL | 116545256 |

The Bureau is similarly going through the list of satellite networks notified in the Master Register with a reference body of the Moon to also provide a description on how their satellite network or system will comply with these requirements.

The Conference is invited to consider if there is a need to add a requirement for administrations to commit to, or demonstrate how they can meet the requirements of Nos. **22.22** to **22.25** when they submit a satellite network with a reference body of Moon.

#### 3.1.9.2 Use of radiocommunication services on the Moon or on the vicinity of the Moon

The Bureau has received enquiries from administrations and operators about the appropriate radiocommunication service to use for stations orbiting or operating on the surface of the Moon. They would like to use radiocommunication services as defined in the Radio Regulations (e.g. radiodetermination-satellite service), where there is no mentioned of the service having to be provided on the Earth. Some would like to provide services similar to mobile, fixed, mobile-satellite or fixed-satellite services on the Moon.

The Bureau is concerned that frequency allocations for satellite services (e.g. radiodetermination-satellite service, fixed-satellite service, mobile-satellite service, broadcasting-satellite service etc.) have been established considering interference scenarios involving artificial earth satellites (see No. **1.111** of the Radio Regulation). Frequency bands allocated to satellite services should not be used for radio communication between the Earth and the Moon or in vicinity of the Moon because interference studies have not yet been conducted.

Consequently, the Bureau has advised that such use of radiocommunication service should make use of only the allocation for space research services or the space operation service (if it is for the operation of the spacecraft).

The Conference is invited to provide guidance on the appropriateness of satellite networks operating in the vicinity of the Moon using radiocommunication services other than the space research service and space operation service.

#### 3.1.9.3 Class of stations for stations operating on the Moon

The Bureau has received enquiries from administrations and operators about the appropriate class of stations to be used for radio stations operating on the surface of the Moon. These include stations that are fixed or mobile with respect to the surface of the Moon.

Based on Article **1** of the Radio Regulations, the Bureau can only classify them as space stations, even if the station will be operating on the surface of the Moon. However, it may be useful to create distinct classes of stations to distinguish space stations that are operating on the surface of the Moon, as compared to space stations that are orbiting around the Moon or in outer space.

The Conference is invited to provide guidance on the appropriateness of creating distinct classes of stations for radio stations operating on the surface on the Moon.

## 3.2 Appendices to the Radio Regulations

### 3.2.1 Appendix 4 of the Radio Regulations

#### 3.2.1.1 Data items Code Rate, Type of Modulation and Effective Height of the Antenna

The 80th meeting of the Radio Regulations Board in March 2019 adopted the Rule of Procedure that made the data items Code Rate and Type of Modulation mandatory for notification of broadcasting stations subject to the GE75 Agreement. The consequential changes are proposed to Appendix 4.

In addition, it is proposed to make the data item Effective Height of the Antenna mandatory for all broadcasting stations in the VHF/UHF bands up to 960 MHz, in order to enable analysis of compatibility between such stations.

APPENDIX 4 (REV.WRC‑19)

Consolidated list and tables of characteristics for use in the  
application of the procedures of Chapter III

ANNEX 1

Characteristics of stations in the terrestrial services

TABLE 1    (Rev. WRC‑19)

Characteristics for terrestrial services

| **Column No.** | **Item identifier** | **Notice related to**  **Description of data items and requirements** | **Broadcasting (sound and television) stations in  the VHF/UHF bands up to 960 MHz, for the  application of No. 11.2 and No. 9.21** | **Broadcasting (sound) stations in the LF/MF  bands, for the application of No. 11.2** | **Transmitting stations (except broadcasting  stations in the planned LF/MF bands, in the HF  bands governed by Article 12, and in the  VHF/UHF bands up to 960 MHz), for the  application of No. 11.2 and No. 9.21** | **Receiving land stations, for the application of  No. 11.9 and No. 9.21** | **Typical transmitting stations, for the application  of No. 11.17** | **Maritime mobile frequency allotment, for the  application of plan modification under Appendix  25 (Nos. 25/1.1.1, 25/1.1.2, 25/1.25)** | **Broadcasting stations in the HF bands, for the  application of No. 12.16** | **Item identifier** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **7.3.2** | **7AA** | the code for the type of modulation  The type of modulation denotes the use of DSB, SSB or any new modulation techniques recommended by ITU‑R  In the case of a LF/MF broadcasting station, required for a digital assignment subject to the GE75 Regional Agreement |  | **+** |  |  |  |  | **X** | **7AA** |
| **7.3.x** | **7B3** | the code rate  Required for digital assignments subject to the GE75 Regional Agreement |  | **+** |  |  |  |  |  | **7B3** |

| **Column No.** | **Item identifier** | **Notice related to**  **Description of data items and requirements** | **Broadcasting (sound and television) stations in  the VHF/UHF bands up to 960 MHz, for the  application of No. 11.2 and No. 9.21** | **Broadcasting (sound) stations in the LF/MF  bands, for the application of No. 11.2** | **Transmitting stations (except broadcasting  stations in the planned LF/MF bands, in the HF  bands governed by Article 12, and in the  VHF/UHF bands up to 960 MHz), for the  application of No. 11.2 and No. 9.21** | **Receiving land stations, for the application of  No. 11.9 and No. 9.21** | **Typical transmitting stations, for the  application of No. 11.17** | **Maritime mobile frequency allotment, for the  application of plan modification under Appendix  25 (Nos. 25/1.1.1, 25/1.1.2, 25/1.25)** | **Broadcasting stations in the HF bands, for the  application of No. 12.16** | **Item identifier** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **9.3.3** | **9EC** | the effective height of the antenna, in metres, above the mean level of the ground between 3 and 15 km from the transmitting antenna, at 36 different azimuths in 10° intervals (i.e. 0°, 10°, ..., 350°), measured in the horizontal plane from True North in a clockwise direction  In the case of a transmitting station, required for an assignment subject to the GE06 Regional Agreement | **X** |  | **+** |  |  |  |  | **9EC** |

**3.2.1.2 Data item to indicate the intended geographical area of operation for a typical earth station**

According to RR No. **11.17**, “Frequency assignments relating to a number of stations or earth stations may be notified in the form of the characteristics of a typical station or a typical earth station and the intended geographical area of operation. Except for mobile earth stations, individual notices of frequency assignments are however necessary in the following cases (see also No. 11.14):”

In the Table A of Annex 2 to Appendix **4**, the data item that allows the intended geographical area of operation to be indicated for a typical earth station is currently sub-item A.1.e.3.a under item A.1.e.3 titled “For a specific earth station or radio astronomy station:” Consequently the intended geographical area of operation is not submitted for a typical earth station.

In order to allow information on the intended geographical area of operation of a specific or typical earth station to be communicated during the notification, data item A.1.e.3.a should be moved after data item A.1.e.2 as item A.1.e.2bis, so as to enable the Bureau to examine the notification of both a specific earth station and a typical earth station with respect to RR Nos. **11.17**, **11.32**, Resolution **1** and other relevant provisions.

The Conference is invited to consider modifying Appendix **4** data item A.1.e.3.a, as follows, in order to enable notification of both specific earth stations and typical earth stations.

Table of characteristics to be submitted for space and radio astronomy services   
(Rev.WRC‑12)

**TABLE A**

GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM,  
EARTH STATION OR RADIO ASTRONOMY STATION     (Rev.WRC‑19)

| **Items in Appendix** | ***A \_ GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION*** |  |  |  |  | **Advance publication of a geostationary- satellite network** | **Advance publication of a non-geostationary-satellite network or system subject to coordination under Section II  of Article 9** | **Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II  of Article 9** | **Notification or coordination of a geostationary-satellite network (including space operation functions under Article 2A of Appendices 30 or 30A)** | **Notification or coordination of a non-geostationary-satellite network or system** | **Notification or coordination of an earth station (including notification under  Appendices 30A or 30B)** | **Notice for a satellite network in the broadcasting-satellite service under  Appendix 30 (Articles 4 and 5)** | **Notice for a satellite network  (feeder-link) under Appendix 30A  (Articles 4 and 5)** | **Notice for a satellite network in the fixed- satellite service under Appendix 30B  (Articles 6 and 8)** | **Items in Appendix** | **Radio astronomy** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **A.1** | **IDENTITY OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIOASTRONOMY STATION** |  |  |  |  |  | | | | | | | | | **A.1** |  |
| A.1.a | the identity of the satellite network or system |  |  |  |  | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | A.1.a |  |
| A.1.b | the beam identification  In the case of Appendix **30** or **30A**, required only for modification, suppression or notification of Plan assignments  In the case of Appendix **30B**, required only for a network derived from the Allotment Plan |  |  |  |  |  |  |  |  |  |  | **+** | **+** | **+** | A.1.b |  |
| A.1.e | **Identity of the earth station or radio astronomy station:** |  |  |  |  |  |  |  |  |  |  |  |  |  | A.1.e |  |
| A.1.e.1 | the type of earth station (specific or typical) |  |  |  |  |  |  |  |  |  | **X** |  |  |  | A.1.e.1 |  |
| A.1.e.2 | the name of the station |  |  |  |  |  |  |  |  |  | **X** |  |  |  | A.1.e.2 | **X** |
| A.1.e.2bis | the country or geographical area in which the station is located, using the symbols from the Preface |  |  |  |  |  |  |  |  |  | **X** |  |  |  | A.1.e.2bis | **X** |
| A.1.e.3 | **For a specific earth station or radio astronomy station:** |  |  |  |  |  |  |  |  |  |  |  |  |  | A.1.e.3 |  |
| ~~A.1.e.3.a~~ | ~~the country or geographical area in which the station is located, using the symbols from the Preface~~ |  |  |  |  |  |  |  |  |  | **~~X~~** |  |  |  | ~~A.1.e.3.a~~ | **~~X~~** |
| A.1.e.3.b | the geographical coordinates of each transmitting or receiving antenna site constituting the station (latitude and longitude in degrees and minutes)  For a specific earth station, seconds are to be provided if the coordination area of the earth station overlaps the territory of another administration |  |  |  |  |  |  |  |  |  | **X** |  |  |  | A.1.e.3.b | **X** |

#### 3.2.1.3 Operating agency

The Radiocommunication Bureau has conducted a check of the information for the operating agencies (for terrestrial services, see data item 12A of Table 1 of Annex 1 to Appendix **4**: *the symbol for the operating agency* and for space services, see data item A.3.a of Table A of Annex 2 to Appendix **4**:*the symbol for the operating administration or agency (see the Preface) that is in operational control of the space station, earth station or radio astronomy station*)in Table 12A/12B of the Preface to the BR IFIC and has the following observations.

* For some satellite networks or systems, the information concerning the operating agency was missing or captured as “999” in the Master Register.
* Some generic names such as “OTHERS NOT SHOWN ON ABOVE (B) LIST”, “AUTRES”, “OTROS ORGANISMOS EXPLOTADORES”, “OTHER GOVERNMENT DEPARTMENTS” are listed as operating agencies in Table 12A/12B of the Preface to the BR IFIC and provided as data item 12A for some terrestrial assignments and data item A.3.a for several satellite networks.

For those frequency assignments where the operating agency was missing or captured as “999”, the Bureau has written to the notifying administrations to request for clarifications. The Bureau has received replies for all the concerned satellite networks, so this issue is resolved.

Concerning those with generic names for operating agencies, such generic names do not give any information about the operator of the station and do not meet the definition of items 12A or A.3.a. In this regard, the Bureau is in the process of requesting the administrations which initially submitted generic names of operating agencies in Table 12A/12B of the Preface to the BR IFIC to update them to specific operating agencies.

#### 3.2.1.4 Renumbering of some items in Annex 2 to Appendix 4

Details on orbital planes (items below A.4.b.4) are only provided for those with reference body of Earth. However, the information on whether the non-geostationary-satellite system represents a “constellation” and details on single or multiple mutually exclusive configurations are currently required for all reference body.

In addition, the information concerning the maximum number of space stations in a non-geostationary-satellite system simultaneously transmitting on a co-frequency basis in the fixed-satellite service in the Northern and Southern Hemisphere (A.4.b.3.a and A.4.b.3.b) is not specified to be required only for those with reference body Earth.

In this case, it is proposed to move the item on reference body up to A.4.b.1, and specify where the information only applies to those where the Earth is the reference body.

|  |  |
| --- | --- |
| A.4.b | **For space station(s) onboard non-geostationary satellite(s):** |
|  |  |
| A.4.b.1 | the reference body code |
| A.4.b.2 | the number of orbital planes |
| A.4.b.2.a | where the Earth is the reference body, indicator of whether the non-geostationary-satellite system represents a “constellation”, where the term “constellation” describes a satellite system, for which the relative distribution of the orbital planes and satellites is defined  *Note* – Non-geostationary-satellite systems in frequency bands subject to the provisions of Nos. 9.12, 9.12A, 22.5C, 22.5D, 22.5F or 22.5L are always considered as “constellations” |
| A.4.b.2.b | where the Earth is the reference body, indicator of whether all the orbital planes identified under A.4.b.2 describe a) a single configuration where all frequency assignments to the satellite system will be in use or b) multiple configurations that are mutually exclusive where a sub-set of the frequency assignments to the satellite system will be in use on one of the sub-sets of orbital parameters to be determined at the notification and recording stage of the satellite system  Required only for the:  1) advance publication information for a non-geostationary-satellite system representing a constellation (A.4.b.1.a), and  2) coordination request for non-geostationary-satellite systems |
| A.4.b.2.c | if the orbital planes identified under A.4.b.2 describe multiple mutually exclusive configurations, identification of the number of sub-sets of orbital characteristics that are mutually exclusive  Required only for the:  1) advance publication information for a non-geostationary-satellite system representing a constellation (A.4.b.2.a), and  2) coordination request for non-geostationary-satellite systems |
| A.4.b.2.d | if the orbital planes identified under A.4.b.2.b describe multiple mutually exclusive configurations, identification of the orbital planes’ id numbers that are associated with each of the mutually exclusive configurations  Required only for the:  1) advance publication information for a non-geostationary-satellite system representing a constellation (A.4.b.2.a), and  2) coordination request for non-geostationary-satellite systems |
|  |  |
| A.4.b.3 | **Where the Earth is a reference body, for space stations of a non-geostationary fixed-satellite service system operating in the frequency band 3 400‑4 200 MHz:** |
| A.4.b.3.a | the maximum number of space stations (*NN*) in a non-geostationary-satellite system simultaneously transmitting on a co-frequency basis in the fixed-satellite service in the Northern Hemisphere |
| A.4.b.3.b | the maximum number of space stations (*NS*) in a non-geostationary-satellite system simultaneously transmitting on a co-frequency basis in the fixed-satellite service in the Southern Hemisphere |
| A.4.b.4 | **For each orbital plane, where the Earth is the reference body:** |

#### 3.2.1.5 Items A.4.b.4.j, A.4.b.4.g, A.4.b.4.k, A.4.b.4.l - The longitude of the ascending node, the right ascension of the ascending node, the reference time.

