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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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| PLENARY MEETING | **Addendum 8 to Document 61-E** |
|  | **14 October 2015** |
|  | **Original: English** |
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| Iran (Islamic Republic of) | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.8 | |

1.8 to review the provisions relating to earth stations located on board vessels (ESVs), based on studies conducted in accordance with Resolution **909 (WRC‑12)**;

Introduction

At WRC-03 diverging views were expressed on the appropriateness of allowing an earth station on board a vessel, which is a maritime mobile earth station, to operate in the fixed-satellite service, with different classes of stations. However, under the prevailing circumstances, the Conference decided to authorize earth stations on board vessels to communicate with the fixed-satellite service, adopted Resolution 902 (WRC-03), and introduced footnotes RR Nos. 5.457A, 5.457B, 5.506A and5.506B.

The issues for ESVs were studied until WRC-03, which established in Resolution 902 (WRC-03) current criteria such as distances from the coastline and antenna diameters following extensive studies. In particular criteria such as distance from the coastline and antenna diameters in both 6 GHz and 14 GHz were derived from certain assumptions and other practical information such as statistics of the number of passing ships in international waters. In particular, Resolution 902(WRC-03) limits the use of ESVs to 125 km “from the low-water mark as officially recognized by the coastal State” for Ku band and 300 km for C band “without the prior agreement of any administration”.

While ESV licensing is available in a handful of countries, most simply adhere to the existing Resolution 902 (WRC-03) coordination requirements. Moreover, the circulation of ESVs within other countries require appropriate administrative and procedural arrangements to ensure that the sovereignty of the country in which ESVs are intended to operate is preserved. This issue should be discussed and agreed between the ESV operator and the licensing authority of each administration in the country where the ESVs will operate, at the time the ESV operator seeks the necessary authorization to operate.

The WRC-03 decisions were reached with a great degree of reluctance from several countries believing that such earth stations were maritime mobile earth stations (RR No. 5.457B) and should not have been dealt with under the FSS. However, some countries believed that ESVs could operate in the FSS if properly regulated. Since that time, the use of these earth stations on ships has increased but no studies updating the ESV deployment scenario considered in 2003 are available.

During the 2007-2012 ITU-R study cycle, an input document called attention to the assumptions used in Recommendations ITU-R S.1587-1 and ITU-R SF.1650-1 to develop Resolution 902 (WRC-03) considering that they are no longer representatives of all current ESV technologies. For example, some of the typical ESVs in the frequency band 5 925-6 425 MHz may operate today with e.i.r.p. density levels that are more than 20 dB lower than those used in Recommendation ITU‑R SF.1650-1. As a consequence, ESV operations at lower power could coordinate more easily with the terrestrial administration if they operate inside the 300 km and 125 km in C and Ku bands, respectively, or even be allowed to operate at smaller distance without the need to coordinate.

To this effect, WRC-12 established agenda item 1.8 to review the provisions relating to Earth Stations located on board Vessels (ESVs), based on studies conducted in accordance with Resolution 909 (WRC‑12).

The frequency bands referred to in Resolution 909 (WRC-12) are, in some countries, extensively used for medium- and long-distance backhaul for cellular networks, and their use is likely to further grow. These terrestrial services also provide the backbone of infrastructure in developing countries including terrestrial stations that are near coastlines and point towards the sea for broadband communications to remote communities or offshore oil platforms.

Pursuant to CPM15-1, studies were being carried out in relation to WRC-15 agenda item 1.8, namely to review the provisions applying to ESVs operating in the FSS in the uplink bands 5 925-6 425 MHz and 14-14.5 GHz, in accordance with Resolution 909 (WRC-12).

