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|  | **Document EG-DEC482-2/3** |
| **18 October 2024** |
| **English only** |
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| Report by the secretariat | |
| DATA ON PROCESSING OF SATELLITE NETWORK FILINGS | |
| **Purpose**  This document provides the data requested by the first meeting of the Expert Group. The data is presented through 10 items following the same structure as the report of the first meeting.  **Action required**  The Expert Group on Decision 482 is invited to **consider** thedata contained in this document and to **take it into account** when revising Decision 482.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **References**  [*EG-DEC482 website*](https://www.itu.int/en/council/Pages/eg-d482.aspx)*;* [*Decision 482 (C01, last amended C24)*](https://www.itu.int/md/S24-CL-C-0135/en) | |

# 1 Background information – Processing of filings of satellite networks and systems

The processing of a submission of a satellite network or system is essentially divided into three steps:

1 Receivability: establishing the submission as receivable (“as received”, completeness, correctness)

2 Examination: performing the required regulatory and technical examination (compliance with RR Article **5** and with limits listed in the Rule of Procedure on RR No. **11.31**, compliance with the provisions of the Space Plans, if relevant, establishment of the coordination requirements)

3 Publication: publishing the special section in a BR IFIC (capturing regulatory findings, publication)

As it was noted during the first meeting of the Council Expert Group during the period 2018-2022, “the use of an individual staff tracking mechanism for processing satellite network filings was implemented in the early 2000 but finally abandoned in 2005”.

# 2 Data requested by the first meeting of the Expert Group

a) In the case of non-receivable filings, the appropriateness or otherwise of charging a fraction of the amount of an equivalent receivable filing for such cases, taking into account the needs of developing countries.

Summary of the item: In *decides* 2f) to 2m) and 9 of Decision 482 (C01, last amended C20), it is indicated that the fee for processing the filing “is payable after receipt of the notice” or that the invoice is issued “upon receipt of the filing”. Noting that, in *decides* 2a) to 2e), reference is made to “date of receipt” and “publication of the notice”, the implementation practice of *decides* 2f) to 2m) has been not to charge any fee for satellite network filings that are not receivable by the Radiocommunication Bureau, thus identifying the actual receipt of the notice with its regulatory receivability. In accordance with the Rule of Procedure on the receivability of forms of notice, there are five cases when a notice should be considered “not receivable”:

1 Under § 3.2 of the Rule, if the notifying administration submits incorrect information.

2 Under § 3.3 of the Rule, if mandatory information required by Appendix **4** of the Radio Regulations is missing in the submission.

3 Under § 3.8 of the Rule, if no reply is received within 30 days from the date of the Bureau’s request for clarification.

4 Under footnote (\*) to the title of the Rule, if conditions for the set of orbital characteristics in the request for coordination related to a non-geostationary satellite (non-GSO) network or system are not met.

5 Under § 4 of the Rule, if various other conditions are not met.

In the second case, the Bureau’s review could be limited to an initial validation, but all other cases require the Bureau to conduct a completeness review of the whole satellite network, sometimes including the previously received and published notice(s), in full. Moreover, these cases could potentially be used by administrations in order to benefit from a form of “free withdrawal” of their submission, even after the period of 15 days allowed by *decides* 10 of Decision 482.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should provide the statistics of non-receivable cases that have been noted over the last four years, or any other period more than four years, indicating the reasons for the non-receivability, the category and units of the notices and the BR workload involved in the processing of the cases.

Data provided in response to the Expert Group’s request:

The following table provides the data about non-receivable cases in the unplanned services for the period 2020-2023.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Special sections | API | CRC | | Notification | |
| GSO | Non-GSO | GSO | Non-GSO |
| Number of cases | 24 | 1 | 11 | 1 | 5 |
| Categories/units | A1 | C1 (2 units) | 10 C1 (from 4 to 233 998 units)  1 C2 (2786 units) | N1 (2276 units) | 1 N1 (647 units)  4 N4 (from 2 to 490 units) |
| Reasons for the non-receivability | No response within 30 days (20)  Submission via Brmail instead of e-Submission (3)  Too many fatal errors (1) | No response within 30 days (1) | No response within 30 days (8)  Not subject to coordination (3) | Not receivable because frequency assignments were not brought into use before the end of the 7-year regulatory period | No response within 30 days (1)  No API before notification (3)  Missing data (1) |

For APIs, most of the analysis work is performed at the receivability stage, and since there is no regulatory and technical examination for API, the cost for processing a non-receivable API may be 70 to 80% of a normal published API.

For other filings, significant work is also done for non-receivable cases, however, the percentage of the overall cost will be lesser and closer to 40%.

b) Whether there are categories of filings for non-GSO satellite systems that, due to their complexity, should not be eligible for free entitlement.

Summary of the item: As provided for by *decides* 4 of Decision 482, “each Member State shall be entitled to the publication of special sections or parts of the BR IFIC (space services) for one satellite network filing each year without the charges”. The financial value of the free filings for the year 2021 was 1 461 379 CHF, for the year 2022 was 1 301 909 CHF, and for the year 2023 was 1 396 871 CHF. A review should be conducted to assess whether certain limitations should not be put on filings eligible to benefit from the exemption of charges, such as limiting eligibility in the planned services to filings having a national service area or excluding non-GSO filings with multiple configurations and/or those subject to epfd limits, which require a substantial amount of Radiocommunication Bureau resources.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should provide the statistics of the requests for free entitlement received since 2015, including the category and units of the corresponding filings as well as the BR workload to process them.

Data provided in response to the Expert Group’s request:

The following file provides the list of the 382 free entitlements from 2016 to 2023 (for a corresponding total amount of 11 614 459 CHF).



The following table summarizes the distribution of free entitlements per categories of filings, over the same period of time.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A1 | C1 | C2 | C3 | N1 | N2 | N3 | N4 | P1 | P2 | P4 | P5 |
| Flat fee (CHF) | 570 | 20 560 | 24 620 | 33 467 | 30 910 | 57 920 | 57 920 | 7 030 | 28 870 | 11 550 | 25 350 | 20 280 |
| 2016 | 4 | 3 | 15 | 4 | 1 | 9 | – | 1 | 19 | – | 5 | – |
| 2017 | 1 | 1 | 12 | 11 | 1 | 10 | 1 | 4 | 2 | 2 | 3 | – |
| 2018 | 4 | – | 11 | 6 | – | 11 | – | 2 | 6 | 3 | 3 | 1 |
| 2019 | 3 | 2 | 7 | 10 | – | 16 | – | 6 | 4 | – | 3 | - |
| 2020 | – | 2 | 13 | 7 | – | 8 | 1 | 3 | 8 | – | 4 | 1 |
| 2021 | 4 | 1 | 8 | 7 | 2 | 9 | 1 | 6 | 6 | – | 4 | – |
| 2022 | 5 | 2 | 5 | 12 | – | 10 | 3 | 1 | 2 | – | 3 | 1 |
| 2023 | 6 | 2 | 3 | 10 | 1 | 7 | – | 2 | 2 | – | 3 | – |
| Total | 27 | 13 | 74 | 67 | 5 | 80 | 6 | 25 | 49 | 5 | 28 | 3 |
| Note – There was no request for free entitlements related to the P3 category during the considered time period. | | | | | | | | | | | | |

Most of the requests concern filings related to coordination requests or notifications within the categories C2, C3 and N2 (the most expensive categories).

Submissions within the category P1 also attract a good number of requests for free entitlements, notably because free entitlements in this category cover simultaneous submissions under both Appendices **30** and **30A** (corresponding to invoice amounts of more than 57 000 CHF).

Requests for smaller invoices (like categories A1 or N4) generally come from administrations that do not submit several requests in a single year.

Concerning the BR workload to process these filings, there is no difference with other filings of the same category, since the same steps and processes are followed. The only difference is the ultimate choice of the notifying administration to request the free entitlement for the invoice related to these filings.

c) Whether specific fees should be paid for processing submissions related to earth stations in motion while avoiding double invoicing.

Summary of the item: Earth stations in motion can be registered through the application of four different Resolutions:

 Resolution **121 (WRC-23)** – Use of the frequency band 12.75-13.25 GHz by earth stations in motion on aircraft and vessels communicating with geostationary space stations in the fixed-satellite service

 Resolution **123 (WRC-23)** – Use of the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth), and 27.5 29.1 GHz and 29.5-30 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service

 Resolution **156 (Rev.WRC 23)** – Use of the frequency bands 19.7-20.2 GHz and 29.5‑30.0 GHz by earth stations in motion communicating with geostationary space stations in the fixed-satellite service

 Resolution **169 (Rev.WRC-23)** – Use of the frequency bands 17.7-19.7 GHz and 27.5‑29.5 GHz by earth stations in motion communicating with geostationary space stations in the fixed-satellite service

ESIMs are currently invoiced as a modification to the notification of a space station (categories N1 to N3).

At its 2024 session, the Council approved a revision of Decision 482 (C01, last amended C24) that includes the submissions under Resolution **121** in the schedule of fees contained in the Annex of this Resolution and instructed the Expert Group on Decision 482 to review the cost recovery aspects of earth stations in motion subject to Resolution **121 (WRC-23)** of the Radio Regulations in order to include a further update of Decision 482, if required, in its report to the 2025 session of the Council.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should provide the list of actions required to process ESIMs submissions, a comparison with the processing of earth stations, and an estimate of the workload encountered in processing ESIMs, in particular ESIMs associated with Resolution **169** and WRC-23 agenda items 1.15 and 1.16.

Data provided in response to the Expert Group’s request

List of actions required to process ESIMs submissions associated with Resolutions **156** and **169**

ESIM submissions associated with Resolutions **156** and **169** are submitted as modifications to notified frequency assignments, therefore as notifications falling under the categories N1 to N3. Pursuant to *resolves* 1.1.4, 1.1.5, and 1.2.5 of Resolution **169**, the Bureau prepared new cover pages and templates for Parts I/II/III-S publications that make specific reference to Resolution **169** to facilitate the visual identification of the notifications of ESIMs received under this Resolution (see Section II of the Preface to the BR IFIC (Space Services)).

Receivability

Like any other submissions, ESIMS associated with these Resolutions are processed in e‑Submission and published as-received, then checked for completeness and published in Part I-S.

Upon receipt of the notification information containing ESIMs submitted under Resolutions **156** and **169**, the Bureau examines these assignments to ensure that the ESIM characteristics are within the envelope characteristics of typical earth stations associated with the satellite network with which these ESIMs communicate.

In the event that ESIMs and typical earth stations are submitted together in the same notice, the frequency assignments of ESIMs would be separated and the typical earth stations would be treated first. In line with *resolves* 1.1.4 and 1.1.1 of Resolution169, the frequency assignments of ESIMs would be subsequently treated as a modification.