The Bureau notes that these data elements present difficulties for administrations to understand what is the difference between the right ascension of the ascending node (RAAN) and the longitude of the ascending node (LAN) and what reference time should be used to determine these elements.

In accordance with Appendix **4**, the RAAN for the orbital plane should be measured counter-clockwise in the equatorial plane from the direction of the vernal equinox to the point where the satellite makes its South-to-North crossing of the equatorial plane, determined at the reference time.

The LAN for the orbital plane should be measured counter-clockwise in the equatorial plane from the Greenwich meridian to the point where the satellite orbit makes its South-to-North crossing of the equatorial plane, determined also at the same reference time.

In accordance with Notes to data items A.4.b.4.g and A.4.b.4.j of Appendix **4**, all satellites in all orbital planes must use the same reference time. If no reference time is provided, it’s assumed to be t=0.

Based on the definitions above, the RAAN determines the position of each orbital plane of a non-GSO satellite system in space relative to the position of the Sun at a reference time, the LAN determines the position of the same orbital planes relative to the Earth at the same reference time. Therefore, values of the RAAN and LAN for each orbital plane of a non-GSO satellite system depend on each other and the difference between them is constant. If, at the reference time, the direction to the Greenwich meridian match with the direction to the vernal equinox, then values of the RAAN and LAN would duplicate each other.

Also, since there are many factors affecting the actual value of RAAN during bringing into use of satellite system (such as the time, date, location of the launch, the launch azimuth etc.), it is difficult to provide predict actual values of the RAAN and the reference time at the stage of submitting of coordination request. Therefore, many administrations submit the same values for the RAAN and LAN for their satellite systems and do not provide reference time (that is t=0). Moreover, although in some cases these parameters do not correspond to the real characteristics of the orbital planes, further they would be notified by administrations since any modification of orbital characteristics will lead to re-examination of the whole network and probably establishing a new date of protection.

In order to avoid such difficulties and considering the decision of WRC-19 to make LAN data elements mandatory for all satellite systems subject to coordination and that the values of RAAN are not used for the examination under Nos. **22.5C**, **22.5D**, **22.5F** and **22.5L**, but only for the bilateral coordination of satellite networks between administrations, the Bureau considers the following options of modification of Appendix **4**:

1) items A.4.b.4.g, A.4.b.4.k and A.4.b.4.l to be removed from Appendix **4** and item A.4.b.4.j to be defined at t = 0, but not at the reference time (items A.4.b.4.k and A.4.b.4.l),

2) items A.4.b.4.g, A.4.b.4.k and A.4.b.4.l to be required only for bilateral coordination between administrations, items A.4.b.4.k and A.4.b.4.l to be required for orbital planes, but not for each satellite, and item A.4.b.4.j to be defined at t = 0, but not at the reference time (items A.4.b.4.k and A.4.b.4.l). Items A.4.b.4.g, A.4.b.4.k and A.4.b.4.l would not be required for submission of notification of a non-geostationary satellite system.

The Conference is invited to consider the proposed options of modification of items A.4.b.4.j, A.4.b.4.g, A.4.b.4.k and A.4.b.4.l of Appendix **4** and provide guidance on how to resolve the described issue.

Details of the proposed options are shown in the Tables below.

Option 1:

|  |  |  |  |
| --- | --- | --- | --- |
| **Items in Appendix** | **A - GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION** | **Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9** | **Notification or coordination of a non-geostationary-satellite network or system** |
| ~~A.4.b.4.g~~ | ~~the right ascension of the ascending node (Ωj) for the j-th orbital plane, measured counter-clockwise in the equatorial plane from the direction of the vernal equinox to the point where the satellite makes its South-to-North crossing of the equatorial plane (0° ≤ Ωj < 360°), determined at the reference time indicated in A.4.b.4.k and A.4.b.4.l~~  ~~Required only for space stations operating in a frequency band subject to the provisions of Nos.~~ **~~9.12~~** ~~or~~ **~~9.12A~~**  ~~Note – All satellites in all orbital planes must use the same reference time. If no reference time is provided in A.4.b.4.k and A.4.b.4.l, it is assumed to be t = 0~~ |  | **~~+~~** |
| A.4.b.4.j | the longitude of the ascending node (θj) for the j-th orbital plane, measured counter-clockwise in the equatorial plane from the Greenwich meridian to the point where the satellite orbit makes its South-to- North crossing of the equatorial plane (0° ≤ θj < 360°) at the reference time t = 0  Required only for orbits of a “constellation” (A.4.b.1.a), and to be specified in:  1) the advance publication information, for any frequency assignment not subject to the provisions of Section II of Article **9**  2) the coordination request, for any frequency assignment subject to the provisions of Nos. **9.12**, **9.12A**, **22.5C**, **22.5D**, **22.5F** or **22.5L**  3) the notification, in all cases  ~~Note – All satellites in all orbital planes must use the same reference time. If no reference time is provided in A.4.b.4.k and A.4.b.4.l, it is assumed to be t = 0~~ | **+** | **+** |
| ~~A.4.b.4.k~~ | ~~the date (day:month:year) at which the satellite is at the location defined by the longitude of the ascending node (θj) (see Note under A.4.b.4.j)~~ | **~~+~~** | **~~+~~** |
| ~~A.4.b.4.l~~ | ~~the time (hours:minutes) at which the satellite is at the location defined by the longitude of the ascending node (θj) (see Note under A.4.b.4.j)~~ | **~~+~~** | **~~+~~** |

Option 2:

|  |  |  |  |
| --- | --- | --- | --- |
| **Items in Appendix** | **A - GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION** | **Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9** | **Notification or coordination of a non-geostationary-satellite network or system** |
| A.4.b.4.g | the right ascension of the ascending node (Ωj) for the j-th orbital plane, measured counter-clockwise in the equatorial plane from the direction of the vernal equinox to the point where the satellite makes its South-to-North crossing of the equatorial plane (0° ≤ Ωj < 360°), determined at the reference time indicated in A.4.b.4.k and A.4.b.4.l  ~~Required only for space stations operating in a frequency band subject to the provisions of Nos.~~ **~~9.12~~** ~~or~~ **~~9.12A~~**  Note – All satellites in all orbital planes must use the same reference time. ~~If no reference time is provided in A.4.b.4.k and A.4.b.4.l, it is assumed to be t = 0~~ |  | **~~+~~C** |
| A.4.b.4.j | the longitude of the ascending node (θj) for the j-th orbital plane, measured counter-clockwise in the equatorial plane from the Greenwich meridian to the point where the satellite orbit makes its South-to- North crossing of the equatorial plane (0° ≤ θj < 360°) at the reference time t = 0  Required only for orbits of a “constellation” (A.4.b.1.a), and to be specified in:  1) the advance publication information, for any frequency assignment not subject to the provisions of Section II of Article **9**  2) the coordination request, for any frequency assignment subject to the provisions of Nos. **9.12**, **9.12A**, **22.5C**, **22.5D**, **22.5F** or **22.5L**  3) the notification, in all cases  ~~Note – All satellites in all orbital planes must use the same reference time. If no reference time is provided in A.4.b.4.k and A.4.b.4.l, it is assumed to be t = 0~~ | **+** | **+** |
| A.4.b.4.k | the date (day:month:year) at which the ~~satellite~~ orbital plane is at the location defined by ~~the longitude of the ascending node (θj)~~ the right ascension of the ascending node (Ωj) (see Note under A.4.b.4.~~j~~g) | **~~+~~** | **~~+~~C** |
| A.4.b.4.l | the time (hours:minutes) at which the ~~satellite~~ orbital plane is at the location defined by ~~the longitude of the ascending node (θj)~~ the right ascension of the ascending node (Ωj) (see Note under A.4.b.4.~~j~~g) | **~~+~~** | **~~+~~C** |

#### 3.2.1.6 Orbital decay

Orbital decay, a gradual decrease of the [distance](https://en.wikipedia.org/wiki/Distance) between the Earth and the satellite, is caused by one or more mechanisms which absorb energy from the orbital motion, such as fluid friction, gravitational anomalies, or electromagnetic effects.

The Bureau notes that in recent years, non-GSO satellite systems are increasingly deployed, especially those utilizing LEO orbits where orbital decay is prevalent due to atmospheric drag and solar radiation pressure.

Example of the altitude of the apogee (km) as a function of the time (days) is shown below:

Diagram

Description automatically generated

Orbit 9

Orbit 8

Orbits 6-7

Orbits 4-5

Orbits 1-3

Some of such satellite systems do not employ any station-keeping that would mitigate these effects and maintains the altitude of orbit. Therefore, the question on how to reflect such orbit decay during the operational lifespan of non-GSO satellites in a filing has been raised by some administrations. For example, a satellite network is initially deployed at a circular orbit with an altitude of 600 km, after that, the altitude of this circular orbit will reduce over time and the system will remain operational until it reaches the altitude of 100 km.

The Bureau also notes that, currently, available Appendix **4** parameters do not allow administrations to clearly reflect the orbital decay in a filing in detail. Pursuant to the Appendix **4** there are 3 items representing altitude characteristics of the orbital planes: the altitudes (in kilometres) of the apogee and perigee of the space station (items **A.4.b.4.d** and **A.4.b.4.e**) and the minimum altitude of the space station above the surface of the Earth at which any satellite transmits (item **A.4.b.4.f**).

In order to reflect changes in the altitude of apogee and/or perigee, administrations should follow procedure of No. **11.43B** that requires to provide technical justifications to demonstrate that there is no increase of interference towards submitted non-GSO systems and GSO networks between original date of receipt (“2D-Date”) and the date of receipt of modifications of orbital parameters in order to keep the original date of protection. Otherwise, a new date of protection will be established and all coordination procedures under Article **9** should be started again.

Therefore, considering difficulties of this procedure, the Bureau is applying the following current practice to represent filings for such systems:

a) the altitudes of the apogee and perigee of the space station indicates the initial orbital parameters at the moment of bringing into use,

b) the minimum altitude of the space station above the surface of the Earth at which any satellite transmits (item **A.4.b.4.f** of Appendix **4**) indicates the minimum altitude at which satellites remain in operation during the entire lifetime,

c) such a satellite network is protected with the initial orbital parameters (the apogee and perigee, which may not include the minimum altitude), and therefore, commitments that the satellite network will not cause more interference or require more protection, as compared to the initial orbital parameters should be provided by the notifying administration,

d) the examination, for example under No. **21.16**, should be carried out based on the worst-case approach for any orbital altitudes between the initial one and the minimum altitude.

|  |
| --- |
| In addition, the Conference is invited to consider the addition of the following data items to Annex 2 of Appendix **4** to better represent such systems in the coordination and notification for recording of satellite network filings submitted to the ITU and to help the Bureau during the verification of the bringing into use and continuous use of these satellite networks:  1) a new data item “an indicator of whether the space station uses station-keeping to maintain the altitudes of the apogee and perigee”, required for each orbital plane of a non-GSO satellite network or system with reference body “Earth  2) a new data item “the altitude of the apogee and perigee (km) as a function of the time (days) beginning from the date of bringing into use for all orbital planes with different orbital characteristics”, required for non-GSO satellite networks for which the indicator introduced above is “N” |

#### 3.2.1.7 Data items A.17 Compliance with Power Flux-Density (pfd) limits

WRC-03, under agenda item 1.25, decided new allocations for the FSS (space-to-Earth) in the frequency bands 48.2-48.54 GHz and 49.44-50.2 GHz limited to geostationary satellite networks. Furthermore, noting that the band 48.94-49.04 GHz is allocated to the radio astronomy service on a primary basis, a new footnote No. **5.555B** was approved to ensure the protection of the radio astronomy sites in this band.

Recognizing that the Bureau’s difficulty to examine pfd or epfd values produced by unwanted emissions at the site of the radio astronomy stations, for similar pfd or epfd limits at the site of a radio astronomy station, i.e. Nos. **5.372**, **5.551H** and **5.551I**, submission of a pfd or epfd value by the notifying administration in accordance with data item A.17 of Appendix **4** is required. In the case of No. **5.555B**, however, without any value being required to be submitted by notifiying administrations, compliance with the limit set forth in this provision has not been examined by the Bureau.

In this regard, the Conference is invited to consider adding the following data item in Appendix **4**:

ADD A.17.c   
the calculated power flux-density produced at the site of a radio astronomy station in the frequency band 48.94-49.04 GHz, as defined in No. **5.555B**.

Required only for geostationary space stations operating in the fixed-satellite service (space-to-Earth) in the frequency bands 48.2-48.54 GHz and 49.44-50.2 GHz.