The relevant DNR was developed by the last WP 4A Meeting, in June 2015. This document presents the description of a number of studies conducted during the 2012-2015 study cycle in connection with WRC-15 agenda item 1.8. While there is no agreement on the studies themselves, Sections 2 through 4 of this DNR include a detailed description of the methodology employed in each study and a summary of the results for each of them. Section 6 of this DNR contains the issues that were not addressed in this Report and Section 7 of this DNR includes several concerns of administrations which believe that further studies are required on this issue. The above-mentioned DNR was submitted to and approved by Study Group 4 of ITU-R together with statements from some membership that there was no consensus on the assumptions and methodology used in some studies concluding that the existing coordination / protection distances could be reduced .The summary record of the ITU-R SG 4 stipulate the following:

***Quote***

***“Document*** [***4/110***](http://www.itu.int/md/R12-SG04-C-0110/en)*:**Draft new Report ITU-R S.[ESV] – “Interference effect of transmissions from earth stations on board vessels operating in fixed-satellite service networks on terrestrial co-frequency stations”*

*Mr. Wengryniuk (Chairman of the WP 4A) introduced this draft new Report noting that WP 4A agreed to included multiple studies on WRC-15 agenda item 1.8,* ***even though there is no agreement on the studies themselves and their different conclusions.*** *The Chairman asked for the document to be considered as a whole. There were no comments and the DN Report was approved by the meetings” under that condition."*

***Unquote***

It is important to indicate that in the newly approved Report referred to above there are two sections:

Section 6 “ Issues that were not addressed in this Report”

There are several paragraphs on this Section, e.g.:

***Quote***

*“The results of the studies contained in this report propose possible reduced protection distances applicable to low e.i.r.p. density ESVs referenced to the low-water mark of a country and hence do not take into account fixed service stations on offshore platforms. It is noted that such stations can be hundreds of km out at sea from the low-water mark of the responsible country”*

***Unquote***

Section 7 “Concerns of some administrations”

About 5 pages of concerns are included in that Section; issues which have not been clarified, so far.

The draft CPM Report contains five methods to satisfy this agenda item:

The Methods are, in brief, as the follows:

**• Method A**: No change to the Radio Regulations.

**• Method B**: Increasing off-shore protection distances in the C and Ku bands.

**• Method C**: Establishment of different protection distances for different maximum e.i.r.p. density levels (with reduction antenna diameters to 1.2 m and increase of number of ESV passes in C band)

**• Method D:** Establishment of different protection distances for different maximum e.i.r.p. density levels with considering the increasing the number of ESV passes in the C and Ku bands

**• Method E:** Review of the regulatory regime governing operation of ESVs

It is worth to mention that the following text appears in the cover page of the DNR:

***Quote***

*"Objective*

*This document presents the description of a number of studies conducted during the 2012-2015 study cycle in connection with WRC-15 agenda item 1.8. While there is no agreement on the studies themselves, Sections 2 through 4 of this Report include a detailed description of the methodology employed in each study and a summary of the results for each of them.*

*Section 6 of this Report contains the Issues that were not addressed in this Report and Section 7 of this Report includes several concerns of administrations which believe that further studies are required on this issue.*

*The preference of these administrations was that these further study areas be completed, with the results included in this Report, before its approval. It is expected that additional studies will be done through the normal ITU process in the future to address these concerns and study areas leading to a revision of this Report."*

***Unquote***

It is also worth to mention that during the recent Study Group 5,the Chairman of WP 5C, in submitting the results of the activities of the last meeting of that working party expressed serious concerns of WP5C membership in regard with the Report ITU-R ESV referred to above due to the fact that the protection of the fixed service was not properly addressed in that Report:

***Quote***

*"The second document was a reply liaison statement to WP 4A from WP 5C (Doc.5/262 dated 16 July 2015), which was brought to the attention of Study Groups 5 and 4 as well because there was a request to resolve an issue of recently approved Report ITU-R S.[ESV] at Study Group 4 addressing sharing studies related to WRC-15 agenda item 1.8. More specifically, this liaison statement pointed out that WP 4A did not fully take into account the views from WP 5C in the development of the final Report (Emphasis is added by underling the text). WP 5C is of the view that such a result does not conform to the agreement between the chairs of Study Groups 4 and 5 for consideration of approval for documents of joint concern to both groups, and should not become a precedent in the future work of the two Study Groups.*