The Bureau will examine, in accordance with *resolves* 1.1.5 and 1.2.5, the ESIM assignments with respect to their conformity with *resolves* 1.1.1 and Part II of Annex 3 of Resolution **169**. However, conformity with the e.i.r.p. density limits in Annex 1 and Part I of Annex 3 of Resolution **169** is assured by a commitment of the administration submitted under item A.20.a of Appendix **4**.

For receiving beams, the Bureau has to split the frequency assignment groups into two groups (one group with the class of station UO and another group with classes of station UU and US) in order to formulate the appropriate findings according to the types of ESIM. The groups of frequency assignment with class of station UO are given qualified favourable finding under No. **11.31** in accordance with *resolves* 7 and 8 of Resolution **169**.

Technical examination of ESIMs submitted under Resolution **156**

The Bureau first checks for commitment to comply with *resolves*1.5 of Resolution **156**. The Bureau then examines each notice with respect to:

i) its conformity with the Table of Frequency Allocations and the other[[1]](#footnote-1) provisions of the Radio Regulation (No. **11.31**);

ii) conformity with the coordination procedures (No. **11.32**);

iii) the probability of harmful interference (Nos. **11.32A** and **11.33**), if requested.

 Examination under No. **11.31**

|  |  |
| --- | --- |
| Provisions | General Description of the Examination |
| Article **5** | Checks if the frequency is in compliance with Table of Frequency Allocation including footnotes |
| Article **21** Section III | Checks that the power limits of earth stations are met |
| Article **21** Section IV | Checks that minimum elevation angles of earth stations are met |
| Article **21** Section V | Checks that limits of power-flux density (pfd) from space stations are met |
| Article **22** Section III | Checks that station keeping of space stations are met |
| Article **22** Section IV | Checks that pointing accuracies of antennae on geostationary satellites are met |
| Article **22** Section VI | Checks that earth station off-axis power limitations in the fixed-satellite service are met |

 Examination in accordance with No. **11.32**

The Bureau examines if the notified characteristics are within the characteristics that have been submitted for coordination request. It then checks if there are any valid objections to coordination agreements published in Part I-S and takes them into account in the examination.

The Bureau establishes the latest coordination requirements taking into consideration the latest information in the SNS and establishes if coordination has been completed with respect to the identified coordination requirements.

 Examination in accordance with No. **11.32A**

In order to carry out the examination under No. **11.32A**, the Bureau computes the C/I levels with respect to frequency assignments for which the ESIM’s notifying administration states that coordination could not be successfully completed and records into the NOTEX database the information related to the frequency assignments where the examination under No. **11.32A** led to an unfavourable finding.

The NOTEX database information is used for applying No. **11.41A** and No. **11.41B** as well as when reviewing findings as a result of objection to agreements published in Part I-S.

Technical examination of ESIMs submitted under Resolution **169**

The Bureau first checks for commitments to comply with *resolves* 1.1.4, 1.2.6 and 7 of Resolution **169**.

 Examination under No. **11.31**

In addition to the usual examination under No. **11.31**, the Bureau has to carry out the examination of aeronautical ESIMs with respect to Part II of Annex 3 of Resolution **169** and was establishing qualified favourable finding in accordance with *resolves* 7 and 8 of the Resolution but will review these qualified findings since the methodology has been developed by ITU-R Working Party 4A.

 Examination in accordance with No. **11.32**

The Bureau examines if the notified ESIMs characteristics are within the envelope of the recorded characteristics of typical earth stations associated with the satellite network with which the ESIMs communicate.

It lists the results of the examination showing the corresponding group links between the ESIMs and the typical earth station characteristics in the envelope under which the ESIM will operate. The results are published in a table detailing the link between the ESIM group id and the corresponding typical earth station characteristic group id under the envelope of which the ESIM will operate.

The coordination agreements of the typical earth stations characteristics under the envelope of which the ESIMs will operate is transferred to the ESIMs notice to show the agreements that have been obtained.

Comparison with the processing of earth stations

An ESIM notice is essentially a space station notice, as compared to an earth station notice so the processing of both types of notices is dissimilar. Therefore, there is more information to verify and to examine.

Notices for ESIM are generally much larger than those of earth stations that have just one to a few groups (average number of groups per ESIM notice : 404, average number of groups per earth station notice: 3.6).

The examination on whether ESIM characteristics are within the envelope of coordinated characteristics is described above and entails the examination of power levels, off axis patterns, service areas, noise temperatures, etc. By comparison, the examination of an earth station is simpler because it is limited to checking No. **11.31** and the obtained coordination agreements.

Estimate of the workload encountered in processing ESIMs, in particular ESIMs associated with Resolution **169** and WRC-23 agenda items 1.15 and 1.16

As indicated above, an ESIM notice is essentially a space station notice and the workload to process such a notice is equivalent to the workload for processing a notification of a space station.

To date, 31 ESIMs have been submitted and processed under Resolution **156** and 10 under Resolution **169**.

Resolutions **121** and **123** were adopted by WRC-23 and will enter into force on 1st January 2025. As such, no submissions under these Resolutions have yet been received.

Request from Council concerning ESIM under Resolution **121 (WRC-23)**

At its 2024 session, the Council instructed the Expert Group on Decision 482 to review the cost recovery aspects of earth stations in motion subject to Resolution **121 (WRC-23)** of the Radio Regulations in order to include a further update of Decision 482, if required, in its report to the 2025 session of the Council.

The table below shows a comparison of BR activities in processing Appendix **30B** submissions and ESIM submissions in the band 12.75-13.25 GHz. As a summary, it can be noted that most Appendix **30B** notices have both uplink and downlink whereas AP**30B** ESIM notices have only one link (uplink) but AP**30B** ESIM notices have more hard limits checks and additional examination to check compatibility among ESIM themselves. As a consequence, it is proposed to use the same cost recovery fees for AP**30B** ESIM submissions (Part-A, Part-B and notification) as those of AP**30B** submissions.

|  |  | Part A | | Part B | | Notification | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | AP30B ESIM | Corresponding  to AP30B | AP30B ESIM | Corresponding  to AP30B | AP30B ESIM | Corresponding  to AP30B |
| **General** | **Frequency bands** | Only uplink | Both uplink and downlink | Only uplink | Both uplink and downlink | Only uplink | Both uplink and downlink |
| **Calculation on grid points** | Grid point in uplink | Grid point in downlink | Grid point in uplink | Grid point in downlink | Grid point in uplink | Grid point in downlink |
| **Completeness** | **Completeness** | X | X | X | X | X | X |
| **preliminary examination** |  |  | X |  |  |  |
| **Hard Limits** | **RR. Articles 21 and 22 Annex 3 of AP30B** | X | X | X | X | X | X |
| **On-axis and off-axis e.i.r.p. comparison** | X |  | X |  | X |  |
| **Service area comparison** | X |  | X |  | X |  |
| **Frequency band comparison** | X |  | X |  | X |  |
| **Pfd calculation for A-ESIM** |  |  |  |  | X |  |
| **Technical examination** | **Comparison of produced interference** | X | X (6.5) | X | X (6.21) | X | X |
| **Check of the cumulative interference** |  |  | X | X (6.22) |  |  |
| **Examination ESIM wrt ESIM** | X |  | X |  |  |  |

d) The cost of processing resubmissions of notification requests.

Summary of the item: Processing resubmissions of notifications is included in the cost of notification categories N1 to N3, as indicated by the Note for these categories in the Annex to Decision 482 (C01, last amended C20). However, current resubmissions generally require more work than was initially foreseen in 2005 because of the additional information contained in these resubmissions, rendering new examinations necessary. Some submissions, though, in response to the formulation of findings by the Radiocommunication Bureau, such as requests for the recording of an assignment for information purposes under No. **8.4** of the Radio Regulations, do not require substantial processing and could be exempted from fees.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should provide statistics of resubmission of notification requests submitted over the last four years, or any other period more than four years, with a modification to the information published in Part III-S, which render a new examination necessary with the indication of the associated workload to process them. Explanations about the type of additional workload (especially compared to the regulatory situation in 2005) are also requested.

Data provided in response to the Expert Group’s request:

Background

A notice can be resubmitted either after it has been returned under No. **11.37** (a notice that received an unfavourable finding under No. **11.32** is returned under No. **11.37** and can be resubmitted under No. **11.46**), or after it has been returned under No. **11.38** (a notice that received unfavourable finding under No. **11.32A** is returned under No. **11.38** and can be resubmitted under No. **11.46** and No. **11.41**).

Statistics of resubmission of notification requests submitted over the last four years with a modification to the information published in Part III-S

In order to assess and compare the evolution of resubmissions, two periods of 4 years were chosen: 2002 to 2005 (early application of Decision 482, prior to the review and change of 2005) and 2020 to 2023.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | First notification | | Resubmission(s) | | Percentage of Resubmissions | |
| GSO | Non-GSO | GSO | Non-GSO | GSO | Non-GSO |
| 2002 to 2005 | 587 | 110 | 171 | 11 | 29% | 10% |
| 2020 to 2023 | 212 | 342 | 258 | 36 | 122% | 11% |
| Note – The number of resubmissions of GSO satellite networks is higher than the number of first notifications because GSO satellite networks can be resubmitted twice (i.e. following a return under No. **11.37** and under No. **11.38**), even if they are subject to the application of a single cost recovery fee. | | | | | | |

The percentage of resubmission of non-GSO satellite filings remains low and stable around 10% however this is because it is computed with respect to the total number of non-GSO satellite systems, i.e. both those that are subject and those that are not subject to coordination. However, when focusing on those subject to coordination, which are the only ones that can be resubmitted, the resubmission ratio during the 2020-2023 period increases from 11% to 68%.

Explanations about the type of additional workload (especially compared to the regulatory situation in 2005)

For every resubmission received by the Bureau, the following actions and deliverables are performed or produced.

Additional completeness and validation of the notice

When technical characteristics such as orbital characteristics, power, power density, antenna pattern, antenna size, noise temperature, service area, frequency assignment, frequency bandwidth, emission, or etc. are modified in a resubmission, the resubmitted notice will have to be examined by comparing the characteristics of the resubmitted notice with the characteristics published in the part III-S of the BR IFIC to identify or confirm the modification(s). As indicated in the table above, the number of resubmissions including such changes has increased in the period 2020-2023 as compared to 2002-2005.

Additional regulatory and technical examination

When the modification has been identified, depending on the technical characteristics that have been modified, No. **11.31**, No. **11.32** and No. **11.32A** examination would need to be carried out.

Additional generation of databases to identify updated coordination requirements and to establish findings

If the resubmission contains modifications to the agreement status of some coordination requirements, the Bureau updates the record of the coordination agreement status, updates the NOTEX database containing record of administrations and satellite networks which assignments were the basis of unfavourable finding under No. **11.32A** and captures the findings with the updated agreement status. The NOTEX database was not existing in the period before the 2005 review of Decision 482.