#### 3.2.1.8 Item A.17.d Mean power flux density for the Earth exploration-satellite service (active) in the frequency band 9 200 – 9 300 MHz and 9 900-10 400 MHz

For the Earth exploration-satellite service (active) in the frequency band 9 900-10 400 MHz, it is required to submit the mean power flux-density in accordance with item A.17.d of Annex 2 of Appendix **4**:

|  |  |
| --- | --- |
| A.17.d | the mean power flux-density produced at the Earth’s surface by any spaceborne sensor, as defined in No. **5.549A** for the frequency band 35.5‑36 GHz or in Table **21‑4** for the frequency band 9 900‑10 400 MHz  Required only for satellite systems operating in  • the Earth exploration-satellite service (active) or space research service (active) in the frequency band 35.5-36 GHz  • the Earth exploration-satellite service (active) in the frequency band 9 900-10 400 MHz |

However, as indicated in the Rules of Procedure relating to this data item, the mean power flux-density has to be provided for each angle of arrival, and can be calculated if the necessary bandwidth (data item C.7.a) is provided, and information on the necessary bandwidth is therefore requested instead. The Bureau has been requesting for the information on the necessary bandwidth in accordance with this Rule of Procedure and would like the Conference to consider if this requirement should be added to Annex 2 of Appendix **4**.

Noting that data item C.7.a requires the information of the necessary bandwidth along with the class of emission and is not required for active or passive sensors, it may not be appropriate to add the requirement for the necessary bandwidth for an active sensor to this item in Appendix **4**.

In addition, for the examination against the requirement stated in No. **5.474A** that the necessary bandwidth should be greater than 600 MHz, the information concerning the necessary bandwidth should therefore be provided by the notifying administration for the frequency assignment in the frequency band 9200 – 9300 MHz as well.

The Conference is therefore invited to consider to add in Annex 2 of Appendix **4**, under the data group C.5.d for active sensors, an additional data item C.5.d.3 for the necessary bandwidth for active sensors operating in the Earth exploration-satellite service (active) in the frequency bands bands 9 200 – 9 300 MHz and 9 900 – 10 400 MHz, and remove the requirement for the provision of mean power density for this band in A.17.d. Possible changes to these items in Annex 2 of Appendix **4** are shown below.

|  |  |
| --- | --- |
| A.17.d | the mean power flux-density produced at the Earth’s surface by any spaceborne sensor, as defined in No. **5.549A** for the frequency band 35.5‑36 GHz  Required only for satellite systems operating in  • the Earth exploration-satellite service (active) or space research service (active) in the frequency band 35.5-36 GHz  • |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II  of Article 9** | **Notification or coordination of a geostationary-satellite network (including space operation functions under Article 2A of Appendices 30 or 30A)** | **Notification or coordination of a non-geostationary-satellite network or system** |
| C.5.d | **For active sensors:** |  |  |  |
| C.5.d.1 | the system noise temperature at the output of the signal processor | X | X | X |
| C.5.d.2 | the receiver noise bandwidth | X | X | X |
| C.5.d.3 | the necessary bandwidth for active sensors operating in the Earth exploration-satellite service (active) in the frequency bands 9 200 – 9 300 MHz and 9 900 – 10 400 MHz |  | + | + |

#### 3.2.1.9 Data item B.3.c.1 The co-polar antenna radiation pattern

The Bureau notes that in accordance with Appendix **4** the co-polar antenna radiation pattern (item B.3.c.1) is required for beams of non-GSO space stations and beams of GSO space stations that are directed towards another satellite.

The antenna radiation pattern can be submitted in different formats, such as:

1) a pattern ID, available in the APL online, captured in SNS database,

2) a diagram “NGSO (or GSO) Space Station Pattern” and “NGSO (or GSO) Earth Station Pattern”, that allow user to capture antenna radiation patterns for space and earth station antennas in digital format, in GIMS database,

3) in the form of equations/formulas/tables in an attachment.

Under the current practice of the Bureau, the antenna radiation pattern should comply with the following basic rules:

1) the co-polar antenna radiation pattern must be plotted as the antenna gain (dBi) as a function of the off-axis angle in degrees,

2) the antenna gain must be defined for all off-axis angles in the range between 0 and 180 degrees,

3) the co-polar antenna gain must correspond to the respective maximum antenna gain for the same beam/earth station as it is indicated in item B.3.a.1,

4) for any off-axis angle, only one gain value must be defined.

Based on these rules, only symmetrical antenna radiation patterns are acceptable and can be used in the examination software. However, for non-GSO space stations that deploy antennas with non-symmetrical radiation patterns, it is not currently possible to submit realistic characteristics of antenna to the Bureau.

The Bureau notes that the modelling of non-symmetrical antenna radiation patterns is extremely complicated for examination under No. **21.16** and establishing coordination requirements where a pfd trigger is used since the exact position of the satellite and its antenna in space should be known at any time. Due to the lack of this information in Appendix **4**, the use of such antenna radiation patterns is not currently possible.

Therefore, the Bureau considers the following approach to solve this issue:

1) the non-symmetrical antenna radiation pattern could be provided in digital format using satellite-based elevation and azimuth plane diagrams, in GIMS database and to be used during bilateral coordination,

2) the symmetrical antenna radiation pattern as the worst case should be created based on these diagrams provided in GIMS and used for examination under No. **21.16,**

3) both antenna radiation patterns should be published in API, CR/C Special Sections or Parts I/II/III-S in BR IFIC.

The Conference is invited to provide guidance whether the proposed approach is acceptable.

#### 3.2.1.10 Data items B.4.a.3.a.1 and B.4.a.3.a.2 - The orientation angles alpha and beta

The Bureau notes that for steerable beams, when satellite antenna can be steered towards any point in the service area, administrations normally submit for these data items a note indicating that these items cannot be provided.

In accordance with Recommendation ITU-R SM.1413, the orientation angle alpha (item B.4.a.3.a.1 of Appendix **4**) is the angle of the projection of the beam axis onto the XY reference plane, measured from the X-axis in an anticlockwise direction when looking in the direction of the Earth from the satellite (0  alpha < 360), where the X-axis is in the direction of the satellite orbit, the Y‑axis is at the same altitude as the X-axis and at right angles to it and the Z‑axis is at right angles to both and in the direction of the centre of the Earth. The orientation angle beta (item B.4.a.3.a.2 of Appendix **4**) is the angle between the antenna beam axis and the Z-axis (0  beta < 90), as shown in the picture below.



When beta = 0, the beam axis is pointing directly at the centre of the Earth and the value of angle alpha is meaningless. Therefore, for the submission of data, the convention that when angle beta = 0 then angle alpha = 0 was adopted.

If the beam is intended to be steerable, i.e reconfigured or redirected, then the orientation angles alpha can take any value from 0 to 360, and the orientation angle beta can take any value from 0 to the angle at which the Earth is still visible. Therefore, for such beam the orientation angles alpha and betta are not constant and cannot be provided as the single value.

Therefore, the Bureau proposes that items B.4.a.3.a.1 and B.4.a.3.a.2 are provided only for fixed beams.

The Conference is invited to consider modifying items B.4.a.3.a.1 and B.4.a.3.a.2 of Appendix **4** as follows.

|  |  |  |  |
| --- | --- | --- | --- |
| **Items in Appendix** | **B - CHARACTERISTICS TO BE PROVIDED FOR EACH SATELLITE ANTENNA BEAM OR EACH EARTH STATION OR RADIO ASTRONOMY ANTENNA** | **Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9** | **Notification or coordination of a non-geostationary-satellite network or system** |
| B.4.a.3.a | **For the orientation angles of the satellite transmitting and receiving antenna beams (required only for fixed beams):** |  |  |
| B.4.a.3.a.1 | the orientation angle alpha, in degrees (see the most recent version of Recommendation ITU-R SM.1413) | **X** | **X** |
| B.4.a.3.a.2 | the orientation angle beta, in degrees (see the most recent version of Recommendation ITU-R SM.1413) | **X** | **X** |

#### 3.2.1.11 Data item B.4.b.2 - The satellite antenna gain G(θe) as a function of elevation angle (θe) at a fixed point on the Earth

The Bureau notes that for steerable beams, when satellite antenna can be steered towards any point in the service area, administrations normally submit for this data element a note, either indicating that this diagram cannot be provided or that gain will be constant and equal to the maximum gain (item B.3.a.1 of Appendix **4**) for any elevation angle (or submitting this diagram with a constant gain).

For fixed beams of systems utilizing circular orbits with different altitudes or elliptical orbits, the gain may be also a function of the transmitting satellite altitude, which will be also changing in time for elliptical orbits. Therefore, it is not clear for which satellite position it is provided.

In addition, the term “fixed point on the Earth” is confusing because the elevation of any fixed point on the Earth with respect to the transmitting satellite would be constantly changing following the move of the NGSO satellite.

Due to the difficulties in interpreting this information, the Bureau currently does not generally use information provided in data item B.4.b.2 for the examination under RR Article **21** or other provisions of the Radio regulations. Moreover, it is not captured electronically for software processing since the information is submitted in many different forms that cannot be readily captured by BR software.

However, in the past and on an exceptional basis, the Bureau has used the information following a detailed explanation by the notifying Administration that this information should be used as a function of the maximum gain versus elevation due to the use of a phased array antenna.

Recognizing the intention of administrations to provide more precise information to be used in Article **21** examination, the Bureau considers introducing an additional element which would indicate maximum gain versus elevation for steerable beams using phased-array antennas or electronically steered beams.

In addition to that, while data item B.4.b.2 is listed under the item header B.4.b which limits the data item B.4.b.2 to a space station submitted in accordance with RR Nos. **9.11A**, **9.12** or **9.12A**, any further clarity on the data item will be beneficial for use by all non-GSO space stations and therefore should not be limited to only non-GSO space stations that are being submitted in accordance with RR Nos. **9.11A**, **9.12** or **9.12A**.

In order to address the above difficulties encountered with the use of this data item, the Bureau considers the following options of modification of Appendix **4**:

1) Making data item B.4.b.2 optional and also applicable for submission of the notification of a non-GSO satellite system not subject to coordination under Section II of Article **9**. At the same time, specifying this data item as a *satellite antenna gain as a function of elevation angle of arrival above horizontal plane at the Earth’s surface* to be provided only for fixed beams while clarifying that it should be provided *for the minimum altitude of the space station above the surface of the Earth at which any satellite transmits* which is submitted under data item A.4.b.4.f;

2) Introducing a new optional data item for steerable beams which would provide *the maximum satellite antenna gain as a function of elevation angle of arrival above horizontal plan at the Earth’s surface* to account for possible variation in maximum antenna gain from the use of phased-array antennas or electronically steered beams.

The Conference is invited to consider the abovementioned suggested modifications of data item B.4.b.2 of Appendix **4**. Alternatively, data item B.4.b.2 should be supressed and the Bureau will only use the Maximum gain (data item B.3.a.1) and the Antenna radiation pattern (data B.3.c) to calculate pfd at the Earth’s surface, which means that administrations will not be able to provide variation of maximum gain as a function of beam pointing.

Details of the proposed changes are shown in the Table below.

| **Items in Appendix** | ***B \_ CHARACTERISTICS TO BE PROVIDED FOR EACH SATELLITE ANTENNA BEAM OR EACH EARTH STATION OR RADIO ASTRONOMY ANTENNA*** | **Notification or coordination of a non-geostationary-satellite network or system** |
| --- | --- | --- |
| **B.4** | **ADDITIONAL CHARACTERISTICS FOR NON-GEOSTATIONARY SPACE STATION ANTENNA** |
| B.4.a.2.bis | the satellite antenna gain *G*(θ*e*) as a function of elevation angle (θ*e*) of arrival above horizontal plane at the Earth’s surfaceat minimum altitude which any of the satellite within the satellite system transmits. Applicable only to transmitting antennas with fixed beam when it is pointed away from nadir direction. | **O** |
| B.4.a.2.ter | the maximum satellite antenna gain *Gmax*(θ*e*) as a function of elevation angle(θ*e*) of arrival above horizontal plane at the Earth’s surface. Applicable to transmitting antennas with steerable beam only. | **O** |
| ~~B.4.b.2~~ | ~~the satellite antenna gain~~ *~~G~~*~~(θ~~*~~e~~*~~) as a function of elevation angle (θ~~*~~e~~*~~) at a fixed point on the Earth~~ | **~~X~~** |

#### 3.2.1.12 Associated satellite networks

The Bureau notes that, in accordance with Article **5** of the Radio Regulations, the use of the fixed-satellite service in some frequency bands is limited to feeder links for another satellite service such as the mobile-satellite or broadcasting-satellite service. For example, pursuant to No. **5.511A**, the use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service.

In order to ensure that the frequency assignments in the relevant frequency bands of any satellite system comply with such limitation in Article **5**, the Bureau requires that a frequency assignment in the satellite service (MSS, BSS, etc.) corresponding to the feeder link allocation be present in API, coordination request or notification valid at the time of examination of this satellite system. In the absence of the relevant service link in any of these notices, the frequency assignments for feeder link will be given an unfavourable finding.

In practice, administration had in the past submitted a notice containing assignment to feeder-link either of MSS or BSS while indicating that the service link is contained in a different notice with different satellite name published or received previously. For example, one ITU satellite filing covers the FSS feeder links of a single non-GSO MSS system and the other ITU satellite filings covers MSS service links of this system.

In this case, if an indication that the frequency assignments using the feeder-link allocation are used to support service links in a notice of another satellite system of the same administration is provided by the notifying administration in its submission, the Bureau will consider this indication in order to establish the findings under No. **11.31** and publish accordingly such information in the BR IFIC.

In order to increase transparency of this arrangement, the Bureau proposes to add a new mandatory Appendix **4** data item under the conditions specified for coordination request and notification as follows: “A.1.c *if the frequency assignments are used to provide feeder-link for frequency assignments contained in another satellite network or system submitted by the same notifying administration, the identity of the associated satellite network(s) or system(s) containing the service-link frequency assignments*”. Based on this information, the Bureau will check if service links exist in the indicated satellite network(s) or system(s) valid at the time of examination of the submitted satellite network or system.

The Conference is invited to consider adding a new mandatory Appendix **4** data item under the conditions specified for coordination request and notification as follows: “A.1.c *if the frequency assignments are used to provide feeder-link for frequency assignments contained in another satellite network or system submitted by the same notifying administration, the identity of the associated satellite network(s) or system(s) containing the service-link frequency assignments*”.