*Islamic Republic of Iran supported the views expressed by Mr. Glass (Chairman of the WP 5C) and explained his concerns in details with regard to Report ITU-R S.[ESV].*

*The Chairman proposed to send a note to the Chairman of Study Group 4 after this meeting in consultation with Mr. Glass(Chairman of the WP 5C), which summarizes the issues raised in Documents 5/261 and 262 and points raised by Islamic Republic of Iran, The meeting agreed to this course of action."*

***Unquote***

Proposal

In view of the above, the I. R. of Iran proposes toincrease the off-shore protection distance in C band (Method B) in order to ensure the protection of fixed and mobile stations, in that band.

Nevertheless, I.R. of Iran may consider Method A (NOC),based on the progress of the discussion of the Method at the Conference.

MOD IRN/61A8/1

RESOLUTION 902 (rev.WRC-15)

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

The World Radiocommunication Conference (Geneva, 2015),

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 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 bands 5 925-6 425 MHz and 14-14.5 GHz;

*e)* that, with respect to the bands considered in this Resolution, global coverage is only available in the 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 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 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, nor 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 5 925-6 425 MHz and 14-14.5 GHz bands 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 (WRC‑03)**,

instructs the Secretary-General

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

ANNEX 1 TO RESOLUTION 902 (rev.WRC-15)

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

1 The administration that issues the licence for the use of ESVs in these 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 item 4 below, with the additional limitations agreed by the licensing and other concerned administrations.

3 In the 3 700‑4 200 MHz band and 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 345 km in the 5 925-6 425 MHz band and 125 km in the 14-14.5 GHz band, 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 the previous item 4 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. **5.505**, except those listed in No. **5.506B** |
| 14.25-14.3 GHz | Countries listed in Nos. **5.505** and **5.508**, except those listed in No. **5.506B** |
| 14.3-14.4 GHz | Regions 1 and 3, except countries listed in No. **5.506B** |
| 14.4-14.5 GHz | All three Regions, except countries listed in No. **5.506B** |

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 items 2 and 4 above.

7 Cessation of emissions as referred to in item 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 item 4 above) fail to comply with the terms required by the concerned administration pursuant to items 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‑15)

Technical limitations applicable to ESVs transmitting in the 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 m1 |
| Tracking accuracy of ESV antenna | ±0.2° (peak) | ±0.2° (peak) |
| Maximum ESV e.i.r.p. spectral density toward 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. density2 | See below | See below |
| 1 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 toward 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.  2 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 operating in the 5 925-6 425 MHz band, at any angle φ specified below, off the main-lobe axis of an earth-station antenna, the maximum e.i.r.p. in any direction within 3° of the GSO shall not exceed the following values:

**5 925-6 425 MHz**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Angle off-axis* | | | | | *Maximum e.i.r.p. per 4 kHz band* | | |
| 2.5° | ≤ | φ | ≤ | 7° | | (32 − 25 log φ) dB(W/4 kHz) |
| 7° | < | φ | ≤ | 9.2° | | 11 dB(W/4 kHz) |
| 9.2° | < | φ | ≤ | 48° | | (35 − 25 log φ) dB(W/4 kHz) |
| 48° | < | φ | ≤ | 180° | | −7  dB(W/4 kHz) |

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

**14.0-14.5 GHz**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Angle off-axis* | | | | | *Maximum e.i.r.p. per 40 kHz band* |
| 2° | ≤ | φ | ≤ | 7° | (33 − 25 log  φ) dB(W/40 kHz) |
| 7° | < | φ | ≤ | 9.2° | 12 dB(W/40 kHz) |
| 9.2° | < | φ | ≤ | 48° | (36 − 25 log φ) dB(W/40 kHz) |
| 48° | < | φ | ≤ | 180° | −6  dB(W/40 kHz) |

**Reasons:** A proposed text of a revised Resolution 902 (WRC-03) incorporating the proposals under Method B.

SUP IRN/61A8/2

RESOLUTION 909 (WRC‑12)

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

**Reasons:** This Resolution is no longer required.

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