Additional publication

The resubmitted notice will have to be published in Part I-S and Part III-S or Part II-S.

**e. The costs associated with the BR’s implementation of additional provisions: Resolutions 4 and 49, Nos. 11.32A, 11.41, 11.47, 11.49, Subsection IID of Article 9, Sections 1 and 2 of Article 13, Article 14.**

Summary of the item: Fees for notification also include “the application of Resolutions **4** and **49**, Nos. **11.32A** (see footnote *a)*), **11.41**, **11.47**, **11.49**, Subsection IID of Article **9**, Sections 1 and 2 of Article **13**, Article **14**”. Consequently, the application of these procedures is not charged separately. Since 2005, WRCs have significantly increased the number of provisions associated with the maintenance of recorded assignments in the Master International Frequency Register.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should submit a document containing the detailed workload for each of these provisions, including any additional work. Other provisions not included in this list but also applied in conjunction with notifications could also be included in the analysis, when relevant. The group noted that the idea is not to charge a separate fee for each of these provisions but to take into account the increased workload associated with their processing in the fee for the corresponding notifications.

Data provided in response to the Expert Group’s request:

Background

The mandatory notification of all frequency assignments to a space station within the same regulatory period as for bringing them into use (see No. **11.44.1**) was introduced by WRC-2000 and entered into force on the 1st January 2002 (date of entry into force of the Final Acts of WRC‑2000). Therefore, noting that the average treatment delay of notifications of space stations in 2002-2004 was around 100 weeks (almost 2 years), little experience was available during the 2005 review of Decision 482 about the detailed BR workload entailed by this decision.

Workload for various provisions related to notified or recorded frequency assignments, including any additional work

Assistance under Sub-section IID of Article 9

Upon receipt of a request for assistance from administration (A), the Bureau proceeds as follows:

 Check for receivability and for validity (CR/C)

 Check for all past correspondences

 Immediately request the administration concerned (B) to give an early decision on the matter or provide the relevant information, within 30 days

 If administration B fails to reply within 30 days, the Bureau sends a reminder providing an additional 15‑day period for the response

 Apply provisions of Nos. **9.48** and **9.49** if the administration (B) fails to inform the Bureau of its agreement or its disagreement together with information concerning its own assignments on which its disagreement is based within fifteen days after the reminder

 Communicate the decision to apply Nos. **9.48** and **9.49** to all concerned administrations.

 Assess the probability of interference between the networks in case of continuing disagreement (No. **9.63**), by undertaking examination under No. **11.32A** and communicate its conclusions to both administrations involved.

226 requests for assistance related to the coordination of space stations have been processed during the 2020-2023 period.

414 requests for assistance related to the coordination of earth stations have been processed during the 2020-2023 period.

Objection to a coordination agreement after publication of Part I-S

A notifying administration may indicate in the Article **11** notification submission of a satellite network that a coordination agreement has been obtained with an affected administration. Such information is taken verbatim by the Bureau for the No. **11.32** examination.

Following the publication of the information in the BR IFIC (Part-I-S/II-S/III-S), an affected administration may inform the Bureau that such a coordination agreement has not been obtained with the affected administration, contrary to what was indicated in the publication.

The objection can come in general form (e.g. coordination has not been completed with the objecting administration) or specific form (e.g. coordination has not been completed with specific satellite networks, or within specific frequency bands, or for a specific orbital separation)

When an objection is received, the Bureau checks if the frequency assignments of the satellite network which received objection is subject to coordination under Section II of Article **9**.

If the frequency assignments are not subject to coordination, no further action is taken by the Bureau.

If the frequency assignments are subject to coordination, the Burau checks if there is agreement indicated with respect to the objecting administration in the notice. If there is no agreement indicated in the notice with the affected administration, the Bureau deems that the objection is not valid since there has been no agreement indicated with respect to the affected administration. If there is agreement indicated with the objecting administration in the notice for at least some frequency assignment groups in the notice, the Bureau carries out further verification to determine if the objection is valid for the groups in the notice.

Verification is carried out using the coordination requirement methods in Appendix **5** for the various forms of coordination using the latest SNS information. If there is coordination requirement for those groups, the objection is deemed valid.

The Bureau then initiates the enquiry process by sending to the notifying administration to inform of the objection and to clarify the situation. The inquiry process includes reminders to administrations and consultation and exchange of information between the notifying administration and the objecting administration and should normally be completed within 4 months from the date of the objection.

The affected administrations can object to a coordination status at any time before or after Part II-S publications. In order not to unduly delay the processing of notification submissions, the Bureau examines the notification information under No. **11.32** as follows:

– If the enquiry process is completed before the Bureau’s Weekly Approval Meeting, then the coordination status based on the results of the enquiry will be taken into account in the formulation of findings.

– If the enquiry process is not yet completed before the Bureau’s Weekly Approval Meeting, the findings with respect to the affected administration will be based on the coordination status submitted by the notifying administration at the time of notification. The Bureau will then take appropriate action, whether to review or not the findings, after the conclusion of the Bureau’s enquiry process. When reviewing the findings of recorded assignments, the Bureau will carry out No. **11.32A** before applying No. **11.41** for the assignments to continue to be recorded into the MIFR. The record of the administrations and their satellite networks whose assignments were the basis of the unfavourable finding under No. **11.32A** will be reviewed.

Between 2019 and 2023, a total of 1 594 cases were processed, with the annual breakdown as follows: 458 cases in 2019, 374 cases in 2020, 282 cases in 2021, 248 cases in 2022 and 232 cases in 2023. Only 89 cases were valid and 42 led to a review.

Implementation of No. 11.41A

No. **11.41A** consists in the review of findings of the frequency assignments resubmitted under No. **11.41** when the assignments that were the basis of the unfavourable finding under No. **11.32A** or **11.33** are not brought into use within the period specified in No. **11.24**, **11.25** or **11.44**.

In order to fulfil the requirements under No. **11.41A**, the Bureau has completed in 2018 the development of a software to store more information during examination under No. **11.32A**. The process of examination under No. **11.32A**/**11.41** keeps a record of the satellite networks of administrations which were the basis of the unfavourable finding under No. **11.32A** for a frequency assignment recorded under No. **11.41**. The Bureau established a process to maintain the record for the entire lifetime of the assignments recorded in the MIFR. The record will be updated whenever one of these networks is suppressed. The identified administration in the CR/C publication will be removed from No. **11.41** recording only if all its affected networks are suppressed in accordance with No. **11.44** and the findings will be reviewed when all identified administrations under No. **11.41** are removed. The Bureau periodically identifies frequency assignments to be reviewed due to the suppression of satellite networks.

46 finding reviews have been processed under No. **11.41A** within the 2018-2023 period for space station assignments.

Implementation of No. 11.41B

Under No. **11.41B**, notifying administrations send updated information on the coordination status of their satellite networks or systems in order to request the review of findings of their frequency assignments recorded under No. **11.41** after completing coordination with an administration whose assignments were the basis for the recording made under No. **11.41**.

Upon receipt of a request from an administration for review of a finding under No. **11.41B**:

• The Bureau analyzes the data and relevant documents and seeks clarifications, if required.

• It then conducts technical and regulatory examination under Nos. **11.32**, **11.32A** and **11.41** as appropriate.

• It reviews the coordination status of any associated earth station as a consequence of the finding review of the assignments of the space stations.

• It prepares the weekly meeting documents and files examination results for future reference and also captures the findings results.

38 requests for finding reviews under No. **11.41B** were received and processed during the 2018-2023 period and findings of 400 earth stations communicating with the space stations have consequently been updated.

Bringing into use, bringing back into use, suspension, extension of the period of validity

During the 2020-2023, the Bureau treated 352 confirmations of bringing into use under No. **11.44B**, No. **11.44C**, No. **11.44D** and No. **11.44E**, 275 requests of suspension or bringing back into use under No. **11.49** and 284 requests of extension of the period of validity under Resolution 4. The detailed application of these provisions only started after WRC-12 adopted provisions aiming at clarifying the conditions for bringing into use and suspending frequency assignments to space stations. As such, there is no comparable data prior to 2005.

The treatment of these provisions includes communications with the notifying administrations to remind them of the regulatory date limits for the different provisions and to clarify the requests if needed. The Bureau reminds the notifying administrations to notify the date of bringing into use under No. **11.47** when the end of the regulatory period established under No. **11.44** is reached. A reminder for the confirmation under No. **11.44B** or No. **11.44C** is sent to the notifying administration 90 days after the communicated date of bringing into use.

The Bureau analyses the requests as regard the recorded frequency assignments and the relevant provisions of the Radio Regulations or Rules of Procedures. Further, when informing the Bureau of the bringing into use of a frequency assignment to a space station in the geostationary-satellite orbit, the information requested by Resolution 40 (WRC-15) shall also be submitted to the Bureau. This information is published by the Bureau on its website.

The Bureau verifies that the information corresponds to the deployed space station, with the capability of transmitting or receiving in the assigned frequencies and use in accordance with the notified required characteristics. Whenever it appears from reliable information available that a notified assignment has not been brought into use in accordance with notified characteristics or if reliable information is not available, the Bureau applies the consultation procedures and subsequent applicable course of action prescribed in No. **13.6**.

Information concerning the bringing into use, suspension and bringing back into use are published in PART II-S of the BR IFIC. Information concerning the extension of the period of validity in accordance with Resolution 4 is published in a RES**4** Special section. The Bureau makes also available “As received” the list of satellite networks brought into use as well as the history of all requested suspensions and resumption on its website.

Prior to the adoption of Resolution **8 (WRC-23)** on tolerances for certain characteristics of space stations deployed as part of non-geostationary-satellite orbit systems, in application of No. **13.6** and in agreement with the notifying administration, the Bureau modified the orbital characteristics of the satellite networks to reflect the actual orbital parameters of the space station used for the bringing into use. The Bureau verified that the value of the power flux density at the Earth’s surface produced by the notified emissions from the space station exceeds the limits specified in No. **21.16** when operated from the actual orbital parameters. The Bureau published 31 modifications of orbital parameters in PART I-S of the BRIFIC during the last 2 years.

Assistance under Sections I and II of Article 13

On receipt of an assistance request under No. **13.1**, the Bureau sends the request for coordination or other correspondence to the administration concerned and takes any necessary further action such as to request an acknowledgment or decision, or details of the assignments of the administration on which the disagreement is based.

Application of No. 13.6

The Bureau applied the consultation procedures of No. **13.6** during the past 4 years to 536 satellite networks or systems.

The Bureau requests clarification from the notifying administration as to whether the assignment was brought into use or continues to be in use in accordance with the notified characteristics and includes the reason for the query. If the notifying administration does not respond within three months, the Bureau sends a first reminder follows, if necessary, by a second reminder. If the notifying administration does not respond within one month of the second reminder or in case of disagreement with the notifying administration, the Bureau consults the Radio Regulations Board, which will decide whether the frequency assignments shall be kept or cancelled.