It should be noted the above proposed addition of the associated satellite network as a data item should not be used for the purpose of splitting one physical satellite system into multiple satellite network filings, which would increase confusion and difficulties of administrations and the Bureau and might facilitate abuse of the regulations where aggregate criteria exist (e.g. epfd limits).

#### 3.2.1.13 Reference body

The Bureau has received satellite network filings for which the spacecraft will operate at the lagrangian point of a two body system, e.g. the L1 Lagrange point of the Earth-Moon system or the L1 Lagrange point of the Earth-Sun system.

The Conference is invited to consider if such information should be included in Appendix **4** instead of just a single reference body for the satellite network.

### 3.2.2 Appendix 5

#### 3.2.2.1 Coordination trigger in the frequency band 17.7 – 17.8 GHz under RR No. 9.11

RR No. **9.11** is related to coordination of a space station in the broadcasting-satellite service in any band shared on an equal primary basis with terrestrial services and where the broadcasting-satellite service is not subject to a plan, in respect of terrestrial services.

RR Appendix **5** states that the following frequency bands shall be subject to coordination under No. **9.11**: 620-790 MHz, 1 452-1 492 MHz, 2 310-2 360 MHz, 2 535-2 655 MHz, 17.7-17.8 GHz and 74-76 GHz. RR Appendix **5** specifies detailed conditions for application of RR No. **9.11** only for the bands 2 630-2 655 MHz and 2 605-2 630 MHz (they are provided in Resolution **539 (Rev.WRC-03)** for non-GSO BSS (sound) systems pursuant to RR Nos. **5.417A** and **5.418**, and directly in these provisions for GSO BSS (sound) networks).

Currently there is a pfd limit in RR Article **21** for the fixed-satellite service in the band 17.7-17.8 GHz, and it may be noted that the Rules of Procedure on RR No. **9.36** for establishing coordination requirements for transmitting space stations vs. terrestrial services under RR No. **9.21** mentioned that, when no coordination threshold pfd value is applicable for service A, but a pfd limit (in RR Article **21**, a footnote or a Resolution) is applicable to another space service (service B) in the same frequency band, the value of this pfd limit is used as a threshold pfd value for service A. If such value is not exceeded, an administration is not potentially affected with respect to symbol 9.21/C. If that value is exceeded, an administration on whose territory the limit is exceeded is considered as potentially affected with respect to symbol 9.21/C.

By using the same principle, in examination of coordination request for the broadcasting-satellite service under RR No. **9.11** in the band 17.7-17.8 GHz, the Bureau currently establishes coordination requirements using the value of the pfd limit contained in RR Article **21** for the fixed-satellite service as coordination threshold. If such value is not exceeded, an administration is not potentially affected with respect RR to No. **9.11**. If that value is exceeded, an administration on whose territory the limit is exceeded is considered as potentially affected with respect to RR No. **9.11**.

The Conference is invited to consider this practice of the Bureau, which has been used for a long time without any contestation, and confirm it by including the pfd values of RR Article **21** in RR Appendix **5** as coordination threshold pfd values for coordination under RR No. **9.11** in the frequency band 17.7-17.8 GHz.

### 3.2.3 Appendix 7

At the end of the introductory section of Appendix **7**, there is a note clarifying how the word “unknown” should be understood in this Appendix when applied to radio stations:

“NOTE – Throughout this Appendix, the word “unknown”, when applied to terrestrial stations or earth stations, refers to such stations that are potentially located in the coordination area.”

However, the usage of the word “unknown” is more related to the lack of knowledge about the specific operational parameters and potential location of radio stations than to the fact that their location is potentially in the coordination area.

The Conference is therefore invited to consider amending the end of the introductory section of Appendix **7** as follows:

The coordination area represents the area surrounding an earth station sharing the same frequency band with terrestrial stations, or the area surrounding a transmitting earth station that is sharing the same bidirectionally allocated frequency band with receiving earth stations, within which the permissible level of interference may be exceeded and hence coordination is required. The coordination area is determined on the basis of known characteristics for the coordinating earth station and on conservative assumptions for the propagation path and for the system parameters for the unknown terrestrial stations (see Tables 7 and 8), or the unknown receiving earth stations (see Table 9), that are sharing the same frequency band.Throughout this Appendix, the word “unknown”, when applied to terrestrial stations or earth stations, refers to such stations whose specific operational parameters and potential location within the coordination area are unknown.

### 3.2.4 Common issues to Appendices 30, 30A and 30B

#### 3.2.4.1 Unrealistic gain contours

The Bureau observed that in some submissions under § 6.17 or §§ 6.17/6.25 of Appendix **30B**, satellite antenna gain contours are shaped along the borders of other administrations to avoid affecting the allotments of these administrations, see Figure 1. These shaped contours are very close to each other and unrealistic in implementation in practice.

The Bureau also noted that some notifying administrations submitted very close contours in uplink satellite antenna gain diagrams to reduce the calculated receiving interference from the allotments and assignments of other administrations, thus keeping good reference situation for their own networks.

Unrealistic satellite antenna gain contours continue to be found in Part B submissions in Appendix **30**, with holes around test-points of assignments of other administrations, see Figure 2, to bypass certain coordination requirements.

The two diagrams below give examples of the above-mentioned unrealistic satellite antenna gain contours.

Diagram

Description automatically generated with medium confidence

Figure 1

A map of the world

Description automatically generated with low confidence

Figure 2

When examining such submissions whose satellite antenna gain diagrams include holes or very close contours, the Bureau requests notifying administrations to modify the satellite antenna gain contours to make them realistic. Most notifying administrations reply by confirming that the submitted antenna gain contours are implementable on board of their satellites.

This issue was already submitted to the attention of WRC-19, but no decision was taken.

In view of the above, the Conference is invited to give guidance on how to decide whether satellite antenna gain contours submitted under the procedures of Appendices **30**, **30A** and **30B** are realistic in practice or not, and how the Bureau shall act with respect to those unrealistic contours.

#### 3.2.4.2 Delays in fulfilling the application of assistance procedures under Appendices 30/30A or Appendix 30B due to communication difficulties with some administrations

After the outbreak of Covid-19, the Bureau had to suspend the fax and surface mails services for the exchange of official correspondence with administrations as from 17 March 2020 (as announced in its [Circular Letter CR/462](https://www.itu.int/md/R00-CR-CIR-0462/en)). Consequently, for the communication with administrations concerning space services, the Bureau had to rely exclusively on electronic means of communications, namely the e-Communications system and official email addresses registered with the Bureau. If an administration is not registered in the e-Communications system, nor has provided it with any official email address (as requested in [Circular Letter CR/366](https://www.itu.int/md/R00-CR-CIR-0366/en) of 19 June 2014), the Bureau could not officially reach that administration.

This situation has an impact on the application of the assistance procedures laid out in § 4.1.10a to § 4.1.10d of Article 4 of Appendices **30** and **30A** or § 6.13 to § 6.15 of Article 6 of Appendix **30B**. In accordance with these procedures, an administration not communicating its decision to the Bureau within the 30-day period would be deemed to have agreed to the proposed assignments and an affected administration implicitly accepts potential interference from the incoming satellite network, including possible degradation of its EPM values or reference situation. Given these grave regulatory implications, the Bureau, in order to duly apply these assistance procedures, should ensure that the reminders under § 4.1.10b and § 4.1.10c of Appendices **30** and **30A** as well as under § 6.14 and § 6.14bis of Appendix **30B** reach the potentially affected administrations in good time so that they can process the request and reply accordingly.

Although the Bureau has made all efforts and managed to reduce the numbers of such “unreachable” administrations significantly, to date, there are still nine (9) administrations which cannot be officially reached by the Bureau concerning space services. As a result, the Bureau expects delays in fulfilling some assistance requests in respect of those unreachable administrations. The administrations that requested the application of the assistance procedures have been informed of this situation. This issue was also reported to the 86th meeting of the Radio Regulations Board.

The Bureau will continue its efforts to establish official communication with those administrations. As soon as an administration becomes officially reachable, the Bureau will proceed with the application of the above assistance procedures.

The Conference is invited to give specific guidelines on how the Bureau shall implement assistance under § 4.1.10a to § 4.1.10d of Article 4 of Appendices **30** and **30A** or § 6.13 to § 6.15 of Article 6 of Appendix **30B** with respect to those administrations that continue to be “officially unreachable”.

As Resolution **907 (Rev.WRC-15)** urges administrations to use, to the extent possible, modern electronic means of communication in the administrative correspondence, the Conference is invited to request all administrations to keep updated contact informations in the e-Communications system as well as official email addresses registered with the Bureau.

### 3.2.5 Appendices 30 and 30A of the Radio Regulations

#### 3.2.5.1 §4.1.24 of Article 4 of Appendices 30 and 30A

In accordance with § 4.1.24 of RR Appendices **30** and **30A**, no assignment in the List shall have a period of operation exceeding 15 years, counted from the date of bringing into use, or 2 June 2000, whichever is later. Upon request by the responsible administration received by the Bureau at the latest three years before the expiry of this period, this period of operation may be extended by up to 15 years on condition that all the characteristics of the assignment remain unchanged.

In response to a suggestion contained in the Director’s report, WRC-19 decided to include footnotes to §4.1.24 of Article 4 of Appendices **30** and **30A** in order for the Bureau to send a reminder to the notifying administrationno later than 90 days before the 3-year deadline for such a request.

Since WRC-19 decision, the Bureau received an extension request after the deadline set in accordance with § 4.1.24 of Article 4 of Appendices **30** and **30A** (see item 4n of the [Summary of decisions of the 92nd meeting of the Radio Regulations Board](https://www.itu.int/md/R23-RRB23.1-C-0015/en) for the details of the case and the course of action adopted).

Despite the decision that a reminder be sent, it appears that the 3-year period for requesting the extension may be difficult to implement for administrations because of the long period of time between the time when the request needs to send and the end of the first period of operation of 15 years.

In view of the above, the Conference may wish to review §4.1.24 of Article 4 of Appendices **30** and **30A**.

#### 3.2.5.2 Update of Article 11 of Appendix 30 and Article 9A of Appendix 30A

WRC‑19 acceded to the specific request made by the Administration of Bulgaria for inclusion in the Appendices **30** and **30A** Regions 1 and 3 Plans of ten assignments corresponding to channels 1, 2, 3, 4, 5, 6, 7, 8, 17 and 18 at the orbital position 1.9°E, in replacement of its assignments appearing in the Plans at 1.2°W, in accordance with §4.1.27 of Article 4 of Appendices **30** and **30A**.

Pursuant to that decision of WRC-19, the Bureau published two Special Sections AP30/P/1 and AP30A/P/1 in BR IFIC 2912 of 21 January 2020 in order to include into the Regions 1 and 3 Plan ten assignments corresponding to channels 1, 2, 3, 4, 5, 6, 7, 8, 17 and 18 at the orbital position 1.9°E, with the characteristics approved by the Conference. The previous assignments in the Plan of the Administration of Bulgaria at the orbital position 1.2°W have been removed.

Therefore, the Conference is invited to update Table 6A of Article 11 of Appendix **30** and Table 3A2 of Article 9A of Appendix **30A** to reflect the changes in relation to the Administration of Bulgaria. In addition, Tables 6B and 3B2 contain information on the minimum equivalent protection margin of assignments in the Regions 1 and 3 Plans at WRC-2000. Therefore, it is proposed to insert a note in relation to the Administration of Bulgaria indicating that the current entry in the Plan is at 1.9°E.

The proposed modifications are reflected as follows.

TABLE 6A (WRC‑23)

Basic characteristics of the Regions 1 and 3 Plan (sorted by administration)

| **1** | **2** | **3** | **4** | | **5** | | | **6** | **7** | **8** | | **9** | | **10** | | **11** | **12** | **13** | **14** | **15** | **16** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Admin. symbol** | **Beam identification** | **Orbital position** | **Boresight** | | **Space station antenna characteristics** | | | **Space station antenna code** | **Shaped beam** | **Space station antenna gain** | | **Earth station antenna** | | **Polarization** | | **e.i.r.p.** | **Designation  of emission** | **Identity of the  space station** | **Group code** | **Status** | **Remarks** |
| **Long.** | **Lat.** | **Major axis** | **Minor axis** | **Orien- tation** | **Co-polar** | **Cross- polar** | **Code** | **Gain** | **Type** | **Angle** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BUL | BUL02000 | 1.9 | 21.00 | 44.70 |  |  |  |  | E001 | 33.8 | -2 | MODRES | 35.50 | L | \*\*\*\* | 47.5 | 33M0G7W |  |  | P |  |

\*\*\*\* Channels 1,3,5,7, 17: 0; channels 2, 4, 6, 8, 18: 90.

TABLE 6B

Minimum equivalent protection margin of assignments in the Regions 1 and 3 Plan (sorted by orbital position)

| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Orbital Position | Admin. symbol | Beam Identifica- tion | Polar- ization type | Channel number | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| Minimum EPM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| –1.20\*\*\* | BUL | BUL02000 | CL |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1.0 |  | –0.4 |  | 1.6 |  | –0.4 |  | 1.6 |  | –0.4 |  | 1.6 |  | –0.4 |  | 1.6 |  | –0.3 |

\*\*\* The current entry is at 1.90E.

TABLE 3A2 (WRC‑23)

Basic characteristics of the Regions 1 and 3 feeder-link Plan in the frequency band 17.3-18.1 GHz (sorted by administration)

| 1 | 2 | 3 | 4 | | 5 | | | 6 | 7 | **8** | | **9** | | | **10** | | | **11** | | **12** | | **13** | | **14** | | **15** | | **16** | | **17** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Admin. Symbol** | **Beam identification** | **Orbital position** | **Boresight** | | **Space station antenna characteristics** | | | **Space station antenna code** | **Shaped beam** | **Space station antenna gain** | | **Earth station antenna** | | | **Polarization** | | | **e.i.r.p.** | | **Power control** | | **Designation of emission** | | **Identity of the space station** | | **Group code** | | **Status** | | **Remarks** | |
| **Long.** | **Lat.** | **Major  axis** | **Minor axis** | **Orien- tation** | **Co-polar** | **Cross-polar** | **Code** | **Gain** | **Type** | | **Angle** |  | |  | |  | |  | |  | |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  | |  | |  | |  | |  | |  | |
| BUL | BUL02000 | 1.9 | 19.00 | 45.50 |  |  |  |  | E001 | 36.5 | 0 | MODTES | 57.00 | L | | \* | 75.8 | |  | | 33M0G7W | |  | |  | | P | |  | |

\* Channels 1,3,5,7,17: 0; channels 2, 4, 6, 8, 18: 90.

