



## **Space Services Department**

### **APPLICATION OF No. 9.41**

#### **1 Introduction**

Article **9** of the Radio Regulations “Procedure for effecting coordination with or obtaining agreement of other administrations” contains provision Nos. **9.41** and **9.42** concerning requests for inclusion or exclusion by administrations relating to coordination requests under Nos. **9.7**, **9.7A** and **9.7B**, and its treatment by the Radiocommunication Bureau.

This paper describes the requirements and procedure for submitting requests under Nos. **9.41** and **9.42** together with the technical criteria for including networks/stations into the coordination process under Nos. **9.7** to **9.7B**.

#### **2 Regulatory background**

Satellite networks using the geostationary-satellite orbit, in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a plan, are subject to coordination under RR No. **9.7**. This coordination requirement and the established associated procedure account for the vast amount of coordination conducted between administrations in accordance with the Radio Regulations.

Also, among other specific coordination provisions, Nos. **9.7A** and **9.7B** establish coordination requirements between very large receiving earth stations<sup>1</sup> and non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands.

All these mentioned coordination procedures allow establishing an initial mandatory list of affected administrations with which coordination is required.

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<sup>1</sup> For the purpose of this document, receiving earth station is considered very large earth station when it meets all of the following conditions:

- a) earth station antenna maximum isotropic gain greater than or equal to 64 dBi for the frequency bands 10.7-12.75 GHz or 68 dBi for the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz;
- b)  $G/T$  of 44 dB/K or higher;
- c) emission bandwidth of 250 MHz or higher for the frequency bands below 12.75 GHz or 800 MHz or higher for the frequency bands above 17.8 GHz.

Provisions of No. **9.41** can be applied after the coordination has been triggered under Nos. **9.7-9.7B**. As it is stipulated in the RR, administrations may, within four months from the date of publication of the relevant BR IFIC, submit comments under No. **9.41**.

Table 1 below provides the list of reference situations where comments under No. **9.41** may be submitted. Further explanation is provided in subsequent sections.

TABLE 1  
Request for inclusion or exclusion under No. 9.41

Reference of Article 9	Incoming network	Commenting network/station	Case	Conditions of Receivability
9.41/9.7	GSO	GSO	<p>A station in a satellite network using the geostationary-satellite orbit (GSO), in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a Plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a Plan, with the exception of the coordination between earth stations operating in the opposite direction of transmission</p> <p><b>Applicable only to the cases listed in items 1) to 8)* of the frequency band column of Table 5-1 of Appendix 5</b></p> <p>*except 6bis) applicable from 1.1.2013</p>	$\Delta T/T > 6\%$ calculations are to be provided for only one pair of assignments for each satellite network to be further considered in the coordination process (a pair consisting of one assignment of the published network and one assignment of the network of the requesting administration)
9.41/9.7	GSO	GSO	<p>In the exceptional case of a potential mistake in CR/C publication, same as above, but applicable to the cases listed in item 9 of the frequency band column of Table 5-1 of Appendix 5, in situation when administration believes that it, or any of its satellite networks not identified under No. <b>9.36.2</b>, should have been included in the request for coordination.</p>	

Reference of Article 9	Incoming network	Commenting network/station	Case	Conditions of Receivability
<b>9.41/9.7A</b>	GSO earth station	Non-GSO system	A specific earth station in a GSO satellite network in the FSS in certain frequency bands, in respect of a non-GSO satellite system in the FSS	Appropriate calculation (epfd, frequency overlap)
<b>9.41/9.7B</b>	Non-GSO system	GSO earth station	A non-GSO satellite system in the FSS in certain frequency bands, in respect of a specific earth station in a GSO satellite network in the FSS	Appropriate calculation (epfd, frequency overlap)

## 2.1 Application of No. 9.41 under No. 9.7

In most frequency bands, coordination requirements under No. **9.7** are established through the application of coordination arc approach. This approach allows identifying the list of potentially affected/networks without going into the detailed technical examination/calculation of interference between a proposed network and existing ones. It is a simple approach, and it was initially proposed to reduce the coordination burden on administrations in frequency bands where the major volume of the notices is received by the Bureau. In other frequency bands not subject to coordination arc approach, another coordination trigger is used and it is based on an equivalent increase of noise temperature of receiving system  $\Delta T/T$  calculated in accordance with RR Appendix 8.