Application of No. **23.13**: request for exclusion of territory from the service area of a satellite network in the broadcasting-satellite service

If, within the four-month period following the publication of the Special section for a satellite network in the broadcasting-satellite service (except sound broadcasting) submitted for coordination under Article **9**, the Bureau will initiate the following steps upon receiving comments requesting exclusion of territory under No. **23.13B**:

 The Bureau assesses the validity of the request by identifying beams with BSS stations classified as EV and confirming the objecting administration’s territory falls within the visibility of the service area of the satellite network.

 Subsequently, the Bureau notifies both administrations involved via correspondence, encouraging them to resolve the issue.

 If no mutual agreement is reached, the Bureau removes the territory of the objecting administration from the service area during the application of Article **11** procedures.

If an Administration objects after the 4-month period mentioned above, the Bureau shall remove its territory from the service area of the concerned satellite network in the broadcasting-satellite service (except sound broadcasting) under No. **23.13C**.

The exclusion of the territory of the objecting administrations from the service area is reflected in the Bureau’s Space Network System (SNS) and published on the ITU Space Network List (SNL) website.

Between 2019 and 2023, a total of 1892 cases were processed, with the annual breakdown as follows: 363 cases in 2019, 550 cases in 2020, 375 cases in 2021, 267 cases in 2022, and 337 cases in 2023.

Resolution 35

Resolution 35 entered into force on 1st January 2021. The Bureau treated 31 submissions during the past 3 years. The implementation of this Resolution includes communications with the notifying administrations reminding to submit the required deployment information within the regulatory date limits and to clarify the submissions if needed.

Upon receipt of the required deployment information, the Bureau makes available the information “As received” on its website. It conducts an examination for compliance with the minimum number of satellites to be deployed as prescribed for each milestone.

In order to conduct the examination of the information provided for compliance with the minimum number of satellites to be deployed, the Bureau is verifying if the satellites in the submissions are carrying the required frequency bands and are close enough to the notified orbital parameters. The Bureau may apply the consultation procedures and subsequent applicable course of action prescribed in No. **13.6**.

Information concerning the deployment information in accordance with Resolution 35 is published in a RES35 Special section. The Bureau maintains also a webpage listing all satellite systems subject to this Resolution and their status related to the different milestones.

Suppression of frequency assignments

The Bureau published during the past 4 years 1849 partial or total suppressions of satellite networks. Among the partial suppressions, 99 suppressions also entailed the consequential modification of the parameters of the filing, i.e., the modification of the frequency bands and/or of the characteristics of the emissions.

f) The costs of processing non-GSO filings having more than 75 000 units or, alternatively, whether the formula to compute units for such non-GSO satellite systems should take into account the impact of the number of different orbital altitudes, number of satellites, number of earth stations, or other characteristics affecting workload associated with the processing of non-GSO systems.

Summary of the item: The technological advances introduced in recent years, especially in the manufacturing and operation of non-GSO constellations, have rendered non-GSO system filings more complex in terms of orbital configurations, associated beams and carriers. Their processing, both in terms of completeness and accuracy of regulatory and technical examinations, has consequently become more resource intensive. When the Council started to address this issue at its 2019 session, it decided on a ceiling of 75 000 units. Since 1 July 2019, the Radiocommunication Bureau has, however, received 10 non-GSO filings having more than 75 000 units. Moreover, the formula to compute units for non-GSO systems does not take into account the number of different orbital altitudes, number of satellites, number of earth stations, or other characteristics affecting examination workload.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should provide statistics of non-GSO filings submitted over the last four years, or any other period more than four years, with more than 75000 units indicating the time spent to finish the examination, human resources and software used. The list will also include example of filings where the BR has determined any impact on its workload based on the number of different orbital altitudes, number of satellites, number of earth stations, or any other characteristics affecting the workload.

Data provided in response to the Expert Group’s request:

Statistics of non-GSO filings submitted over the last four years with more than 75 000 units indicating the time spent to finish the examination, human resources and software used.

Since 1st January 2020, the Bureau received 10 non-GSO satellite systems exceeding 75 000 units (9 coordination requests and 1 notification), as shown in the table below.

| No | Date of receipt | ADM | Satellite network | Number of orbits | Number of satellites | Category | Units | Processing time (months) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 08.04.2021 | F | FMS-LEO | 899 | 19 708 | N4 | 207 360 | 7.3 |
| 2 | 19.08.2021 | CAN | TELSTAR-LEO-2 | 67 | 1 671 | C1 | 235 486 | 5.8 |
| 3 | 30.11.2021 | F | MCSAT-2-LEO-1QV | 36 | 1 296 | C1 | 83 700 | 7.5 |
| 4 | 07.10.2022 | F | F-SAT-NG-15\_A | 36 | 720 | C1 | 485 640 | 8.8 |
| 5 | 03.04.2023 | USA | USASAT-NGSO-3X | 288 | 29 988 | C1 | 95 542 | 6.6 |
| 6 | 03.08.2023 | CHN | SAILSPACE-2-M | 49 | 2 552 | C2 | 92 160 | processing |
| 7 | 03.08.2023 | CHN | SAILSPACE-2-C | 66 | 5 400 | C2 | 78 396 | processing |
| 8 | 03.08.2023 | CHN | SAILSPACE-2-B | 48 | 5 952 | C2 | 78 396 | processing |
| 9 | 03.08.2023 | CHN | SAILSPACE-2-A | 163 | 13 904 | C2 | 78 396 | 13.7 |
| 10 | 11.08.2023 | CAN | TELSTAR-LEO-4 | 36 | 548 | C1 | 76 512 | 6.4 |

During the last 4 years, not only 10 non-GSO satellite systems exceeded 75 000 units but the maximum number of units for a given satellite system received by Bureau reached 485 640 that is more than 6 times greater than the threshold value of 75 000 units included in the Annex of Decision 482.

The following software were used during the processing of these filings: ITU-BR SpaceCap, ITU BR-SIS Validation, ITU-BR GIBC, ITU-BR Regulatory Walker (internal tool).

*The list will also include example of filings where the BR has determined any impact on its workload based on the number of different orbital altitudes, number of satellites, number of earth stations, or any other characteristics affecting the workload.*

Factors affecting complexity of the treatment of non-GSO submission (receivability)

The main factors affecting complexity of the receivability (completeness and correctness) of non-GSO submissions are shown in the table below.

| Complexity | Description | Examples |
| --- | --- | --- |
| § 3.2 of the Rules of Procedure (RoP) concerning receivability (completeness and correctness) | | |
| 1) Preliminary validation – publication notice “As-Received” and preparation of documents, databases for further validation | | |
| Number of orbital planes (satellites), assigned frequencies, emissions, assigned earth/space stations | Based on the number of orbital planes (satellites), assigned frequencies, emissions, assigned earth/space stations, running time of software used for preliminary validation will increase (in some very “big” cases it may lead to requirement of software update) |  |
| 2) Validation of frequency assignments to identify if they are subject or not subject to coordination for API and CR notices | | |
| 1a) Number of different frequency assignments | Frequency assignments should be validated and, for those which are (not) subject to coordination should be removed from the filing depending on the case (API or CR) and communicated to Administration |  |
| 1b) Number of frequency assignments cover frequency bands subject and not subject to coordination | If frequency assignments cover frequency bands subject and not subject to coordination, then proposals of splitting such frequency assignments required, as well as confirmation from administration | In a coordination request, a frequency assignment in the frequency band 17.7-17.9 GHz is submitted for FSS in Region 2. Then the frequency band 17.7-17.8 GHz is not subject to coordination and the band 17.8-17.9 GHz is subject to coordination under No. **9.12**. Therefore, it should be proposed to the notifying administration to restructure in order to remove the band 17.7-17.8 GHz. |
| 3) Validation of correctness of orbital planes (satellites), beams, groups, earth or space stations | | |
| 2a) Number of different orbital planes (satellites), assigned frequencies, emissions, assigned earth/space stations | Validation of correctness should be carried out for all submitted Appendix **4** parameters, the number of which depends on the number of different orbital planes (satellites), assigned frequencies, emissions, assigned earth/space stations |  |
| 2b) Satellite system represents “constellation” | Additional Appendix **4** parameters should be submitted for such case and, therefore, additional correctness validation should be carried out | For example, for API additional orbital parameters, such as phase angle, LAN, required for such cases. |
| 2c) Subject to No. **9.21** | For example, additional information, such as indicator if orbital planes are sun-synchronous, required for such cases. Validation of consistency of this indicator and submitted orbital characteristics should be carried out. |
| 2d) Subject to No. **9.11A** | For example, additional orbital parameters, such as RAAN and LAN, required for such cases. Validation of consistency of these parameters should be carried out. |
| 2e) Subject to Article **22** epfd limits |  |
| 4) Validation of completeness | | |
| 2a) Number of different information, required in accordance with Appendix **4**, provided in attachments | Completeness of information provided in attachments should be validated, and missing information should be identified and requested from administration |  |
| 2b) Number of diagrams provided in GIMS format if links between SNS database and GIMS database are not established | Links between SNS database and GIMS database should be validated and established, and missing diagrams should be identified and requested from administration |  |
| 2c) The quality of submitted filing | For fillings with bad quality additional manual corrections are required |  |

Factors affecting complexity of the treatment of non-GSO submission (regulatory and technical examination)

Examples of recent CR/C filings is provided in the file *Workload\_factors.xls* embedded below.



These examples and statistics do not try to measure the overall workload but rather to provide an indication of the extra workload for processing large non-GSO filings in comparison with the average workload relating to an examination of a GSO case or a non-GSO case examined in the 2010-2015 timeframe.

The situation the Bureau experienced during the past four years is a sharp increase in submissions targeted to provide a service in a very large number of frequency ranges and classes of service. Nowadays, it is common to receive submission, for example, having frequency assignments in UHF and Ka-band.

The statistics presented, in general, shows that *the number of different orbital altitudes* or *number of satellites* doesn’t affect alone the workload. The constellation size of non-GSO system should be considered together with the following factors:

|  |  |
| --- | --- |
| Applicable forms of the coordination | Forms of coordination containing criteria in addition to frequency overlap such as PFD-threshold would affect both workload and running times |
| Applicability of Article **21** PFD-limits | In general, it increases calculation time as well as post-processing (establishing findings, notes, doing split) |
| Geometry of orbit | Non-circular orbits requiring longer simulation and examination under Article **21**, Appendix 5 |
| The number of applicable forms of coordination and the number of corresponding frequency ranges | This number tend to affect the time spent doing Article **5** examination, may involve the split of frequency assignments groups and splits to separate different forms of coordination. |

Based on the processing experience, a potential candidate for the computation of the number of units to be additionally considered could be the number of unique frequency ranges per applicable form of coordination on uplink and downlink.