TABLE 3B2

Minimum equivalent protection margin in the Regions 1 and 3 feeder-link Plan in the frequency band 17.3-18.1 GHz (sorted by orbital position)

| **1** | **2** | **3** | **4** | **5** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Orbital Position** | **Admin. Symbol** | **Beam Identification** | **Polarization type** | **Channel number** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** | **31** | **32** | **33** | **34** | **35** | **36** | **37** | **38** | **39** | **40** |
| **Minimum equivalent protection margin** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| −1.20\*\* | BUL | BUL02000 | CL | 3.5 |  | 1.6 |  | 1.6 |  | 1.6 |  | 1.6 |  | 1.6 |  | 1.6 |  | 3.2 |  | 5.6 |  | 5.5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

\*\* The current entry is at 1.90E.

#### 3.2.5.3 Update of Table 2 of Article 11 of Appendix 30 of the Radio Regulations

The Bureau received a communication from the Administration of the Russian Federation confirming that coordination between the RUS-4 Plan beam and the AM-SAT A4 network of the Administration of the United Kingdom of Great Britain and Northern Ireland was completed. The Administration of Russian Federation requested to update Table 2 to reflect the coordination status as indicated below.

TABLE 2   (WRC‑23)

Affected administrations and corresponding networks/beams identified based on Note 5 in § 11.2 of Article 11

| Beam name | Channels | Ref. Table 1 | Affected administrations\* | Affected networks/beams\* |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| \* Administrations and corresponding networks/beams whose assignment(s) may receive interference from the beam shown in the left-hand column. | | | | |

The Conference is invited to update Table 2 of Article 11 of Appendix **30** accordingly.

### 3.2.6 Appendix 30B of the Radio Regulations

#### 3.2.6.1 Uplink and downlink service areas of Appendix 30B network to be entered in the List

*Note: Unless otherwise specified, the uplink and downlink mentioned in this section refer to a pair of links in the Earth-to-space and space-to-Earth directions which are strapped with each other.*

A service area of a satellite network in the List of Appendix **30B** is defined by a set of maximum 100 test points and by service area contour on the surface of the Earth. For an allotment in the Appendix **30B** Plan, the uplink and downlink service areas are the same, which are the national territory of the responsible administration for that allotment.

For the additional system, as there is no provision in Appendix **30B** requesting for service areas in downlink and uplink of a satellite network to be the same, the Bureau accepts the submissions when uplink and downlink service areas are different. As a result, there are some Appendix **30B** networks with “asymmetrical” service areas in uplink / downlink beams in the List. For example, a network A may include the territories of 5 administrations inside the uplink service area but the territories of 10 administrations are included inside downlink service area (the 5 territories in uplink service area may not overlap with the 10 territories in downlink service area). It means that in some territories the network may have only receiving earth stations (or only transmitting earth stations). It is not a problem in the case of Broadcasting-Satellite Service (BSS), where one hub (gateway) station may serve a lot of receiving earth stations in the downlink service area. However, it is a common understanding that an earth station of a network in Fixed-Satellite Service (FSS) includes forward (Earth-to-space) and return (space-to-Earth) links, although “asymmetrical” links are possible in FSS as well (e.g., using cable connection between earth stations).

The Bureau noted that some notifying administrations submitted “asymmetrical” service areas to reduce coordination difficulty, i.e., by removing some parts of the uplink service area and associated test points, the calculated interference to other networks could be reduced and thus coordination with other administrations could be avoided. However, the characteristics of these networks in the List and MIFR might not reflect the operational ones and thus they should not be accepted.

In view of the above, the Bureau understands that the service areas of strapped uplink and downlink in an Appendix **30B** satellite network shall be the same (i.e., the uplink and downlink service areas cover the same set of territories). If different uplink and downlink service areas are submitted, the notifying administration shall provide an explanation to justify the “asymmetrical” service areas therefor. The Conference is requested to endorse this proposal.

#### 3.2.6.2 At least one test-point in uplink service area of an Appendix 30B network

The service area of an Appendix **30B** satellite network is identified by a set of a maximum of 100 test-points and by a service area contour on the surface of the Earth. To reduce the coordination burden, it is a common practice that notifying administrations submit under §6.17 or §§6.17/6.25 only few test-points for uplink service area. When most territories in uplink service area does not have associated test-points, the uplink characteristics do not correctly describe the situation of actual operation.

During the last couple of years, the Bureau has received more and more Part B submissions where there are only a few (or even a single) test-points in uplink even though the service area of the subject network includes the territories of more than one administration. The Bureau proposed the notifying administration, at the completeness stage, to increase the number of test-points in both uplink and downlink service areas, but most administrations accepted the proposal for downlink only. As a result, an assignment in the List may have few (or even only one) uplink test-points whereas the service area is quite large. One consequence of having few test points in uplink is that the calculated interference to other assignments or allotments may be under-estimated because the interfering uplink earth stations are assumed to be located only at those submitted uplink test-points. On one hand this may reduce the coordination burden for the notifying administration, on the other hand it may lead to incompatibility in actual operation.

In the case where a single test-point is located on the territory of an administration different from the one of the notifying administrations, the beam associated with such service area will be deleted, if at a later stage the administration on whose territory the unique test-point is located objects to be included in the service area in accordance with §6.16 of Appendix **30B**. Consequently, any downlink beam that only straps with the deleted uplink beam would also be deleted.

The Conference is invited to decide that in a submission of an Appendix **30B** network, the notifying administration shall submit enough test points to represent the service area well. If the service area includes the territories of multiple administrations, at least one test point shall be provided per country / territory included in uplink service area of the subject network.

#### 3.2.6.3 Two assignments in uplink having same characteristics with overlapping coverage and multiple power density values

In the Director’s Report to WRC-12, paragraph 3.8.2 addressed the issue of multiple assignments with the same characteristics except for power-density values. Although WRC-12 made no change in the Radio Regulations, this issue was noted with thanks to the Bureau.

The Bureau has so far accepted the submissions which contain the assignments with only difference in power-density value under § 6.1 of Article 6 of Appendix **30B**. However, in order to maintain the efficiency of the Plan in terms of spectrum and orbit usage, when an administration finalized the characteristics of its network after coordination with other administrations and submitted under § 6.17 or §§6.17/6.25 of Appendix **30B** for including the assignments of the network in the List, the Bureau requested that the power-density value for each assignment be limited to one.

The current practice of the Bureau is to consider two downlink assignments with the same characteristics (except for power density) and with overlapping service area as one assignment. However, when it comes to uplink, the calculation of receiving interference in examination is related to the coverage area (represented by uplink satellite antenna gain contours of the interfered-with network). The Bureau has observed that in some submissions, several power density values are submitted for assignments with the same uplink coverage and the same type of transmitting earth station. The diagrams below show as example three such assignments (with the same global coverage, different service areas and power densities).

Chart

Description automatically generated

Consequently, the same assignment with three different power density values is protected in subsequent examinations of the Bureau.

In order to maintain the efficiency of the Plan and, in particular, not to create unnecessary constrains to subsequent submissions of Appendix **30B** networks, it is proposed to accept only a single power density for cases similar to the one in the example above. If the notifying administration insists to have different power density values, it shall submit separate coverage areas as defined below.

|  |
| --- |
| In summary, in examination of a submission under § 6.17 or §§6.17/6.25 of Article 6 of Appendix **30B**, the Bureau takes the following action:   * If the service areas of two downlink assignments are wholly or partially overlapped and other characteristics (excluding power density) of the two assignments are same, these two assignments shall be considered as same and shall have the same power density value. * If the areas within [-X dB, with the value of X determined by WRC-23] satellite antenna gain contours of two uplink assignments wholly or partially overlap and other characteristics (excluding power density) of the two assignments are same, these two assignments shall be considered as same and shall have the same power density value.   The Conference is invited to endorse this course of action. |

#### 3.2.6.4 Update of Article 10 of Appendix 30B

Since WRC-19, some allotments have been reinstated from the List or converted into assignments that were subsequently entered in the List. The reinstatement or entry in the List have been published in Special Sections of BR IFIC and included in the Appendix **30B** master database. The changes are indicated below.

The allotments of two administrations (Brazil and Canada) were reinstated in application of § 6.33 *c)* of Article 6 of Appendix **30B**:

4 500-4 800 MHz, 6 725-7 025 MHz

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| B 00011 | -65.0 | -62.6 | -6.0 |  |  |  | -2.5 | -38.7 | 3 |
| B 00022 | -56.5 | -45.4 | -6.3 |  |  |  | -1.9 | -38.6 | 3 |
| CAN0EASTM | -107.5 | -76.6 | 50.1 | 5.0 | 1.7 | 154.0 | -7.0 | -38.4 |  |

10.7-10.95 GHz, 11.20-11.45 GHz, 12.75-13.25 GHz

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| B 00011 | -65.0 | -62.6 | -6.0 |  |  |  | 9.8 | -22.4 | 3 |
| B 00022 | -56.5 | -45.4 | -6.3 |  |  |  | 0.8 | -22.4 | 3 |
| CAN0EASTM | -107.5 | -76.6 | 50.1 | 5.0 | 1.7 | 154.0 | 6.2 | -25.1 |  |

*Col. 10 Remark 3*: Allotment converted into assignment with a shaped beam and then reinstated back into the Plan.

The allotment of one administration (Romania) has been converted into assignments and entered in the List of Appendix **30B**.

4 500-4 800 MHz, 6 725-7 025 MHz

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| ROU | 30.45 |  |  |  |  |  |  |  | 1 |

10.7-10.95 GHz, 11.20-11.45 GHz, 12.75-13.25 GHz

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| ROU | 30.45 |  |  |  |  |  |  |  | 1 |

*Col. 10 Remark 1:* Assignment converted from allotment.

The Conference is invited to update Article 10 of Appendix **30B** accordingly.

In addition, the Administration of Montenegro has successfully completed the procedure of Article 6 of Appendix **30B** as a new Member State which does not have a national allotment in the Plan or assignments in the List stemming from the conversion of an allotment. Thus, this Administration may wish to seek under § 6.35 of Article 6 of Appendix **30B** agreement of the Conference for the inclusion in the Plan of a new allotment over its national territory. In the case of such a request from the Administration of Montenegro to WRC-23, the following update of Article 10 of Appendix **30B** would be needed.

4 500-4 800 MHz, 6 725-7 025 MHz

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| MNE | -36.6 | 19.22 | 42.62 | 1.6 | 1.6 | 0 | -9.6 | -42.3 |  |

10.7-10.95 GHz, 11.20-11.45 GHz, 12.75-13.25 GHz

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| MNE | -36.6 | 19.22 | 42.62 | 0.8 | 0.8 | 0 | -10.2 | -30.8 |  |

#### 3.2.6.5 Amendment of Appendix 1 to Annex 4 of Appendix 30B

Appendix 1 to Annex 4 of Appendix **30B** deals with the method to determine the overall single-entry and aggregate carrier-to-interference (*C/I*) value averaged over the necessary bandwidth of the modulated carrier. Section 1 of Appendix 1 to Annex 4 contains various equations for the calculation of the single-entry uplink and downlink *C/I* due to a single satellite network and the overall single-entry *C/I* at a given downlink test point due to a single interfering allotment or assignment. In the case of the latter, instead of the expected equation to calculate the overall *C/I*, an equation to calculate of the overall carrier-to-noise (*C/N*) ratio is erroneously included (see page 757 Volume 2 of RR, English version only).

Therefore, the Conference is invited to make the relevant amendment (in the English version of the Radio Regulations only) and include the correct equation for calculation of the overall single-entry (C/I)t at a given downlink test point due to a single interfering allotment or assignment as follows.

|  |  |
| --- | --- |
|  | …  The overall single-entry (*C*/*I*)*t* at a given downlink test point due to a single interfering allotment or assignment is given by: |
| Instead of: | , dB |
| Read: | , dB |
|  | where:  (C/I)umin: lowest uplink C/I value among all uplink test points;  (C/I)d: downlink C/I value at the test point under consideration.  NOTE – When only one of the uplink or the downlink is implemented in the bands subject to Appendix **30B**, only the contribution from the link that is implemented in the bands subject to Appendix **30B** shall be considered in calculating (C/I)t. |

## 3.3 Resolutions

### 3.3.1 Resolution 4 (Rev.WRC-03)

The Radiocommunication Bureau, acting under the auspices of No. **11.50**, and with a view to improving the accuracy of the data recorded in the Master Register undertook a review of satellite networks recorded in the Master Register.

The Bureau noted that the frequency assignments to some satellite networks were recorded in the Master Register without any period of validity indicated. The Bureau therefore requested the concerned Administrations to indicate the intended period of validity for these frequency assignments.

### 3.3.2 Resolution 32 (WRC-19)

WRC-19 adopted Resolution **32** (WRC-19) on the regulatory procedures for frequency assignments to non-geostationary-satellite networks or systems identified as short-duration missions (non-GSO SDM) not subject to Section II of Article **9**. This resolution came into effect immediately after the conference, and the Bureau implemented it first with a PDF form for administrations to submit the necessary parameters along with their submission, then introduced the necessary fields in the database structure and capture software.

There were many interests expressed by administrations in this new procedure, and the Bureau provided many cases of assistance in accordance with *instructs to the Director of the Radiocommunication Bureau* 2 of Resolution **32 (WRC-19)** to advise on the procedure, the conditions and the benefits of submitting under this procedure.

The BR created a webpage (<https://www.itu.int/en/ITU-R/space/support/nonGSO/RES32>) to provide additional support to administrations and made the necessary changes to its software and database to implement the decisions of WRC-19.