All necessary criteria for identification of assignments to be taken into account in effecting coordination or seeking agreement are contained in RR Appendix 5. This includes all the cases for which coordination arc applies (e.g. coordination between GSO FSS in the bands 3.4-4.2 GHz etc.) and the cases for which  $\Delta T/T > 6\%$  is applicable (such as coordination with GSO MSS (mobile-satellite service)).

The list of administrations and their affected networks, identified in accordance with Nos. **9.36** and **9.36.2** respectively, are published in BR IFIC.

In case of the coordination arc approach, it is quite possible that administrations may consider that their existing networks located outside the coordination arc are also affected by a proposed network based on consideration of potential interference. According to No. **9.41** and Appendix 5, only the networks for which  $\Delta T/T$  exceeds **6%** may be included into the coordination process. But as we mentioned earlier,  $\Delta T/T$  approach is also used in some cases to establish the list of affected administrations under No. **9.7**. In latter case, in the exceptional case of a potential mistake in CR/C publication, if an administration finds that any of its satellite networks, not identified under No. **9.36.2** by the Bureau using  $\Delta T/T$  criteria, should have been included in the CR/C, it may still request its inclusion under No. **9.41**.

## 2.2 Application of No. 9.41 in relation with Nos. 9.7A and 9.7B

Provisions of Nos. 9.7A and 9.7B were established by WRC-2000 in order to ensure adequate protection of very large earth stations antenna from transmitting non-GSO FSS stations.

No. 9.7A is establishing coordination of new proposed GSO FSS earth stations with respect to existing non-GSO FSS systems, whereas No. 9.7B is establishing coordination of new proposed non-GSO FSS systems with respect to existing GSO FSS earth stations.

Criteria for triggering coordination are given in Appendix 5 and are based on verifying the following conditions:

- Condition 1) there is a frequency overlap between an existing (9.7A) or proposed (9.7B) non-GSO FSS system and a proposed (9.7A) or existing (9.7B) receiving earth station which is considered as “very large earth station”, i.e. having certain values of emission bandwidth, receiving system figure of merit ( $G/T$ ) and maximum antenna gain.
- Condition 2) the level of downlink equivalent power flux density (EPFD) of an existing (9.7A) or proposed (9.7B) non-GSO FSS system exceeds the limits in Appendix 5 at proposed (9.7A) or existing (9.7B) receiving earth station satisfying condition 1.

Since the beginning of 2017 when EPFD validation software has become available to administrations, the Bureau determines coordination requirements between GSO FSS earth stations and non-GSO FSS systems under Nos. 9.7A and 9.7B based on Conditions 1 and 2.

The same applies for identifying affected administrations/networks in application of No. 9.41 – Conditions 1 and 2 should be used currently as criteria to include additional administrations or network/stations into coordination under Nos. 9.7A and 9.7B.

## 3 Submitting comments under No. 9.41

According to No. 9.41, there could be two situations:

- 1) an administration believing that it, or any of its satellite networks not identified under No. 9.36.2, should have been included in the request under Nos. 9.7-9.7B;
- 2) initiating administration believing that an administration, or any of the satellite networks identified under No. 9.36.2, in accordance with the provisions of Nos. 9.7-9.7B should not have been included in the request.

In both situations these administrations, within four months of the date of publication of the relevant BR IFIC, should inform the initiating administration or the identified administration, as appropriate, and the Bureau, giving its technical reasons for doing so, and shall request:

- 1) either its name, or the name of any of its satellite networks not identified under No. 9.36.2, be included, or
- 2) the name of the identified administration, or any of its satellite networks identified under No. 9.36.2, be excluded.

**SpaceCom** software allows to submit comments electronically to the Bureau and to facilitate their further treatment.

Any comments submitted under No. 9.41 should be supported by appropriate technical reasons. In case of No. 9.7, this requires the submission of  $\Delta T/T$  calculations.

