

## RESOLUTION 902 (REV.WRC-23)

**Provisions relating to earth stations located on board vessels which operate  
in fixed-satellite service networks in the uplink frequency bands  
5 925-6 425 MHz and 14-14.5 GHz**

The World Radiocommunication Conference (Dubai, 2023),

*considering*

- a)* that there is a demand for global wideband satellite communication services on vessels;
- b)* that the technology exists that enables earth stations on board vessels (ESVs) to use fixed-satellite service (FSS) networks operating in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz;
- c)* that ESVs are currently operating through FSS networks in the frequency bands 3 700-4 200 MHz, 5 925-6 425 MHz, 10.7-12.75 GHz and 14-14.5 GHz under No. 4.4;
- d)* that ESVs have the potential to cause unacceptable interference to other services in the frequency bands 5 925-6 425 MHz and 14-14.5 GHz;
- e)* that, with respect to the frequency bands considered in this Resolution, global coverage is only available in the frequency band 5 925-6 425 MHz and that only a limited number of geostationary FSS systems can provide such global coverage;
- f)* that, without special regulatory provisions, ESVs could place a heavy coordination burden on some administrations, especially those in developing countries;
- g)* that, in order to ensure the protection and future growth of other services, ESVs need to operate under certain technical and operational limitations;
- h)* that, within ITU-R studies, based on agreed technical assumptions, minimum distances from the low-water mark as officially recognized by the coastal State have been calculated, beyond which an ESV will not have the potential to cause unacceptable interference to other services in the frequency bands 5 925-6 425 MHz and 14-14.5 GHz;
- i)* that, in order to limit the interference into other networks in the FSS, it is necessary to establish maximum off-axis e.i.r.p. density limits on ESV emissions;
- j)* that establishing a minimum antenna diameter for ESVs has an impact on the number of ESVs that will ultimately be deployed, hence it will reduce interference into the fixed service,

*noting*

- a) that ESVs may be assigned frequencies to operate in FSS networks in the frequency bands 3 700-4 200 MHz, 5 925-6 425 MHz, 10.7-12.75 GHz and 14-14.5 GHz pursuant to No. 4.4 and shall not claim protection from, or cause interference to, other services having allocations in these bands;
- b) that the regulatory procedures of Article 9 apply for ESVs operating at specified fixed points,

*resolves*

that ESVs transmitting in the frequency bands 5 925-6 425 MHz and 14-14.5 GHz shall operate under the regulatory and operational provisions contained in Annex 1 and the technical limitations in Annex 2 of this Resolution,

*encourages concerned administrations*

to cooperate with administrations which license ESVs while seeking agreement under the above-mentioned provisions, taking into consideration the provisions of Recommendation 37 (Rev.WRC-23),

*instructs the Secretary-General*

to bring this Resolution to the attention of the Secretary-General of the International Maritime Organization.

## ANNEX 1 TO RESOLUTION 902 (REV.WRC-23)

### **Regulatory and operational provisions for ESVs transmitting in the frequency bands 5 925-6 425 MHz and 14-14.5 GHz**

1 The administration that issues the licence for the use of earth stations on board vessels (ESVs) in these frequency bands (licensing administration) shall ensure that such stations follow the provisions of this Annex and thus do not present any potential to cause unacceptable interference to the services of other concerned administrations.

2 ESV service providers shall comply with the technical limitations listed in Annex 2 and, when operating within the minimum distances as identified in § 4 below, with the additional limitations agreed by the licensing and other concerned administrations.

3 In the frequency band 3 700-4 200 MHz and frequency range 10.7-12.75 GHz range, ESVs in motion shall not claim protection from transmissions of terrestrial services operating in accordance with the Radio Regulations.

4 The minimum distances from the low-water mark as officially recognized by the coastal State beyond which ESVs can operate without the prior agreement of any administration are 300 km in the frequency band 5 925-6 425 MHz and 125 km in the frequency band 14-14.5 GHz, taking into account the technical limitations in Annex 2. Any transmissions from ESVs within the minimum distances shall be subject to the prior agreement of the concerned administration(s).

5 The potentially concerned administrations referred to in § 4 above are those where fixed or mobile services are allocated on a primary basis in the Table of Frequency Allocations of the Radio Regulations:

Frequency bands	Potentially concerned administrations
5 925-6 425 MHz	All three Regions
14-14.25 GHz	Countries listed in No. <b>5.505</b> , except those listed in No. <b>5.506B</b>
14.25-14.3 GHz	Countries listed in Nos. <b>5.505</b> , <b>5.508</b> and <b>5.509</b> , except those listed in No. <b>5.506B</b>
14.3-14.4 GHz	Regions 1 and 3, except countries listed in No. <b>5.506B</b>
14.4-14.5 GHz	All three Regions, except countries listed in No. <b>5.506B</b>

6 The ESV system shall include means of identification and mechanisms to immediately cease emissions, whenever the station does not operate in compliance with the provisions of §§ 2 and 4 above.