Below is an example based on the MICRONSAT-2 satellite system (46 units):

Earth-to-space

| Coordination provision | Frequency range(s) (MHz) | Frequency assignments (central frequency/bandwidth/class) |
| --- | --- | --- |
| **9.12** | 454-456 459-460 1 626.5-1 660.5 1 980-2 025 2 655-2 690 47 200-50 200 50 400-51 400 | 454.5-455.5 (2 freqs) (1000) ED/EK 459.5 (1 freq) (1000) ED/EK 2 015 (1 freq) (10000) EI 2 017.5 (1 freq) (15000) ED/EK 2 662.5 (1 freq) (15000) ED/EK 2 680 (1 freq) (20000) ED/EK 1 995 (1 freq) (30000) ED/EK 1 995 (1 freq) (30000) EI 1 643.5 (1 freq) (34000) EI 50 900 (1 freq) (1000000) EC 48 700 (1 freq) (3000000) EC |
| **9.12A** | 1 626.5-1 660.5 1 980-2 025 2 655-2 690 | 2 015 (1 freq) (10000) EI 2 017.5 (1 freq) (15000) ED/EK 2 662.5 (1 freq) (15000) ED/EK 2 680 (1 freq) (20000) ED/EK 1 995 (1 freq) (30000) ED/EK 1 995 (1 freq) (30000) EI 1 643.5 (1 freq) (34000) EI |
| **9.21/A** | 449.75-450.25 807-862 880-890 2 655-2 670 | 450 (1 freq) (500) ET 885 (1 freq) (10000) E6/EG/EU 885 (1 freq) (10000) EI 2 662.5 (1 freq) (15000) ED/EK 834.5 (1 freq) (55000) E6/EG/EU 834.5 (1 freq) (55000) EI |
| **9.21/B** | 449.75-450.25 807-862 880-890 2 655-2 670 | 450 (1 freq) (500) ET 885 (1 freq) (10000) E6/EG/EU 885 (1 freq) (10000) EI 2 662.5 (1 freq) (15000) ED/EK 834.5 (1 freq) (55000) E6/EG/EU 834.5 (1 freq) (55000) EI |
| **9.21/C** | 449.75-450.25 807-862 880-890 2 655-2 670 | 450 (1 freq) (500) ET 885 (1 freq) (10000) E6/EG/EU 885 (1 freq) (10000) EI 2 662.5 (1 freq) (15000) ED/EK 834.5 (1 freq) (55000) E6/EG/EU 834.5 (1 freq) (55000) EI |

Space-to-Earth

| Coordination provision | Frequency range(s) (MHz) | Frequency assignments (central frequency/bandwidth/class) |
| --- | --- | --- |
| **9.12** | 1 525-1 559 2 160-2 200 2 483.5-2 535 37 500-42 500 | 2 165 (1 freq) (10000) EI 2 165 (1 freq) (10000) EK/ER 2 527.5 (1 freq) (15000) EK/ER 2 491.75 (1 freq) (16500) EK/ER 2 510 (1 freq) (20000) EK/ER 2 185 (1 freq) (30000) EI 2 185 (1 freq) (30000) EK/ER 1 542 (1 freq) (34000) EI 42 250 (1 freq) (500000) EC 39 750-40 250 (2 freqs) (500000) EI 41 000 (1 freq) (2000000) EC 38 750 (1 freq) (2500000) EC |
| **9.12A** | 1 525-1 559 2 160-2 200 2 483.5-2 535 | 2 165 (1 freq) (10000) EI 2 165 (1 freq) (10000) EK/ER 2 527.5 (1 freq) (15000) EK/ER 2 491.75 (1 freq) (16500) EK/ER 2 510 (1 freq) (20000) EK/ER 2 185 (1 freq) (30000) EI 2 185 (1 freq) (30000) EK/ER 1 542 (1 freq) (34000) EI |
| **9.14** | 1 525-1 530 2 160-2 200 2 483.5-2 500 | 2 165 (1 freq) (10000) EI 2 165 (1 freq) (10000) EK/ER 2 491.75 (1 freq) (16500) EK/ER 2 185 (1 freq) (30000) EI 2 185 (1 freq) (30000) EK/ER 1 542 (1 freq) (34000) EI |
| **9.21/A** | 470-475 806-821 852-890 942-960 2 500-2 535 | 472.5 (1 freq) (5000) ET 813.5 (1 freq) (15000) E6/EG/EU 813.5 (1 freq) (15000) EI 2 527.5 (1 freq) (15000) EK/ER 951 (1 freq) (18000) E6/EG/EU 2 510 (1 freq) (20000) EK/ER 871 (1 freq) (38000) E6/EG/EU 871 (1 freq) (38000) EI |
| **9.21/B** | 470-475 806-821 852-890 942-960 2 500-2 535 | 472.5 (1 freq) (5000) ET 813.5 (1 freq) (15000) E6/EG/EU 813.5 (1 freq) (15000) EI 2 527.5 (1 freq) (15000) EK/ER 951 (1 freq) (18000) E6/EG/EU 2 510 (1 freq) (20000) EK/ER 871 (1 freq) (38000) E6/EG/EU 871 (1 freq) (38000) EI |
| **9.21/C** | 470-475 806-821 852-890 942-960 | 472.5 (1 freq) (5000) ET 813.5 (1 freq) (15000) E6/EG/EU 813.5 (1 freq) (15000) EI 951 (1 freq) (18000) E6/EG/EU 871 (1 freq) (38000) E6/EG/EU 871 (1 freq) (38000) EI |

Such criteria would represent the potential amount of workload relating to the Article **5** examination as well as the required splits of groups. Some weighting factors could be added for specific forms of coordination requiring a more extensive workload such as examination under No. **9.14** with a pfd coordination threshold.

Factors affecting the complexity of the treatment of non-GSO submission (publication)

The main factors affecting the complexity of the publication of non-GSO submissions are shown in the table below.

|  |  |
| --- | --- |
| Complexity | Description |
| Number of orbital planes (satellites), assigned frequencies, emissions, assigned earth/space stations | Based on the number of orbital planes (satellites), assigned frequencies, emissions, and assigned earth/space stations, the complexity of publication preparation is growing (in some very “big” cases it may lead to the requirement of a software update) |
| Number of notes/information provided in attachments | All this information should be translated into 6 languages and prepared for publication |
| Subject to Article **22** epfd limits | Additional information such as input e.i.r.p. or pfd masks as well as other required information for epfd examination should be prepared for publication |

**g) Consider the introduction of units in categories A1 and N4, with a different fee being charged for more complex or larger systems, depending on the number of units.**

Summary of the item: Filings for satellite systems not subject to coordination have also evolved considerably since 2005, when only a few, well-prepared filings containing a small number of frequency assignments were submitted every year. Non-GSO filings not subject to coordination have not only grown in number but now may contain a large set of frequency assignments covering almost all possible frequency bands allocated to space services. Moreover, the quality of the filings received is lower than before, when they were mainly prepared by experienced satellite operators. For these cases, studies should be conducted to consider the introduction of units in categories A1 and N4, with a different fee being charged depending on the number of units.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should provide statistics of non-GSO networks not subject to coordination received in the last four years, or any other period more than four years, indicating the number of satellites and configurations, and estimates of their processing workloads. Possible methods for the definition of units for these categories also need to be provided.

Data provided in response to the Expert Group’s request:

Statistics of non-GSO networks not subject to coordination received in the last four years indicating the number of satellites and configurations

The following figures show statistics related to API received since 1st January 2016.

A white graph with numbers and a red line

Description automatically generated with medium confidence

Out of 1532 API, 1458 had less than 50 orbital planes, 60 between 50 and 500 orbital planes, 8 between 500 and 1 000, 3 between 1 000 and 2 000 and 3 more than 2 000 (with an absolute maximum of 2 697 orbital planes).

A graph with numbers and lines

Description automatically generated

Out of 1532 API, 1332 had less than 50 satellites, 42 between 50 and 100 satellites, 31 between 100 and 200 satellites, 34 between 200 and 500 satellites, 10 between 500 and 1 000 satellites, 45 between 1 000 and 5 000, 11 between 5 000 and 10 000 satellites, 12 between 10 000 and 50 000 satellites, 13 between 50 000 and 100 000 satellites and 2 more than 100 000 satellites (with an absolute maximum of 116 640 satellites).

A few other metrics could be useful to consider in order to “measure” the size of an API:

Number of groups of frequency ranges in the API

A table with numbers and a number of groups

Description automatically generated

Number of beams per API

A table with numbers and percentages

Description automatically generated

Number of classes of stations per API

A table with numbers and a number of stations

Description automatically generated

Note – The number corresponds to the sum, over all the groups,   
of the number of different classes of stations per group.

Number of associated earth stations per API   
(maximum is 3 600)

A screenshot of a table

Description automatically generated

Note – The number corresponds to the sum, over all the groups,   
of the number of different types of earth stations per group.

Number of associated space stations per API   
(Out of 1 532 API, 262, i.e. 17.1%, have associated space stations)  
(maximum is 960)

A screenshot of a table

Description automatically generated

Note – The number corresponds to the sum, over all the groups,   
of the number of different types of associated space stations per group.

Estimates of their processing workloads

The table below presents the workflow of notification submissions comparing the procedures for notifications that are subject to coordination (cost recovery categories N1-N3) versus those that are not, except agreement-seeking under No. **9.21** (cost recovery categories N4).

|  |  |  |
| --- | --- | --- |
|  | Subject to coordination  (N1 to N3) | Not subject to coordination or non-GSO subject to No. 9.21 only  (N4) |
| **For ALL** |  |  |
| Conformity with table of frequency allocation | Yes | Yes |
| Examination against hard limits | Yes | Yes |
| Verification and implementation objections, assistance, exclusions of service area | Yes | Yes |
| **For non-GSO only** |  |  |
| Comparison of orbital characteristics between CR/C and Notification | Yes | Only for non-GSO  subject to No. **9.21** |
| Preparation of epfd masks and SRS, examination against epfd hard limits and preparation of epfd results | Only for non-GSO subject to epfd limits | Only for non-GSO subject to epfd limits (i.e. in C band) |
| **For ALL** |  |  |
| Establishment of the link between CR/C and Notification | Yes | Only for non-GSO  subject to No. **9.21** |
| Verification of coordination requirements | Yes | Only for non-GSO  subject to No. **9.21** |
| Establishment of findings (**11.31**) | Yes | Yes |
| Establishment of findings (**11.32**, **11.32A**, **11.41**) | Yes | No |

The following statistics are based on the first notification date from 01.01.2016.

The average examination time for non-GSO satellite networks or systems subject to coordination is 14% more than for GSO satellite networks. However, when epfd calculations are required, the examination time increases by almost 40%. On average, a non-GSO satellite system not subject to coordination requires less examination time, i.e. 29% of the time required to examine a non-GSO satellite system subject to coordination.