### 3.1 Providing technical justifications under No. 9.41

The validity of a request for inclusion or exclusion under No. 9.41 is subject to providing calculation ( $\Delta T/T > 6\%$  criteria for provision No. 9.7) for one pair of assignments for each satellite network requested for provision No. 9.7 and other appropriate technical justification for provisions Nos. 9.7A and 9.7B.

Administration may use their own instruments or tools to conduct  $\Delta T/T$  calculations and submit the results of these calculations as a technical justification of request under No. 9.41.

The GIBC software, made available by BR, implements the methodology of Appendix 8 of the Radio Regulations and could also be used for the same purpose.

## 4 Examination of request received by the Bureau under No. 9.41 and the publication of CR/E Special Section

Comments prepared using SpaceCom software together with the results of calculations need to be submitted to the Bureau using the ITU web interface “e-Submission of satellite network filings” (<https://www.itu.int/en/ITU-R/space/e-submission/Pages/default.aspx>). The Rules of Procedure under Nos. 9.41-9.42 contain detailed background on the method of application of the provisions Nos. 9.41/9.42 by the Bureau.

Before describing the validation criteria for the comments received from administrations, it is important to mention the results of the World Radiocommunication Conference 2012 which are affecting the procedures for considering the requests received under No. 9.41.

Before WRC-12, the provisions of No. 9.36.2 stipulated that the list of the networks identified by the Bureau under No. 9.7 is for information purposes only, to help administrations comply with this procedure. Administrations may agree between themselves which networks need to be taken into account during coordination. Therefore, if the administration is already identified as affected under No. 9.7 there is no need to add additional networks, unless the intention is to inform initiating administration. So one of the main condition for including administration under No. 9.41 was to verify whether this administration is not identified already under No. 9.7.

The WRC-12 took a decision to modify the provision of Nos. 9.36.2, 9.41 and 9.42 such as to remove “only informational” nature of a list of networks/stations identified under Nos. 9.7, 9.7A and 9.7B. **Therefore, in accordance with the new provisions**, the Bureau shall also identify the specific satellite networks or earth stations with which coordination needs to be effected in addition to the administration names themselves. This would effectively mean that even if the administration is already identified as affected under Nos. 9.7-9.7B it may still request inclusion of additional networks/earth station into coordination process in accordance with No. 9.41.

Examination criteria given in Table 2 below are based on existing regulatory regime which is applicable for coordination request CR/C received after 1.1.2013.

TABLE 2

**Request validation criteria for CR/Cs**

<b>Request received within 4 months</b>	<b>Coordination arc applies</b>	<b><math>\Delta T/T</math> sample provided</b>	<b><math>\Delta T/T &gt; 6\%</math></b>	<b>Decision</b>
<b>✗</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>Not to include</b>
<b>✓</b>	<b>✗<sup>2</sup></b>	<b>✓</b>	<b>✓</b>	<b>Not to include</b>
<b>✓</b>	<b>✓</b>	<b>✗</b>	<b>✓</b>	<b>Not to include</b>
<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>To include</b>

After the examination, the Bureau publishes a Special Section CR/E which includes the status of requests for inclusion in the coordination procedure, submitted under No. **9.41**.

The CR/E Special Section is used for indicating administrations that have sent comments in respect of coordination requests published in BR IFIC.

The CR/E Special Section also contains information on the list of satellite networks which served as basis for inclusion under No. **9.41**, summary of coordination requirements for applicable provisions and a list of coordination requirements at group level related to No. **9.41** requests.

## 5 Conclusion

This paper describes the overall process of commenting under No. **9.41**. This material may prove helpful to administrations in understanding the process of submission of the requests under No. **9.41**.

The use of BR software and some of the practical aspects of comments submission are covered in the workshop session dedicated to No. **9.41** requests.

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<sup>2</sup> In the case when coordination arc does not apply and  $\Delta T/T$  criteria is used to identify potentially affected networks, in exceptional cases, when administration believes that list of networks identified under No. **9.36.2** does not includes any of it potentially affected networks and for which  $\Delta T/T > 6\%$  it may still request application of No. **9.41**.