WRC-19 also allocated the frequency bands 137.025-138 MHz (space-to-Earth) and 148-149.9 MHz (Earth-to-space) to the usage by non-GSO SDM for space operation services. Such use is exempt from coordination procedures under ​Nos. **9.11A** and **9.21** with some conditions, as stated in RR Nos. **5.203C** and **5.218A**, and Resolution **660 (WRC-19)**, in addition to Resolution **32 (WRC‑19)**.​​

As of 1 July 2023, 60 non-GSO SDM satellite networks were published in API/A special sections and still active, and 7 satellite networks were notification publications in Part I/II-S/III-S of the BR IFIC. It should be noted that a high number of such submissions does not include the frequency bands 137.025-138 MHz (space-to-Earth) or 148-149.9 MHz (Earth-to-space), as shown in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Inclusion of 138 MHz band  (space-to-Earth) | Inclusion of 149 MHz band (Earth-to-space) | Inclusion of other frequency bands only |
| API | 4 | 11 | 53 |
| Notification | - | 2 | 5 |

Notifications of satellite networks with an indication of short duration mission in accordance with Resolution **32 (WRC-19)** that contain the frequency band 148-149.9 MHz (Earth-to-space) are not yet examined against the power flux density requirement of No. **5.218A** in order to determine that the notification can be submitted under this procedure (see section 3.1.3.1 about No. **5.218A** for a discussion on the issues relating to the pfd examination).

No. **9.3.1** adopted by WRC-19 requires the Bureau to promptly make the comments received concerning frequency assignments to non-geostationary-satellite systems subject to Resolution **32 (WRC-19)** available “as received” on the ITU website. *instructs to the Director of the Radiocommunication Bureau* 1 of Resolution **32 (WRC-19)** instructed the Director to expedite the online publication of notices “as received” for such networks or systems, in addition to the normal publication of notices. The Bureau has implemented this on 5 October 2020 as part of the Bureau’s e-Submission system, and had even extended this feature to all comments submitted under No. **9.3** responding to API/A special sections.

§5 of Annex to Resolution **32 (WRC-19)** requires the Bureau to publish the characteristics of the system together with the findings under No. **11.31** in the International Frequency Information Circular (BR IFIC) and on its website. The Bureau modified the internal publication system to meet this requirement, and the first publication of these notification notices both on the BRIFIC DVD and on its website (<https://www.itu.int/net/ITU-R/space/snl/bresult/radvance.asp?res32=Y>) were done on 7 September 2021.

There were 4 cases of notifications received by the Bureau for which, as No. **9.1** restricts the date of receipt of notification to be not earlier than 4 months after the publication of the API special section, the resulting official date of receipt will be later than 2 months of the launch of the satellite as required under §4 of the Annex to Resolution **32 (WRC-19)**. This matter was brought to the attention of the Radio Regulations Board, who approved, at its 88th meeting, the Rules of Procedure on Resolution **32 (WRC-19)** clarifying that the Bureau shall publish such notification notices with a date of receipt established in accordance with No. **9.1**, together with a note indicating the date to which the information was communicated to the Radiocommunication Bureau, in order for Administrations to be informed of the compliance of these notices with §4 of the Annex to Resolution **32 (WRC-19).**

In §4 of Annex to Resolution **32 (WRC-19)**, the word “notices” in the sentence “Notices relating to non-GSO networks or systems identified as short-duration mission ….” may be misleading as it may refer to the API or the notification notices. Only when read in conjunction with the sentence in No. **11.25** can it be understood as referring only to the notification for recording. Since No. **11.25** is within Article **11**, it is then clear that ‘notices’ refers to notification for recording. However, when read in this Resolution, this is not so clear, so it is suggested to change the sentence in §4 of Annex to Resolution **32 (WRC-19)**.

The Conference is invited to consider modifying §4 of Annex to Resolution **32 (WRC-19)** as follows:

4 Notices relating to the notification for recording of non-GSO networks or systems identified as short-duration mission shall be communicated to BR only after the launch of a satellite in the case of a satellite network or of the first satellite in the case of a system requiring multiple launches, and not later than two months after the date of bringing into use. (…)

§4 of Annex to Resolution **32 (WRC-19)** requires that the notification shall be communicated to the Bureau within 2 months after the launch of a satellite. The Bureau has received one satellite network which was published with an indication of being a short duration mission under Resolution **32** in the API, which was subsequently notified but found to be not supported by an actual satellite launch, therefore it was concluded to be not receivable. In this case, the notifying administration has still up to the end of the period specified in No.**11.44** to submit the notification for this satellite network.

The Bureau has also received one satellite network which was published with an indication of being a short duration mission under Resolution **32 (WRC-19)** in the API, however the notifying administration indicated that they had not been able to complete coordination with the relevant parties on time, therefore the notification was delayed and submitted later than 2 months after the launch of the satellite bringing into use the frequency assignments. After consultation with the Bureau, who determined that this was indeed corresponding to the actual situation in orbit, the notice was submitted as not a short duration mission under Resolution **32 (WRC-19)** and processed in accordance with normal Article **11** procedures since the notice did not include the frequency bands 137.025-138 MHz (space-to-Earth) or 148-149.9 MHz (Earth-to-space) for which the absence of coordination granted to short duration missions is conditioned on the application of Resolution **32 (WRC-19)**.In these two frequency bands, it would not have been possible to process the submission with the normal procedures of Article **11** but in other frequency bands, there are no provisions to prohibit proceeding with this course of action.

The Conference is invited to consider if some explicit provisions and appropriate conditions should be included in Resolution **32 (WRC-19)** to allow the process of a notification notice under normal Article **11** procedure when the corresponding API was submitted as a short duration mission under Resolution **32 (WRC-19)**. An alternative option would be to decide that an API with SDM indication is receivable only if this submission contains at least one of the frequency bands 137.025-138 MHz (space-to-Earth) or 148-149.9 MHz (Earth-to-space) for the space operation service.

### 3.3.3 Resolution 35 (WRC-19)

#### 3.3.3.1 Addition to the Table contained in *resolves* 1

Resolution **35 (WRC-19)** applies to frequency assignments to non-GSO systems brought into use in accordance with Nos. **11.44** and **11.44C**, in the frequency bands and for the services listed in the Table contained in *resolves* 1 of this Resolution.

Frequency assignments in the frequency bands 19.7-20.1 GHz and 29.5-29.9 GHz using the mobile-satellite service are subject to this Resolution only if they are operating in Region 2, consistently with the Table of Frequency Allocation in Article **5**, which allocate the mobile-satellite service on a primary basis in Region 2. The mobile-satellite service is secondary for Regions 1 and 3 in these frequency bands and is therefore not listed in the Table in *resolves* 1 of this Resolution.

Administrations often notify groups of frequency assignments in these frequency bands for the mobile-satellite service with a global service area, which the Bureau splits into different groups between the different Regions due to different categories of service. In such cases, the group of frequency assignments with a service area in Region 2 (primary) is subject to Resolution **35 (WRC‑19)**, while the other group, with identical characteristics but with a service area in Regions 1 and 3 (secondary), is not subject to the Resolution **35 (WRC-19)**.

On the other hand, frequency assignments in the frequency bands 20.1-20.2 GHz and 29.9-30 GHz using the mMobile-satellite service are primary in all three Regions and are subject to Resolution **35 (WRC-19)**.

Hence, in the case where an administration notifies a frequency assignment using the mobile-satellite service covering both frequency bands 19.7-20.1 GHz and 20.1-20.2 GHz or covering both frequency bands 29.5-29.9 GHz and 29.9-30 GHz in Regions 1 or 3, the Bureau considers this frequency assignment as secondary in accordance to §1.2 of the Rules of Procedure relating to No. **4.5** and §5.5 of the Rules of Procedure relating to No. **11.31** andconsiders that the frequency assignment is not subject to Resolution **35 (WRC-19)**.

The Conference is invited to confirm the above-mentioned approach, or alternatively to consider if the mobile-satellite service should be added for the frequency bands 19.7-20.1 GHz and 29.5-29.9 GHz in Regions 1 and 3 in the Table in *resolves* 1 of Resolution **35 (WRC-19)**.

#### 3.3.3.2 Modification of notified characteristics in accordance with *resolves* 11

When, in application of *resolves* 11 of Resolution **35 (WRC-19)**, a notifying administration submits to the Bureau the modifications to the characteristics of the notified or recorded frequency assignments of the non-GSO satellite system in order to reduce the maximum number of satellites to the values computed in accordance with *resolves* 11 *a)*, *b)* or *c)*, the question was raised whether it is necessary to keep among the remaining satellites at least the orbital characteristics corresponding to the satellite(s), which was or were used for the bringing into use of the frequency assignments to this satellite system or for the completion of a previous milestone of Resolution **35 (WRC-19)**.

The current wording of Resolution **35 (WRC-19)** doesnot impose to retain these characteristics: the modification consisting in reducing the maximum number of satellites under *resolves* 11 does not require the retention of the orbital plane(s) that was used for bringing into use or completing previous milestones. However, satellites previously deployed on a plane subsequently deleted by such a modification can not be counted any longer during the following steps of Resolution **35 (WRC-19)**.

The Conference is invited to note this aspect of implementation of *resolves* 11 of Resolution **35 (WRC-19)**.

#### 3.3.3.3 Changes to orbital parameters in accordance with *resolves* 14

When the number of space station(s) declared as deployed is less than the required criteria set in *resolves* 11 *a)* to *c)*, as appropriate, the notifying administration in accordance with *resolves* 11 is required to submit to the Bureau the corresponding modifications to the characteristics of the notified or recorded frequency assignments.

In accordance with *resolves* 14, the Bureau, for the purpose of No. **11.43B**, shall retain the original dates of entry of the frequency assignments in the Master Register if the modifications are limited to the reduction of the number of orbital planes and modifications to the right ascension of the ascending node (RAAN) of each plane, the longitude of the ascending node (LAN) and its date and time associated with the remaining orbital planes, or reduction of the number of space stations per plane and modifications of the initial phase angle of the space stations within planes.

Concerning the change of RAAN and LAN, the wording “of each plane” in *resolves* 14 *c)* ii) leads the Bureau to understand that a change of RAAN, if required, should be provided for all the remaining orbital planes in order to compensate the need to shift remaining orbits. Changes to LAN are required to correspond to modified RAAN parameters. In this regard, *resolves* 14 does not indicate whether the changes to RAAN are limited to the starting position of each plane while retaining the initial spacing between consecutive orbital planes or whether such change may also be aimed at modifying such spacing.

The Conference is invited to clarify whether, in application of *resolves* 14, the changes to RAAN are limited to the starting position of each plane while retaining the initial spacing between consecutive orbital planes or whether such change may also be aimed at modifying such spacing.

#### 3.3.3.4 Application of *resolves* 17 *b)*

For the application of *resolves* 17 *b)* i) of Resolution **35 (WRC-19)**, the Bureau understands that all satellites in any orbital plane not listed in the last complete deployment information, as well as all orbital planes where no satellite is listed in the last complete deployment information, submitted under *resolves* 2, 3, 7 or 8,as appropriate, will be suppressed from the notice. Additionally, any beams and frequency assignment groups associated solely with these orbital planes or satellites will also be suppressed.

Regarding the frequency assignments which were associated with the remaining orbital planes and satellites, in application of *resolves* 17 *b)* ii), a symbol will be inserted into the Remarks column indicating that these frequency assignments are not in compliance with Resolution **35 (WRC-19)** and will no longer be taken into account under subsequent examinations under Nos. **9.36**, **11.32** or **11.32A**.

The remark will also be inserted to the frequency assignments not associated with the supressed orbital planes and satellites because the modification to the satellite system mandated by *resolves* 11 was not submitted when the milestones were not reached.

The information recorded under the date of protection or “2D-date” (i.e. the date from which an assignment is taken into account as defined in §1 e) of Appendix **5**) and the information concerning coordination agreement status will be removed for these frequency assignments.

These frequency assignments will be recorded for information purposes only and shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the Radio Regulations, in a manner similar to a recording with a request for the application of No. **4.4**. The Bureau will publish the updated status of these frequency assignments in a BR IFIC.

Noting that *resolves* 17 applies only in cases where a notifying administration fails to provide the required information and in order to avoid retaining unused frequency assignments in the MIFR, the Bureau will apply No. **13.6** beforerecording and publishing the updated status of these frequency assignments.

The Conference is invited to note the Bureau’s course of action in implementing *resolves* 17 of Resolution **35 (WRC-19)**.

### 3.3.4 Resolution 40 (Rev.WRC-19)

Noting the Rule of Procedure on the simultaneous bringing into use or bringing back into use of multiple geostationary satellite networks with a single satellite adopted by the Radio Regulations Board in its 89th meeting, clarifications on the information to be submitted under Resolution **40 (Rev.WRC-19)** may be needed.

Indeed, *resolves* 1 of this Resolution requires that, when informing the Bureau of the bringing into use, or bringing back into use after suspension, of a frequency assignment to a space station in a GSO satellite network, the notifying administration shall indicate whether or not this action has been accomplished with a space station that has previously been used to bring into use, or resume the use of, frequency assignments *at a different orbital location* within the three years prior to the date of submission of this information.

Hence, as regards the application of this Rule of Procedure on the Resolution **40** information, the Bureau’s approach is that the bringing (back) into use of a frequency assignment to a GSO satellite network with a satellite which is simultaneously used for the bringing (back) into use or continuing use of frequency assignments to other GSO satellite networks located at different nominal positions, but located at no more than 0.5 degree from the position of the satellite and for which bandwidths do not overlap, is not considered as having been accomplished with a space station that has previously been used to bring into use, or resume the use of, those frequency assignments at a different orbital location, on the condition that these frequency assignments are in simultaneous use.