But when No. **9.21** is involved, the examination time increases to 43%. There is also a 7% increase for non-GSO satellite systems not subject to coordination and involving non-Earth reference bodies.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Total examination time  (days) | Number of satellite  networks or systems | Average time  (days) |
| GSO | 24210 | 242 | 100.0 |
| Non-GSO subject to coordination | 3314 | 29 | 114.3 |
| + epfd | 634 | 4 | 158.5 |
| Non-GSO not subject to coordination | 11719 | 353 | 33.2 |
| Not around Earth | 887 | 25 | 35.5 |
| 9.21 | 476 | 10 | 47.6 |

In general, examination of frequency assignments not subject to coordination take longer in the following circumstances:

– When No. **9.21** is involved, the work is almost similar to non-GSO satellite systems subject to coordination.

– Non-GSO satellite systems whose reference body is not Earth and are subject to PFD hard limits require substantial work to establish findings under No. **21.16** based on the geometry and distance from Earth.

– When apogee/perigee are not homogenous, different PFD hard limits depend on the height.

– When there is a need to contact the notifying administration for clarification e.g. 4.4, space operation functions.

Possible methods for the definition of units for these categories

For submissions falling in the N4 category, it is possible to compute units as for categories C1 to C3 or N1 to N3, i.e. as the product of the number of frequency assignments, number of classes of station, and the number of emissions, summed up for all frequency assignment groups.

For submissions falling in the A1 category (i.e. API), the difficulty comes from the fact that APIs do not contain frequency assignments but only frequency ranges. This could be alleviated by defining units for this category as the product of the number of frequency ranges, the number of classes of stations, and the number of emissions summed up for all frequency groups. Such a formula for computing units related to the A1 category would lead to the following distribution, which appears representative of the various distributions presented above:

A table with numbers and percentages

Description automatically generated

h) An additional fee for recovering the costs of epfd examination of coordination requests and notifications

Summary of the item: Non-GSO systems subject to epfd limits continue to require significant additional resources not only to compute epfd curves but also to prepare data and analyse results. Furthermore, the increasing number and complexity of non-GSO systems subject to epfd limits result in the need for almost continuous updating of the ITU-R epfd validation methodology contained in Recommendation ITU-R S.1503, which entails changes in processing and examination. All these aspects require the development and frequent updating of specific software.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should provide statistics of non-GSO networks subject to epfd examination, received in the last four years, or any other period more than four years, indicating the different software used to finalize the examination, and the complexity of the epfd examination, including the examination under Nos. **9.7A** and **9.7B**. A different method of calculating units in the case of networks subject to epfd examination should be considered, taking into account the various parameters affecting the epfd examination.

Data provided in response to the Expert Group’s request:

*Statistics of non-GSO networks subject to epfd examination, received in the last four years indicating the different software used to finalize the examination*

The Bureau provides statistics of non-GSO networks subject to epfd examination, received in the last four years, in the table below.