7 Cessation of emissions as referred to in § 6 above shall be implemented in such a way that the corresponding mechanisms cannot be bypassed on board the vessel, except under the provisions of No. **4.9**.

8 ESVs shall be equipped so as to:

- enable the licensing administration under the provisions of Article **18** to verify earth station performance; and
- enable the cessation of ESV emissions immediately upon request by an administration whose services may be affected.

9 Each licence-holder shall provide a point of contact to the administration with which agreements have been reached for the purpose of reporting unacceptable interference caused by the ESV.

10 When ESVs operating beyond the territorial sea but within the minimum distance (as referred to in § 4 above) fail to comply with the terms required by the concerned administration pursuant to §§ 2 and 4, then that administration may:

- request the ESV to comply with such terms or cease operation immediately; or
- request the licensing administration to require such compliance or immediate cessation of the operation.

ANNEX 2 TO RESOLUTION 902 (REV.WRC-23)

Technical limitations applicable to ESVs transmitting  
in the frequency bands 5 925-6 425 MHz and 14-14.5 GHz

	5 925-6 425 MHz	14-14.5 GHz
Minimum diameter of ESV antenna	2.4 m	1.2 m <sup>1</sup>
Tracking accuracy of ESV antenna	±0.2° (peak)	±0.2° (peak)
Maximum ESV e.i.r.p. spectral density towards the horizon	17 dB(W/MHz)	12.5 dB(W/MHz)
Maximum ESV e.i.r.p. towards the horizon	20.8 dBW	16.3 dBW
Maximum off-axis e.i.r.p. density <sup>2</sup>	See below	See below

<sup>1</sup> While operations within the minimum distances are subject to specific agreement with concerned administrations, licensing administrations may authorize the deployment of smaller antenna sizes down to 0.6 m at 14 GHz provided that the interference to the terrestrial services is no greater than that which would be caused with an antenna size of 1.2 m, taking into account the most recent version of Recommendation ITU-R SF.1650. In any case, the use of smaller antenna size shall be in compliance with the tracking accuracy of ESV antenna, maximum ESV e.i.r.p. spectral density towards the horizon, maximum ESV e.i.r.p. towards the horizon and maximum off-axis e.i.r.p. density limits in the Table above and the protection requirements of the FSS intersystem coordination agreements.

<sup>2</sup> In any case, the e.i.r.p. off-axis limits shall be compliant with the FSS intersystem coordination agreements that may agree to more stringent off-axis e.i.r.p. levels.

Off-axis limits

For earth stations on board vessels (ESVs) operating in the 5 925-6 425 MHz band, at any angle  $\varphi$  specified below, off the main-lobe axis of an earth-station antenna, the maximum equivalent isotropically radiated power (e.i.r.p.) in any direction within 3° of the geostationary-satellite orbit (GSO) shall not exceed the following values:

5 925-6 425 MHz

<i>Angle off-axis</i>	<i>Maximum e.i.r.p. per 4 kHz band</i>
2.5° ≤ $\varphi$ ≤ 7°	(32 – 25 log $\varphi$ ) dB(W/4 kHz)
7° < $\varphi$ ≤ 9.2°	11 dB(W/4 kHz)
9.2° < $\varphi$ ≤ 48°	(35 – 25 log $\varphi$ ) dB(W/4 kHz)
48° < $\varphi$ ≤ 180°	–7 dB(W/4 kHz)

For ESV operating in the 14-14.5 GHz band, at any angle  $\phi$  specified below, off the main-lobe axis of an earth station antenna, the maximum e.i.r.p. in any direction within  $3^\circ$  of the GSO shall not exceed the following values:

14.0-14.5 GHz

<i>Angle off-axis</i>		<i>Maximum e.i.r.p. per 40 kHz band</i>	
$2^\circ$	$\leq \phi \leq 7^\circ$	$(33 - 25 \log \phi)$	dB(W/40 kHz)
$7^\circ$	$< \phi \leq 9.2^\circ$	12	dB(W/40 kHz)
$9.2^\circ$	$< \phi \leq 48^\circ$	$(36 - 25 \log \phi)$	dB(W/40 kHz)
$48^\circ$	$< \phi \leq 180^\circ$	-6	dB(W/40 kHz)