*Example: if a satellite, at position X° and not located at any previous position three years prior to the submission of the information, brought into use the frequency assignments to a satellite network A located at position Y1° (X°±0.5°) and later brought into use the frequency assignments to a satellite network B located at position Y2° (X°±0.5°), at the condition that the bandwidths of the frequency assignments to satellite network A and satellite network B do not overlap, the Bureau do not consider that this action has been accomplished with a space station that has previously been used to bring into use, or resume the use of, frequency assignments at a different orbital location within the three years prior to the date of submission of this information.*

Furthermore, to identify such situations, the Bureau considers that additional information to the mandatory information requested by the Resolution **40** would need be provided by the notifying administration when informing the Bureau of the bringing into use, or bringing back into use after suspension, of a frequency assignment to a space station in a GSO satellite network. The administration should notably indicate whether the space station is used simultaneouslyfor the bringing (back) into use or continuing use of frequency assignments of satellite networks located at several orbital positions, and should provide:

– the orbital position(s) where the space station is simultaneously used for the bringing (back) into use or continuing use of frequency assignments,

– the satellite network(s) with which the frequency assignments above are associated.

The Conference is invited to consider modifying Resolution **40 (Rev.WRC-19)** in order to cater for the above-mentioned case. An updated Resolution **40** form to be filled by notifying administrations is suggested below.

**Updated Resolution 40 form**

RESOLUTION 40 (Rev.WRC-19)

Use of one space station to bring frequency assignments to geostationary‑satellite networks at different orbital locations into use within a short period of time

Satellite network for which frequency assignments have been brought into use, or brought back into use after suspension:

|  |  |  |
| --- | --- | --- |
|  | AP4 items |  |
| Identity of the Satellite Network | A.1.a |  |
| Notifying Administration | A.1.f.1 |  |
| Nominal Orbital Position | A.4.a.1 |  |
| Date of bringing into use (Or bringing back into use after suspension) | A.2.a |  |

1. The bringing into use, or bringing back into use after suspension has been accomplished with a space station that has previously been used to bring into use, or resume the use of, frequency assignments at a different orbital location within the three years prior to the date of submission of this information:

|  |  |  |
| --- | --- | --- |
|  | YES | NO |
|  |  |  |
| a) Last orbital location where the space station was used to bring into use, or resume the use of, frequency assignments |  |  |
| b) the satellite network(s) with which the frequency assignments above were associated |  |  |
| c) The date on which the space station was no longer maintained at the orbital location in a) above |  |  |

1. The bringing into use, or bringing back into use after suspension has been accomplished with a space station that is simultaneously used to bring into use, or resume the use of, frequency assignments at a different orbital location:

|  |  |  |
| --- | --- | --- |
|  | YES | NO |
|  |  |  |
| a) the orbital position(s) where the space station is simultaneously used for the bringing (back) into use or continuing use of frequency assignments |  |  |
| b) Satellite network(s) with which the frequency assignments in a) above are associated |  |  |

### 3.3.5 Resolution 49 (Rev. WRC-19)

*Note – if the Conference adopts the course of action described in section 3.1.4.4 in order to remove advance publication information for satellite networks subject to coordination under section II of Article* ***9****, then consideration of this section on Resolution* ***49*** *is no longer needed.*

The Bureau notes that §1 of Annex 1 to Resolution **49 (Rev.WRC-19)** concerns frequency assignments that are subject to coordination under Nos. **9.7**, **9.11**, **9.12**, **9.12A** and **9.13**. However, when referring to the applicability of the administrative due diligence procedure for these cases, the *resolves* of Resolution **49 (Rev.WRC-19)** indicates both No. **9.1A** andNo. **9.2B**. No. **9.2B** refers to Nos. **9.1** and **9.2**, which also refer to frequency assignments not subject to coordination, so a reference to No. **9.2B** in the *resolves* of Resolution **49 (Rev.WRC-19)** may create some confusion.

The Conference is invited to consider amending the *resolves* of Resolution **49 (Rev.WRC-19)** as follows:

“that the administrative due diligence procedure contained in Annex 1 to this Resolution shall be applied for a satellite network or satellite system of the fixed-satellite service, mobile-satellite service or broadcasting-satellite service for which the advance publication information under No~~s~~. **9.1A** ~~or~~**~~9.2B~~**, or for which the request for modifications of the Region 2 Plan under Article 4, § 4.2.1 *b)* of Appendices **30** and **30A** that involve the addition of new frequencies or orbit positions, or for which the request for modifications of the Region 2 Plan under Article 4, § 4.2.1 *a)* of Appendices **30** and **30A** that extend the service area to another country or countries in addition to the existing service area, or for which the request for additional uses in Regions 1 and 3 under § 4.1 of Article 4 of Appendices **30** and **30A**, or for which the submission under Appendix **30B** is received, with the exception of submissions of new Member States seeking the acquisition of their respective national allotments2 for inclusion in the Appendix **30B** Plan,”

As indicated in Annex 5/4-1 of the Report of the CPM, several provisions of the Radio Regulations refer to Resolution **49**, sometimes with a reference to former versions of this Resolution. If Resolution **49** is once again modified by WRC-23, there will be a need to ensure consistency among the various references to this Resolution.

### 3.3.6 Resolution 170 (WRC-19)

WRC-19 established 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. Among those measures, in Appendix 1 to Attachment 1 to Resolution **170 (WRC-19)**, there is a reduction of the coordination arc to 7° in the frequency bands 4 500-4 800 MHz and 6 725-7 025 MHz and to 6° in the frequency bands 10.70-10.95 GHz, 11.20-11.45 GHz and 12.75-13.25 GHz and the corresponding modification of the pdf limits aimed to protect networks outside the coordination arc (i.e. pfd hard limits).

At a later stage of its work, WRC-19 decided to apply to Annexes 3 and 4 to Appendix **30B** the same above-mentioned changes done to Appendix 1 to Attachment 1 to Resolution **170 (WRC-19)**.

As a result, there is no difference between the values of the pfd hard limits and coordination arc established in Annexes 3 and 4 to Appendix **30B** and the values prescribed in Appendix 1 to Attachment 1 to Resolution **170 (WRC-19)**.

In view of the above, the Conference is invited to modify Resolution **170 (WRC-19)** in order to delete the three last paragraphs in Appendix 1 to Attachment 1 to this Resolution, starting from “In addition to the above, and as a consequence of the reduced coordination arc in 1) above as …” up to the end of Appendix 1.

### 3.3.7 Resolution 554 (WRC-12)

WRC-12 modified the provisions on the use of the frequency band 21.4-22 GHz by BSS in Regions 1 and 3, which entered into force as of 18 February 2012.

The modifications included the introduction of Resolution **554 (WRC-12)** which deals with the application of pfd masks for BSS networks in the frequency band 21.4-22 GHz in Regions 1 and 3. Pursuant to *resolves* 1 of this Resolution, WRC-12 introduced a threshold pfd value in addition to the coordination arc of ±12 degrees to identify the administrations and satellite networks with which coordination is required under provision No. **9.7**.

Similarly, for submissions under the special procedure of Resolution **553 (Rev.WRC-15)**, pfd masks contained in Annex 2 to the Attachment of this Resolution are applicable.

These pfd masks were introduced as a means to have a more precise criteria to apply No. **9.7** and have the potential to reduce undue protection requirements in respect of incoming assignments. Further, the reduction of undue protection requirements would facilitate coordination of submissions of new networks and the use of pfd thresholds to identify coordination requirements would encourage the use of more homogenous technical parameters and support efficient spectrum usage.

Based on this understanding, the Bureau implemented the pfd masks in the GIBC/PXT program such that whenever an incoming assignment exceeded the pfd threshold over the service area of an existing assignment of a satellite network within a coordination arc of ±12 degrees, the existing administration and satellite network would be identified as affected under provision No. **9.7**.

However, the examination of whether an existing assignment exceeded the pfd threshold over the service area of an incoming assignment was not considered. As such, this is a departure from §1 of Appendix **5** where the frequency assignments that “might affect or be affected” shall be taken into account for identification of coordination requirements as well as from the current implementation of *T/T* under No. **9.7** where the identification of affected administrations and satellite networks are considered on the basis of both causing interference to, and/or receiving interference from, a potentially affected assignment of an existing network. Consequently, only the probability of harmful interference that may be caused to, and not by, existing satellite networks will be considered under No. **11.32A**.

Since the entry into force of Resolutions **553 (Rev.WRC-15)** and **554 (WRC-12)**, 17 BSS satellite networks have been recorded in the MIFR and brought into use in the frequency band 21.4-22 GHz in Regions 1 and 3. To date there has been no complaint of harmful interference affecting these frequency assignments.

|  | Adm. | Satellite name | Orbital position (°E) | Date of receipt |
| --- | --- | --- | --- | --- |
| 1 | ARS/ARB | ARABSAT 7B-26E | 26 | 28.08.2016 |
| 2 | ARS/ARB | ARABSAT 8A-30.5E | 30.5 | 14.12.2021 |
| 3 | CHN | CHINASAT-D-87.5E | 87.5 | 25.02.2021 |
| 4 | CHN | CHINASAT-D-115.5E | 115.5 | 25.02.2021 |
| 5 | E | HISPASAT-10A | -30 | 17.01.2020 |
| 6 | EGY | NILESAT-301-7W | -7 | 20.05.2020 |
| 7 | F | F-SAT-N4-139W | -139 | 12.05.2021 |
| 8 | F | F-SAT-N-E-7E | 7 | 17.07.2017 |
| 9 | F | F-SAT-N-E-16E | 16 | 26.03.2018 |
| 10 | F | F-SAT-N-E-25.5E | 25.5 | 17.07.2017 |
| 11 | F | F-SAT-N5-25.5E | 25.5 | 29.04.2020 |
| 12 | F | F-SAT-N3-25.5E | 25.5 | 03.06.2020 |
| 13 | HOL | NSS-G4-26 | 95 | 25.06.2019 |
| 14 | LUX | LUX-G6-8 | 28.2 | 12.07.2017 |
| 15 | LUX | LUX-G6-9 | 31.5 | 31.08.2017 |
| 16 | S | SIRIUS-P | 5 | 23.10.2015 |
| 17 | TUR | TURKSAT-42E-B | 42 | 17.12.2015 |

In view of the above, the Conference is invited to confirm that the pfd masks are only applicable over the service area of frequency assignments of existing satellite networks and no assessment of pfd levels should be carried out in the service area of the incoming assignment.

In this regard, the Conference may consider adding two additional *resolves* in Resolutions **553** and **554** to clarify the status of the incoming assignments:

*resolves*

that the pfd threshold values contained in this Resolution shall be applied only to identify the BSS frequency assignments in the 21.4-22 GHz frequency band in Regions 1 and 3 which might be affected;

that stations having BSS frequency assignments in the 21.4-22 GHz frequency band in Regions 1 and 3 shall not claim protection from other stations having BSS frequency assignments with an earlier date of receipt under No. **9.30** and No. **5.43A** does not apply.

### 3.3.8 Resolution 761 (Rev.WRC-19)

At WRC-19, under agenda item 9.1(9.1.2), an update of Resolution **761** which concerned compatibility of International Mobile Telecommunications and broadcasting-satellite service (sound) in the frequency band 1 452-1 492 MHz in Regions 1 and 3, was approved.

The *resolves* 6 of Resolution **761** **(Rev.WRC-19)** stipulates that Radiocommunication Bureau (BR) shall apply the coordination threshold identified in *resolves* 5 above in the application of No. **9.11** to identify potentially affected administrations for frequency assignments to stations in the BSS (sound) in the frequency band 1452- 1492 MHz in Regions 1 and 3 for which complete Appendix **4** coordination information is considered as having been received after 23 November 2019.

However, as stipulated by Resolution **99 (Rev.WRC-19)**, as of 23 November 2019, the provisions of Appendix **5** shall provisionally apply. Appendix **5** indicates, *inter alia*, the detailed conditions for the application of No. **9.11** in the frequency band 1 452-1 492 MHz as provided in Resolution **761** **(Rev.WRC-19)** for Regions 1 and 3.

On 23 November 2019, the Bureau has received three satellite networks submitted by the Administration of China and using frequency assignments to stations in the BSS (sound) in the frequency band 1452- 1492 MHz, namely CHINASAT-G-125E, CHINASAT-G-115.5E and CHINASAT-G-87.5E. The Bureau decided to treat those three networks with the same condition as indicated in Appendix **5**.

In this regard, the Conference is invited to consider modify *resolves* 6 of Resolution **761** **(Rev.WRC-19)** to confirm that the application of No. **9.11** to identify potentially affected administrations for frequency assignments to stations in the BSS (sound) in the frequency band 1452- 1492 MHz in Regions 1 and 3 for which complete Appendix **4** coordination information is considered as having been received as of 23 November 2019:

6 that the Radiocommunication Bureau (BR) shall apply the coordination threshold identified in *resolves* 5 above in the application of No. **9.11** to identify potentially affected

administrations for frequency assignments to stations in the BSS (sound) in the frequency band 1452- 1492 MHz in Regions 1 and 3 for which complete Appendix **4** coordination information is considered as having been received on or after 23 November 2019;

### 3.3.9 Resolution 762 (WRC-15)

Resolution **762 (WRC-15)** instructs the Director of the Radiocommunication Bureau to report to WRC-19 the results and any potential difficulties relating to the implementation of this Resolution.

This Resolution introduces new criteria based on power-flux density to assess the potential for harmful interference under No. **11.32A** for fixed-satellite and broadcasting-satellite service networks in the 6 GHz and 10/11/12/14 GHz frequency bands not subject to a Plan.

In particular, No. **11.32A.2** establishes that these new power-flux density criteria shall be used for the application of No. **11.32A** with respect to the coordination procedure under No. **9.7** in the frequency bands 5 725-5 850 MHz (Region 1), 5 850-6 725 MHz and 7 025‑7 075 MHz (Earth-to-space) for satellite networks having a nominal orbital separation in the geostationary-satellite orbit of more than 7°, and in the frequency bands 10.95‑11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz (Region 2), 12.2‑12.5 GHz (Region 3), 12.5‑12.7 GHz (Regions 1 and 3) and 12.7-12.75 GHz (space-to-Earth) and 13.75-14.5 GHz (Earth-to-space) for satellite networks having a nominal orbital separation in the geostationary-satellite orbit of more than 6°. For all other cases subject to coordination under No. **9.7**, the existing methodology defined in Part B, Section B3 of the Rules of procedures and based on the carrier-to-noise ratio criteria is used.