| Notice ID | Satellite name | Adm/Org | Type | Date of receipt | 22.5C/5D/5F | 22.5L | Date of review publication | IFIC No. for review publication | Number of sets of EPFD parameters[[2]](#footnote-2) (configuration) | Number of examination scenarios |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 119520317 | VIDA | MEX | C | 23.11.2019 |  | Yes |  |  | 2 |  |
| 119520321 | VERITY | F | C | 23.11.2019 |  | Yes |  |  | 2 |  |
| 119520349 | DREBBELSAT-3 | HOL | C | 23.11.2019 |  | Yes |  |  | 2 |  |
| 119520350 | TELSTAR-LEO-V-1 | CAN | C | 23.11.2019 |  | Yes |  |  | 2 |  |
| 119520351 | O3B-E | G | C | 23.11.2019 |  | Yes |  |  | 2 |  |
| 119520352 | VROOM | G | C | 23.11.2019 |  | Yes |  |  | 2 |  |
| 119520325 | HISPASAT-LEO-QV-2 | E | C | 23.11.2019 |  | Yes |  |  | 2 |  |
| 119520355 | USASAT-NGSO-9 | USA | C | 02.12.2019 |  | Yes |  |  | 2 |  |
| 119520389 | GW-S | CHN | C | 19.12.2019 | Yes |  | 25.01.2022 | 2963 | 3 | 1 |
| 120520001 | FFZ | CHN | C | 03.01.2020 |  | Yes |  |  | 2 |  |
| 120520016 | D-ISIPELE-C | D | C | 21.01.2020 | Yes |  | 22.03.2022 | 2967 | 3 | 1 |
| 120520068 | ARISTARCHUS | G | C | 17.04.2020 | Yes |  | 22.03.2022 | 2967 | 7 |  |
| 120520072 | D-MEG1-1 | D | C | 02.05.2020 | Yes |  | 09.08.2022 | 2977 | 5 |  |
| 120520087 | O3B-F | G | C | 26.05.2020 | Yes |  | 19.04.2022 | 2969 | 4 | 1 |
| 120520101 | DREBBELSAT-4 | HOL | C | 11.06.2020 | Yes |  | 31.05.2022 | 2972 | 7 | 1 |
| 120520102 | HOTH | CAN | C | 15.06.2020 | Yes |  | 31.05.2022 | 2972 | 9 |  |
| 120520111 | ENGSO MEO | D | C | 25.06.2020 | Yes |  | 19.09.2023 | 3005 | 7 |  |
| 120520115 | ENGSO LEO | D | C | 07.07.2020 | Yes |  | 26.07.2022 | 2976 | 10 |  |
| 120500155 | 3ECOM-1 | LIE | N | 09.07.2020 | Yes |  | 12.07.2022 | 2975 | 4 |  |
| 120520119 | MCNT-02 | CHN | C | 14.07.2020 | Yes |  | 10.01.2023 | 2987 | 9 | 2 |
| 120520125 | F-SAT-NG-13 | F | C | 17.07.2020 | Yes |  | 17.05.2022 | 2971 | 9 (1), 10 (2) | 3 |
| 120520143 | DMT-SY | CHN | C | 05.08.2020 | Yes |  | 02.05.2023 | 2995 | 5 | 1 |
| 120520170 | GW-A59 | CHN | C | 11.09.2020 | Yes |  | 02.05.2023 | 2995 | 15 |  |
| 120520172 | GW-2 | CHN | C | 11.09.2020 | Yes |  | 16.05.2023 | 2996 | 16 (1,2,4), 14 (3) | 4 |
| 120520177 | GALAXY-3A | CHN | C | 21.09.2020 | Yes |  | 09.07.2024 | 3025 | 6 |  |
| 120520179 | ODYSSEY NGSO | D | C | 30.09.2020 | Yes |  | 16.05.2023 | 2996 | 7 | 2 |
| 120520184 | KBSAT-NGSO-1 | D | C | 06.10.2020 | Yes |  | 31.10.2023 | 3008 | 6 | 3 |
| 120520207 | METHERA-D | G | C | 05.11.2020 |  | Yes |  |  | 2 |  |
| 120520210 | GALAXY-3B | CHN | C | 06.11.2020 | Yes |  | 19.09.2023 | 3005 | 7 |  |
| 120520228 | L7A | G | C | 26.11.2020 | Yes |  | 22.08.2023 | 3003 | 8 |  |
| 120520227 | L6 | G | C | 26.11.2020 | Yes |  | 22.08.2023 | 3003 | 8 | 3 |
| 120520233 | HISPASAT-LEO-BB-1 | E | C | 03.12.2020 | Yes |  | 31.10.2023 | 3008 | 7 | 3 |
| 120520248 | MCNT-03 | CHN | C | 21.12.2020 | Yes |  | 19.09.2023 | 3005 | 9 |  |
| 121500085 | MCSAT-2 HEO | F | N | 27.01.2021 | Yes |  | 19.09.2023 | 3005 | 4 |  |
| 121520048 | CANPLEIADES | CAN | C | 11.03.2021 | Yes |  | 31.10.2023 | 3008 | 8 | 2 |
| 121520051 | HISPASAT-LEO-BB-2 | E | C | 18.03.2021 | Yes | Yes | 24.01.2024 | 3013 | 9 | 3 |
| 121520056 | USAAK | USA | C | 24.03.2021 | Yes |  | 24.01.2024 | 3013 | 5 | 2 |
| 121520071 | KBSAT-NGSO-P | D | C | 04.05.2021 | Yes | Yes | 16.04.2024 | 3019 | 6 | 15 |
| 121520081 | OMNIA-1 | LUX | C | 21.05.2021 | Yes |  | 06.02.2024 | 3014 | 7 |  |
| 121520082 | OMNIA-2 | LUX | C | 21.05.2021 | Yes |  | 06.02.2024 | 3014 | 7 |  |
| 121520083 | OMNIA-3 | LUX | C | 21.05.2021 | Yes |  | 06.02.2024 | 3014 | 7 |  |
| 121520084 | OMNIA-4 | LUX | C | 21.05.2021 | Yes |  | 06.02.2024 | 3014 | 4 |  |
| 121500129 | STEAM-2 | NOR | N | 09.06.2021 | Yes |  | 16.04.2024 | 3019 | 3 |  |
| 121500130 | STEAM-1 | NOR | N | 10.06.2021 | Yes |  | 01.10.2024 | 3031 | 4 | 4 |
| 121520090 | RAFANET-1 | ISR | C | 10.06.2021 | Yes |  | 12.12.2023 | 3011 | 1 |  |
| 121520132 | O3B-E2 | G | C | 15.07.2021 |  | Yes |  |  | 1 |  |
| 121520147 | TELSTAR-LEO-2 | CAN | C | 19.08.2021 | Yes |  | 20.02.2024 | 3015 | 5 |  |
| 121520161 | KOREASAT-NGSO-K | KOR | C | 14.09.2021 | Yes | Yes | 20.02.2024 | 3015 | 12 | 1 |
| 121500189 | 3ECOM-3 | LIE | N | 16.09.2021 | Yes |  | 19.09.2023 | 3005 | 4 |  |
| 121520170 | ODYSSEY NGSO-1 | D | C | 12.10.2021 | Yes | Yes | 20.02.2024 | 3015 | 5 | 1 |
| 121520171 | ODYSSEY NGSO-2 | D | C | 12.10.2021 | Yes | Yes | 20.02.2024 | 3015 | 5 |  |
| 121520172 | ODYSSEY NGSO-3 | D | C | 12.10.2021 | Yes | Yes | 20.02.2024 | 3015 | 5 | 1 |
| 121520177 | USASAT-NGSO-10 | USA | C | 20.10.2021 | Yes |  | 20.02.2024 | 3015 | 4 |  |
| 121520179 | TELSTAR-LEO-V-2 | CAN | C | 28.10.2021 |  | Yes |  |  | 2 |  |
| 121520181 | ENGSO LEO-2 | D | C | 30.10.2021 |  | Yes |  |  | 2 |  |
| 121520182 | TARD-1S | G | C | 02.11.2021 | Yes | Yes |  |  | 11 (1-4) |  |
| 121520184 | SN-CONSTELLATION1 | G | C | 04.11.2021 | Yes | Yes | 20.02.2024 | 3015 | 8 |  |
| 121520185 | USASAT-NGSO-5A | USA | C | 10.11.2021 |  | Yes |  |  | 2 |  |
| 121520196 | MARS-K1 | D | C | 20.11.2021 | Yes |  | 02.04.2024 | 3018 | 12 |  |
| 121520197 | MARS-K2 | D | C | 20.11.2021 | Yes |  | 20.08.2024 | 3028 | 12 |  |
| 121520199 | MCSAT-2-LEO-1QV | F | C | 30.11.2021 |  | Yes |  |  | 2 |  |
| 121520229 | ATHENE-1 | D | C | 15.12.2021 | Yes |  | 24.01.2024 | 3013 | 5 |  |
| 121520236 | CSN-V1-1 | CHN | C | 20.12.2021 | Yes | Yes | 28.05.2024 | 3022 | 13 |  |
| 121520237 | CSN-V1-2 | CHN | C | 20.12.2021 | Yes | Yes | 28.05.2024 | 3022 | 13 |  |
| 121520238 | CSN-V1-3 | CHN | C | 20.12.2021 | Yes | Yes | 28.05.2024 | 3022 | 13 |  |
| 121520239 | CSN-V2-1 | CHN | C | 20.12.2021 | Yes | Yes | 28.05.2024 | 3022 | 13 | 3 |
| 121520240 | CSN-V2-2 | CHN | C | 20.12.2021 | Yes | Yes | 28.05.2024 | 3022 | 13 |  |
| 121520241 | CSN-V3-1 | CHN | C | 20.12.2021 | Yes | Yes | 28.05.2024 | 3022 | 13 | 3 |
| 121520242 | CSN-V3-2 | CHN | C | 20.12.2021 | Yes | Yes | 28.05.2024 | 3022 | 13 |  |
| 121520245 | STELLAR-DASH | F | C | 21.12.2021 | Yes | Yes |  |  | 6 |  |
| 122520020 | USASAT-NGSO-9A | USA | C | 02.02.2022 | Yes | Yes | 23.07.2024 | 3026 | 8 |  |
| 122520021 | CSIOT\_NBIOT22 | D | C | 03.02.2022 | Yes |  | 23.07.2024 | 3026 | 3 |  |
| 122520028 | SKY-F2 | RUS | C | 15.03.2022 | Yes |  | 23.07.2024 | 3026 | 3 |  |
| 122520059 | MARS-K3 | D | C | 22.05.2022 | Yes |  |  |  | 8 (1,2) |  |
| 122520060 | MARS-K4 | D | C | 22.05.2022 | Yes |  |  |  | 8 (1,2) |  |
| 122500093 | 102 | CAN | N | 26.05.2022 | Yes |  |  |  | 4 |  |
| 122520062 | KPS-NGSO | KOR | C | 30.05.2022 | Yes |  |  |  | 2 |  |
| 122520070 | RASSVET | RUS | C | 02.06.2022 | Yes |  | 09.07.2024 | 3025 | 3 |  |
| 122520085 | STEAM-1B | NOR | C | 18.07.2022 | Yes |  | 17.09.2024 | 3030 | 6 |  |
| 122500115 | SKY-F | RUS | N | 21.07.2022 | Yes |  | 15.11.2022 | 2984 | 3 |  |
| 122520094 | MM-ASC | ISR | C | 01.08.2022 | Yes | Yes | 23.07.2024 | 3026 | 9 |  |
| 122520096 | BEETLESAT\_LEO | ISR | C | 11.08.2022 | Yes | Yes | 23.07.2024 | 3026 | 12 |  |
| 122520097 | APSTAR-H1 | CHN | C | 16.08.2022 | Yes | Yes | 20.08.2024 | 3028 | 9 |  |
| 122520146 | F-SAT-NG-15\_A | F | C | 07.10.2022 | Yes | Yes |  |  | 9 |  |
| 122520147 | D-LEG1-2 | D | C | 08.10.2022 | Yes | Yes | 06.08.2024 | 3027 | 7 |  |
| 122520161 | CSN-L1 | CHN | C | 03.11.2022 | Yes | Yes |  |  | 12 |  |
| 122520162 | CSN-L2 | CHN | C | 03.11.2022 | Yes | Yes | 06.08.2024 | 3027 | 12 |  |
| 122520163 | CSN-L3 | CHN | C | 03.11.2022 | Yes | Yes |  |  | 11 |  |
| 122520165 | HISKY LEO | G | C | 07.11.2022 | Yes |  |  |  | 8 |  |
| 122520223 | STELLAR-ASTE | F | C | 20.12.2022 | Yes | Yes |  |  | 7 |  |
| 122520224 | STELLAR-RION | F | C | 20.12.2022 | Yes | Yes |  |  | 9 |  |
| 123520005 | RASSVET-2 | RUS | C | 10.01.2023 | Yes |  |  |  | 9 |  |
| 123520004 | RASSVET-1 | RUS | C | 10.01.2023 | Yes |  |  |  | 9 |  |
| 123500016 | SKY-F | RUS | N | 31.01.2023 | Yes |  |  |  | 3 |  |
| 123520011 | SPECSTAR-HT | CHN | C | 01.02.2023 | Yes | Yes |  |  | 13 |  |
| 123520012 | SPECSTAR-1 | CHN | C | 01.02.2023 | Yes | Yes |  |  | 5 |  |
| 123520057 | HERMES-IOT | ISR | C | 20.02.2023 | Yes | Yes |  |  | 9 |  |
| 123520058 | ATOZSAT | USA | C | 22.02.2023 | Yes |  |  |  | 6 |  |
| 123520009 | MICRONSAT-2 | PNG | C | 03.04.2023 |  | Yes |  |  | 2 |  |
| 123520029 | USASAT-NGSO-3X | USA | C | 03.04.2023 | Yes |  |  |  | 9 |  |
| 123520044 | SAILSPACE-1 | CHN | C | 07.04.2023 | Yes | Yes |  |  | 5 |  |
| 123520045 | CSN-V4 | CHN | C | 07.04.2023 | Yes | Yes |  |  | 12 |  |
| 123520046 | CSN-V5 | CHN | C | 07.04.2023 | Yes | Yes |  |  | 12 |  |
| 123520047 | CSN-V6 | CHN | C | 07.04.2023 | Yes | Yes |  |  | 12 |  |
| 123520048 | CSN-V7 | CHN | C | 07.04.2023 | Yes | Yes |  |  | 12 |  |
| 123520060 | GC-MEO | CHN | C | 27.04.2023 |  | Yes |  |  | 1 |  |
| 123500094 | THEO | G | N | 19.06.2023 | Yes |  |  |  | 8 |  |
| 123520095 | BALKAN\_C | BUL | C | 23.06.2023 | Yes |  |  |  | 8 |  |
| 123500110 | MULTUS | CAN | N | 27.06.2023 | Yes |  |  |  | 3 |  |
| 123520073 | L6B | G | C | 03.08.2023 | Yes |  |  |  | 7 |  |
| 123520112 | BLACKSPIDER | CHN | C | 03.08.2023 | Yes | Yes |  |  | 5 |  |
| 123520116 | SAILSPACE-2-A | CHN | C | 03.08.2023 | Yes |  |  |  |  |  |
| 123520122 | TELSTAR-LEO-4 | CAN | C | 11.08.2023 | Yes |  |  |  |  |  |
| 123520134 | SPACETOWER-2 | ARS | C | 07.09.2023 | Yes |  |  |  |  |  |
| 123520114 | SAILSPACE-2-C | CHN | C | 03.08.2023 | Yes |  |  |  |  |  |
| 123520172 | O3BNEXT2 | LUX | C | 14.11.2023 | Yes |  |  |  |  |  |
| 123520182 | O3BNEXT1 | LUX | C | 01.12.2023 | Yes |  |  |  |  |  |
| 123520189 | SESNEXT2 | F | C | 08.12.2023 | Yes |  |  |  |  |  |
| 123520190 | SESNEXT1 | F | C | 08.12.2023 | Yes |  |  |  |  |  |
| 123500222 | SLEIPNER-1 | NOR | N | 14.12.2023 | Yes |  |  |  |  |  |
| 123500245 | STEAM-2B | NOR | N | 21.12.2023 | Yes |  |  |  |  |  |
| 123500239 | USASAT-NGSO-3A-R | USA | N | 28.12.2023 | Yes |  |  |  |  |  |
| 123500240 | USASAT-NGSO-3B-R | USA | N | 28.12.2023 | Yes |  |  |  |  |  |

The following software have been used to finalize the epfd examination for all satellite networks subject to No. **22.5C**/**D**/**F** listed in the table above:

a. EPFDvalidation Agenium

b. Transfinite S1503\_2Analysis

c. ITU-BR EPFD Static

d. ITU-BR GIBC

e. ITU-BR EPFD Prepare

f. ITU-BR EPFDMassValidate (internal tool)

The Bureau also provides epfd support web-site and maintains a webpage containing input data and results of the examination.

Complexity of the epfd examination, including the examination under Nos. **9.7A** and **9.7B**

Non-GSO systems subject to epfd limits require significant additional resources not only to compute epfd curves but also to prepare data and analyse results. In order to explain complexity of such examination, the Bureau considers two main elements describing complexity:

– “set of validated EPFD parameters” which can be defined as a combination of one mask or multiple masks with the same type (item A.14.a or A.14.b or A.14.c of Appendix **4**) and the technical parameters required for networks subject to epfd examination (items A.4.b.7 or A.14.d of Appendix **4**) in specific frequency range. Only one set of validated EPFD parameters can be submitted in each frequency range and multiple masks with the same type can be submitted only if they associated with different orbital planes or satellites.

– “examination scenario” defines an individual scenario sharing the same operational parameters (exclusion zone width, Nco, earth station density etc.) applicable to specific frequency ranges. Most common example:

*Scenario Ku*: 10-7-12.75 GHz (space-to-Earth) and 12.75 -14.5 GHz (Earth-to-space)

*Scenario Ka*: 17-8-18.6 GHz/19.7-20.2 GHz (space-to-Earth) and 27.5-28.6 GHz/  
29.5-30 GHz (Earth-to-space).

For each set of validated EPFD parameters and examination scenarios submitted by an administration in different frequency ranges, the Bureau carries out the following examinations:

1 Receivability check and validation of the correctness of e.i.r.p. or pfd masks and technical parameters submitted by administration

2 Communication with administration in case of not complete or not correct submission

3 Publication of input epfd information in BR IFIC and ITU website

4 Modification to coordination request (or in some cases notification) to satellite network/system, if necessary

5 For each examination scenario:

a) Preparation of examination databases;

b) Examination under Article **22** and No. **9.7B**, where applicable;

c) Validation of result of examination.