The Bureau notes that *resolves* 1 and 2 of this Resolution refer to the identification of the potential to cause harmful interference when the pfd levels produced by the satellite network exceed the threshold values within the service area of the potentially affected assignment (space-to-Earth) or at location in the geostationary-satellite orbit of the other FSS network (Earth-to-space), without referring to the interference source (i.e. whether the incoming satellite network is causing or receiving interference).

In this regard, the provisions of *resolves* 1 and 2 do not indicate whether the same criteria based on pfd levels should also be applied to a satellite network examined under No. **11.32A** in order to identify its potential to receive harmful interference from potentially affected assignment(s) of existing satellite network(s).

It should be noted that a notifying administration, when initiating coordination, may inform the Bureau of its intention to apply provision of Appendix **5**, § 6 *d i)* so that it accepts interference resulting from the frequency assignments referred to in No. **9.27**. However, no such requests have been received by the Bureau to date for any frequency assignments of satellite networks for which complete coordination information was received on or after 1 January 2017.

Taking into account *considering f)* and *g)* of Resolution **762 (WRC-15)**, the abovementioned potential difficulty and the absence of clear indication whether the pfd threshold of Resolution **762** should also be used to identify the potential of receiving harmful interference from existing networks, the Bureau took a conservative approach by continuing to apply the methodology defined in Part B, Section B3 of Rules of Procedure (i.e. using carrier-to-interference ratio) for identifying the probability for a frequency assignment of a satellite network submitted for examination under No. **11.32A** to receive harmful interference from an already-recorded frequency assignment of an existing satellite network.

The Conference is invited to confirm or otherwise whether this conservative approach should continue to be applied.

If this approach is confirmed, No. **11.32A.2** should be amended to clearly indicate that Resolution **762 (WRC-15)** should be used only to identify probability of causing harmful interference in the space-to-Earth and Earth-to-space directions of transmission. In this regard, the Conference is invited to consider the following modification:

**11.32A.2** For the application of No. **11.32A** to evaluate the probability of causing harmful interference to frequency assignments of existing satellite networks with respect to the procedure for coordination under No. **9.7** in the frequency bands 5 725-5 850 MHz (Region 1), 5 850-6 725 MHz and 7 025-7 075 MHz (Earth-to-space) for satellite networks having a nominal orbital separation in the geostationary-satellite orbit of more than 7°, and in the frequency bands 10.95-11.2 GHz, 11.45‑11.7 GHz, 11.7-12.2 GHz (Region 2), 12.2-12.5 GHz (Region 3), 12.5-12.7 GHz (Regions 1 and 3) and 12.7-12.75 GHz (space-to-Earth) and 13.75-14.5 GHz (Earth-to-space) for satellite networks having a nominal orbital separation in the geostationary-satellite orbit of more than 6°, Resolution **762 (WRC-15)** shall apply. For other cases, the methodology shall be identified and included in the Rules of Procedure, if so required.

### 3.3.10 Resolution 902 (WRC-03)

Resolution **902 (WRC-03)** was adopted by WRC-03 in order to set forth the necessary provisions relating to earth stations located on board vessels which operate in fixed-satellite service networks in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz. The Bureau regularly receives questions from administrations about the application of these provisions to non-GSO satellite systems.

In the absence of specific restrictions in the Table of Frequency Allocations, Nos. **5.457A**, **5.457B**, **5.506A**, **5.506B** or Resolution **902 (WRC-03)** concerning the type of orbits of space stations with which earth stations located on board vessels operate, the Bureau understands that these provisions as well as the technical and operational conditions contained in Resolution **902 (WRC-03)** apply to both GSO and non-GSO satellite networks and systems, even if the preparatory work before WRC-03 leading to the adoption of Resolution **902 (WRC-03)** considered GSO satellite networks.

The Conference is invited to confirm, or otherwise, this understanding.

### 3.3.11 Resolutions 907 and 908 (Rev. WRC-15)

The Bureau has successfully implemented the online platforms e-Communications and e-Submission of Satellite Network Filings in response to the requirements of Resolutions **907 (Rev. WRC-15)** and **908 (Rev. WRC-15)**. Since 1st August 2018, all satellite network filings are submitted to the Bureau through e-Submission, and since 23rd October 2019, all correspondence relating to the submission and commenting of satellite network filings could be communicated through e-Communications, in addition to correspondence related to other coordination activities between administrations.

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Noting that the requirements for the development of these systems have been met, the Bureau suggests to consolidate the operational concepts from Resolutions **907 (Rev. WRC-15)** and **908** **(Rev. WRC-15)** into Resolution **55 (Rev. WRC-19)**.

The Conference is invited to consider suppressing Resolutions **907 (Rev. WRC-15)** and **908** **(Rev. WRC-15)** after having amended Resolution **55 (Rev. WRC-19)** as suggested below.

RESOLUTION 55 (REV.WRC‑23)

Electronic submission of, and communications on, notice forms for satellite networks, earth stations and radio astronomy stations

The World Radiocommunication Conference (Dubai, 2023),

considering

1 that submission of notices for all satellite networks, earth stations and radio astronomy stations in electronic format would further facilitate the tasks of the Radiocommunication Bureau and of administrations, and would accelerate the processing of these notices;

2 that the volume of advance publication information, coordination requests, notifications and filings under Appendices **30**, **30A** and **30B** for satellite networks or systems has been steadily increasing in recent years;

3 that a significant amount of effort is required to maintain the relevant databases;

4 that a paperless electronic approach for the submission of satellite network filings and comments, if required, would make this information readily accessible to all, and would limit the workload for administrations and the Bureau in the processing of these filings;

5 that the use of electronic means of communication in an integrated online platform for administrative correspondence related to advance publication, coordination and notification of satellite networks, earth stations, radio astronomy stations would facilitate the tasks of the Bureau and of administrations with the potential to improve the efficiency and the coordination and notification process by reducing the amount of duplicated correspondence,

recognizing

1 that, should the processing delays related to the coordination and notification procedures extend beyond the periods specified in Articles **9** and **11** as well as in Appendices **30**, **30A** and **30B**, administrations may be faced with a shortened time window in which to effect coordination;

2 that administrations could use the time freed by a reduction of administrative correspondence to effect coordination;

3 that the Bureau has successfully implemented the online platforms e-Communications and e-Submission of Satellite Network Filings in response to Resolutions **907 (Rev.WRC-15)** and **908 (Rev.WRC-15)**, respectively;

4 that, since 1st August 2018, all satellite network filings are submitted to the Bureau through the e-Submission of Satellite Network Filings;

5 that, since 23rd October 2019, all correspondence relating to the submission and commenting of satellite network filings could be communicated through e-Communications;

6 that, since 1st September 2018, reports of harmful interference affecting space services have been submitted by Administrations through the Satellite Interference Reporting and Resolution System (SIRRS) implemented by the Bureau for this purpose,

resolves

1 that, as from 3 June 2000, all notices (AP4/II and AP4/III), radio astronomy notices (AP4/IV) and API (AP4/V and AP4/VI) and due diligence information (Resolution **49 (Rev.WRC-19)**) for satellite networks and earth stations submitted to BR pursuant to Articles **9** and **11** shall be submitted in electronic format compatible with the BR electronic notice form capture software (SpaceCap);

2 that, as from 17 November 2007, all notices for satellite networks, earth stations and radio astronomy stations submitted to BR pursuant to Articles **9** and **11**, as well as Appendices **30** and **30A** and Resolution **49 (Rev.WRC-19)**, shall be submitted in electronic format compatible with the BR electronic notice form capture software (SpaceCap and SpaceCom);

3 that, as from 1 June 2008, all notices for satellite networks and earth stations submitted to BR pursuant to Appendix **30B** shall be submitted in electronic format compatible with the BR electronic notice form capture software (SpaceCap);

4 that, as from 1 July 2009, comments/objections submitted to BR in accordance with Nos. **9.3** and **9.52** with respect to Nos. **9.11** to **9.14** and **9.21** of Article **9**, or in accordance with § 4.1.7, 4.1.9, 4.1.10, 4.2.10, 4.2.13 or 4.2.14 of Appendices **30** and **30A** with respect to modification to the Region 2 Plan or to additional uses in Regions 1 and 3 under Article 4 and use of the guardbands under Article 2A of those Appendices, shall be submitted in electronic format compatible with the BR electronic notice form capture software (SpaceCom);

5 that, as from 18 February 2012, all requests for inclusion or exclusion submitted to BR under No. **9.41** of Article **9** shall be submitted in electronic format compatible with the BR electronic notice form capture software (SpaceCom);

6 that, since 3 June 2000, all graphical data associated with the submissions addressed in *resolves* 1, 2 and 3 should be submitted in graphics data format compatible with BR’s data capture software (graphical interference management system (GIMS));

7 that all information indicated in *resolves* 1 to 6, in Annexes 1 and 2 to Resolution **35 (WRC-19)**, in Annex 2 to Resolution **552 (Rev.WRC-19)** and in the Attachment to Resolution **553 (Rev.WRC-19)** under § 8 and § 9, shall be submitted to the Bureau, using the ITU web interface e-Submission of Satellite Network Filings;

8 that the administrative correspondence between administrations and the Bureau related to the advance publication, coordination, notification and recording processes, including correspondence related to Appendices **30**, **30A** and **30B**, for satellite networks, earth stations and radio astronomy stations shall be communicated, whenever possible, using the ITU web interface e-Communications;

9 that reports of harmful interference affecting space services and associated correspondence communicated between Administrations and the Bureau in accordance with Article **15** and No. **13.2** of the Radio Regulations shall be submitted, whenever possible, using the ITU web interface SIRRS;

10 that, wherever the words “telegram”, “telex” or “fax” are inserted in provisions related to the advance publication, coordination, notification and recording processes of satellite /networks, earth stations and radio astronomy stations, including the provisions contained in Appendices **30**, **30A** and **30B**, e-Communications shall be used instead;

11 that other, traditional means of communication can be used in case of difficulty encountered in *resolves* 8 , 9 and 10,

instructs the Radiocommunication Bureau

1 to make available coordination requests and notifications referred to in *resolves* 1 “as received” within 30 days of receipt on its website;

2 to provide administrations with the latest versions of the capture and validation software and any necessary technical means, training and manuals, along with any assistance requested by administrations to enable them to comply with *resolves* 1 to 4 above;

3 to integrate the validation software with the capture software to the extent practicable;

4 to continue to develop and improve e-Submission of Satellite Network Filings, e-Communications and SIRRS to meet the needs of the Radio Regulations with respect to the submission of, and comments to, satellite network filings, as well as the associated correspondence.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 23 **11.44.1** In the case of space station frequency assignments that are brought into use prior to the completion of the coordination process, and for which the Resolution **49 (Rev.WRC‑19)** orResolution **552 (Rev.WRC‑19)** data, as appropriate, have been submitted to the Bureau, the assignment shall continue to be taken into consideration for a maximum period of seven years from the date of receipt of the relevant information under No. **9.30**. If the first notice for recording of the assignments in question under No. **11.15** related to No. **9.1** or No. **9.30** has not been received by the Bureau by the end of this seven-year period, the assignments shall be cancelled by the Bureau after having informed the notifying administration of its pending actions six months in advance.     (WRC‑19) [↑](#footnote-ref-1)
2. 24 **11.44.2** The notified date of bringing into use of a frequency assignment to a space station of a satellite network or system shall be the date of the commencement of the continuous period defined in No. **11.44B** or No. **11.44C**, or the date of deployment as defined in No. **11.44D** or No. **11.44E***,* as applicable.     (WRC‑19) [↑](#footnote-ref-2)
3. 25 **11.44.3**, **11.44B.1,** **11.44C.2**, **11.44D.2** and **11.44E.1** Upon receipt of this information and whenever it appears from reliable information available that a notified frequency assignment has not been brought into use in accordance with No. **11.44**, No. **11.44B**,No. **11.44C**, No. **11.44D** orNo. **11.44E**, as the case may be, the consultation procedures and subsequent applicable course of action prescribed in No. **13.6** shall apply, as appropriate.     (WRC‑19) [↑](#footnote-ref-3)
4. 31 **11.48.1** If the information pursuant to Resolution **552 (Rev.WRC‑19)** has not been provided, the corresponding information published under No. **9.38** shall be cancelled 30 days after the end of the seven-year period following the date of receipt by the Bureau of the relevant complete information under No. **9.30**.      (WRC‑19) [↑](#footnote-ref-4)
5. 1 The coordination under Nos. **9.11A** to **9.19** applies only to assignments in frequency bands allocated with equal rights.      (WRC‑15) [↑](#footnote-ref-5)
6. 2 For the purpose of effecting coordination, an assignment for which the process of obtaining agreement under No. **9.21** has been initiated is considered to be in conformity with No. **11.31** with respect to No. **9.21**. [↑](#footnote-ref-6)
7. 3 See No. **9.1** concerning the date to be considered as the date of receipt by the Bureau of the information relating to the notification of a frequency assignment.      (WRC‑15) [↑](#footnote-ref-7)
8. 4 The associated space network characteristics must have been communicated to the Bureau under No. **9.30** or under § 4.1.3/4.2.6 of Article 4 of Appendix **30** or § 4.1.3/4.2.6 of Article 4 of Appendix **30A**.     (WRC‑2000) [↑](#footnote-ref-8)
9. 1 This Resolution does not apply to satellite networks or satellite systems of the broadcasting-satellite service in the frequency band 21.4-22 GHz in Regions 1 and 3. [↑](#footnote-ref-9)
10. 2 See § 2.3 of Appendix **30B (Rev.WRC‑19)**. [↑](#footnote-ref-10)
11. 1 This information has already been provided by the administration under the provisions of Article **11** and will be inserted by the Radiocommunication Bureau (BR). [↑](#footnote-ref-11)
12. “*Member States recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies.*” [↑](#footnote-ref-14)