6 Publication in BR IFIC and on the ITU website.

*A different method of calculating units in the case of networks subject to epfd examination should be considered, taking into account the various parameters affecting the epfd examination.*

Number of sets of validated EPFD parameters

Based on the statistics presented above, it appears that, for more than 50% of the satellite networks subject to epfd limits, up to 7 sets of validated EPFD parameters were submitted. Therefore, this number of sets could be considered as a threshold value for additional fees, i.e. for satellite systems with more than 7 sets of EPFD parameters, the overall cost recovery fee could be increased per each additional set of EPFD parameters.

Number of examination scenarios

Each non-GSO system generally contain frequency assignments in 1 to 3 different frequency ranges subject to Article **22** limits:

Ku-band 10.7-12.75 GHz/12.5-14.5 GHz

Ka-band 17.8-18.6 GHz/19.7-20.2 GHz/27.5-28.6 GHz/29.5-30 GHz.

Q/V-band 37.5-39.5 GHz/39.5-42.5 GHz/47.2-50.2 GHz/50.4-51.4 GHz.

Recognizing the fact that the conditions of operation in each frequency range above are very different, normally operations in each of these ranges are characterized by their own set of operational parameters which constitute an examination scenario.

The Bureau nevertheless observes cases where operations in both Ku and Ka-band is described by a single set of operational parameters. Thus, it appears possible to provide a single set of operational parameters for several frequency ranges.

Parameters presented for Q/V-band maybe submitted using extended set and submissions are currently not examined in this frequency band with respect to No. **22.5L**.

Based on these considerations, the number of examination scenarios to be used in the cost recovery scheme could be determined as a number of sets of operational data[[3]](#footnote-3) indicated in submission.

Examples are given below:

|  |  |
| --- | --- |
| Scenario 1: Ku-band | Scenario 2: Ka-band |
| A.4.b.7.d.2 Exclusion zone size, degrees = 10 | A.4.b.7.d.2 Exclusion zone size, degrees = 15 |
| A.4.b.7.b Earth station density (1/km2) = 0.001 | A.4.b.7.b Earth station density (1/km2) = 0.0000001 |
| A.4.b.7.c Average distance (km) = 200 | A.4.b.7.c Average distance (km) = 800 |
| A.4.b.7.a number of satellites receiving simultaneously = 1 | A.4.b.7.a number of satellites receiving simultaneously = 10 |
| A.4.b.6.a Number of satellites transmitting to any latitude within corresponding range = 1 | A.4.b.6.a Number of satellites transmitting to any latitude within corresponding range = 10 |

Having one single examination scenario would be considered as a baseline already included in flat fee. Additional examination scenarios would be subject to additional fees.

It should be noted that the Bureau do not expect to recover the cost of calculating each examination scenario as it is done currently. The Bureau intends to improve examination software to be able to run all examination scenarios in a single run.

The main purpose of this category is to recover the cost for preparing, validating and publishing each examination scenario.

i) Consequences of modifications introduced by any WRC after WRC-2000, if any, to regulatory provisions governing the Space Plans.

Summary of the item: Since 2005, WRCs have also introduced a number of modifications to the Space Plans (for example, the possibility of a second examination for processing of Part B submissions or additional activities related to the maintenance of the planned frequency assignments.

Request from the first meeting of the Expert Group: For the next meeting, the Bureau should provide the statistics of the lists of additional uses received in the last four years, or any other period more than four years, indicating the additional workload generated.

Data provided in response to the Expert Group’s request:

*Statistics of the lists of additional uses received in the last four years indicating the additional workload generated*

WRC-19 introduced additional examination under note 7*bis* of § 4.1.12 and note 6*bis* of § 4.2.16 of Appendices **30** and **30A** as well as under note 7*bis* of § 6.21 of Appendix **30B**. Such additional examination cases (12 per year based on an average over the period 2020-2023) increased the BR workload associated with the processing of Part B submissions.

New provisions approved by WRC-23 also have the potential to further increase the complexity of Part-B examination (e.g. the exclusion of territory from a feeder-link/uplink service area of a satellite network in Appendix **30A** or **30B**).

The following table provides the annual average number of submissions of additional uses in the Space Plans and quantifies the workload generated by the submissions and the additional examination decided by WRC-19.

Note however that the period 2020-2023 corresponds to the implementation of Resolution **559** (90 Part A submissions and 82 Part B submissions in Appendices **30** and **30A**) as well as 7 requests of application of Article 7 of Appendix **30B**. All these submissions were not subject to cost recovery.

In order to quantify the workload generated by the additional examination, the following has been considered:

Notification (the simplest form of submission in the Space Plans) has been taken as a reference of 1 unit of workload. The workload to process Part A submissions corresponds to 1.5 unit, to process Part B submissions to 3 units and the additional examination to 1.5 unit.

In order to recover the costs associated with the additional examination, two options are possible: either to charge a specific additional fee corresponding to half the fee for Part B (in this option, only filings requiring the additional examination will pay the fee) or to increase the fee associated with Part B by 50%, based on the data for the period 2020-2023 (in this option, the costs of the additional examination is spread over all Part B submissions).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | Satellite notices of Appendices 30, 30A and 30B | | | | Additional Examination |
| Part A | Part B | Notification | Total | 7*bis* of § 4.1.12 and 6*bis* of § 4.2.16 of AP30/30A  7*bis* of § 6.21 of AP30B |
| Period 2009-2018 | Average number of submissions per year | 114 | 29 | 28 | 170 | - |
| Percentage | 67% | 17% | 16% | 100% | - |
| Workload (symbolic unit, see above) | 171 | 87 | 28 | 286 |  |
| Period 2019-2023 | Average number of submissions per year | 59 | 31 | 29 | 118 | 12 requests per year (averaged over 2020-2023) |
| Percentage | 49% | 26% | 25% | 100% |  |
| Workload (symbolic unit, see above) | 88.5 | 93 | 29 | 211 | 18 |

j) The cost of dedicated resources needed to continually update and modernize the Bureau software applications used for satellite filings. However, satellite cost recovery should not be used to fund the development of software tools for processing terrestrial filings.

Summary of the item: The 2023 session of RAG concluded that the Radiocommunication Bureau lacked sufficient dedicated resources needed to continually update and modernize the Bureau software applications used for satellite and terrestrial filings. Modernized software would also directly benefit administrations since it is provided free of charge to all ITU members.

Request from the first meeting of the Expert Group: The Bureau is invited to provide the costs of updating or modernizing software applications used for satellite filings.

Data provided in response to the Expert Group’s request:

Costs of updating or modernizing software applications used for satellite filings

Software developed in the Radiocommunication Bureau for the purpose of supporting the processing of satellite network filings have very long lifetimes and are incremental in nature. It is not uncommon for the same software (desktop or web) application to be maintained and enhanced over a period of 25 or even 30 years, until it is replaced by a completely new implementation (modernization), but still serving the same purpose. Features are almost never removed, because World Radiocommunications Conference (WRC) decisions are predominantly additions to the RR.

The 2023 costs of in-house developed space are provided below: significant work (i.e. beyond fix of minor bugs or assistance) have been carried out on 21 software/tools either by ITU staff (P grade) for a total amount of 2 645 human-days or by SSA contracts for a total amount of 553 271.75 CHF. Software development licence costs amounted to 3 323 CHF.

*Financial impact of WRC-23 decisions in terms of space software updates*

As indicated in Council Document [C24/63](https://www.itu.int/md/S24-CL-C-0063/en), the WRC-23 decisions require space software updates to be implemented. The following table provides an estimate of the costs related to each agenda item.

| WRC-23/Final Acts Reference and Description | CHF |
| --- | --- |
| Res **406 (WRC-23)**: AMS(R) service in band 117.975-137 MHz | 43 821.00 |
| Res **678 (WRC-23)**: Space research service in the frequency band 14.8-15.35 GHz | 78 877.80 |
| Res **121 (WRC-23)**: AP**30B** ESIM | 438 210.00 |
| Res **123 (WRC-23)**: NGSO ESIM | 350 568.00 |
| Res **679 (WRC-23)**: Inter-satellite links: Protection of space and terrestrial services | 350 568.00 |
| Res **8 (WRC-23)**: Tolerances for certain orbital characteristics of non-GSO | 262 926.00 |
| AI 7C (WRC-23): Protection of GSO MSS in 7/8 GHz and 20/30 GHz bands | 43 821.00 |
| AI 7D2 (WRC-23): RR AP**4** parameters for Rec ITU-R S.1503 updates | 35 056.80 |
| AI 7D3 (WRC-23): BIU and BBIU reminders | 43 821.00 |
| AI 7K (WRC-23): Changes to Attachment to Res **553** | 26 292.60 |
| AI 9.1 (WRC-23): RR Article **21** changes | 26 292.60 |
| AI 9.1-d) (WRC-23): Protection of EESS (passive) in band 36-37 GHz | 87 642.00 |
| AI 9.3 (WRC-23): Changes to AP**30B** Art 6 and Art 8, plenary minutes | 17 528.40 |
| AI 7E (WRC-23): Changes to AP**30B** Art 7 and Art 10 | 175 284.00 |
| AI 7F (WRC-23): Changes to AP**30A** Art 4 and AP**30B** Art 6 | 175 284.00 |
| AI 7G (WRC-23): Change to Res **770** epfd Validation software | 175 284.00 |
| Res **126 (WRC-23)**: Temporary measures in AP**30B** | 87 642.00 |
| Res **676** + AI 9.2 (WRC-23): Changes to 9.52.1 (unacceptable interference), RR**21**, and improvements of BR processing | 87 642.00 |
| Res **677 (WRC-23)**: EESS (active) for spaceborne radar sounders | 148 991.40 |
| AI 1.19 (WRC-23): FSS (space-to-Earth) in band 17.3-17.7 GHz in Region 2 | 148 991.40 |
| Res **35 (Rev.WRC-23)**: NGSO BIU post-milestone procedure | 175 284.00 |
| **Total:** | **2 979 828.00** |

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1. The “other provisions” are identified in the Rules of Procedure of No. 11.31. [↑](#footnote-ref-1)
2. The terms “set of epfd parameters” and “examination scenario” are defined below. [↑](#footnote-ref-2)
3. A.4.b.7.d.1 Exclusion zone type, A.4.b.7.d.2 Exclusion zone size, degrees, A.4.b.7.b Earth station density (1/km2), A.4.b.7.c Average distance (km), A.4.b.7.a number of satellites receiving simultaneously, A.4.b.6.a Number of satellites transmitting to any latitude within corresponding range. [↑](#footnote-ref-3)