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| A close up of a sign  Description automatically generated | **World Radiocommunication Conference (WRC-23)Dubai, 20 November - 15 December 2023** |  |
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| PLENARY MEETING | **Addendum 16 toDocument 85-E** |
|  | **22 October 2023** |
|  | **Original: Russian** |
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| Regional Commonwealth in the field of Communications Common Proposals |
| proposals for the work of the conference |
|  |
| Agenda item 1.16 |

1.16 to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the 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 non-geostationary fixed-satellite service earth stations in motion, while ensuring due protection of existing services in those frequency bands, in accordance with Resolution **173 (WRC‑19)**;

Introduction

The RCC Administrations propose modifications to the Radio Regulations to facilitate the 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 earth stations in motion (ESIMs) communicating with non-geostationary (non-GSO) satellite systems in the fixed-satellite service (FSS), while ensuring due protection of, and without imposing additional constraints on, services to which those and adjacent frequency bands are allocated.

The RCC Administrations propose that the conference consider and agree on the following regulatory measures and technical limitations for the use of ESIMs in non-GSO FSS systems:

ESIMs communicating with a non-GSO FSS system in the frequency bands 17.7-18.6 GHz or 18.8-19.3 GHz (space-to-Earth) shall not claim protection from terrestrial services having allocations in those frequency bands and operating in accordance with the Radio Regulations.

ESIMs may be used in non-GSO FSS systems only when the following conditions are met:

– any frequency assignment for the operation of ESIMs shall be notified to the BR by the administration notifying the non-GSO FSS system with which the ESIM will be communicating;

– the technical and operational measures and the possible regulatory changes stemming from the results of ITU-R studies shall not relax the provisions of Article **22** of the Radio Regulations relating to the protection of geostationary-satellite (GSO) networks from non-GSO FSS systems;

– ESIMs in non-GSO FSS systems shall operate within the characteristics and conditions specified for frequency assignments of typical earth stations in the non-GSO FSS systems published in BR IFIC Part II-S and in coordination agreements between administrations;

– frequency assignments to ESIMs in non-GSO FSS systems shall not cause more interference or claim more protection than that specified for frequency assignments of typical earth stations in the non-GSO FSS systems published in BR IFIC Part II-S and in coordination agreements between administrations;

– ESIMs in non-GSO FSS systems shall not be used by safety-of-life applications, except in cases of application of RR No. **4.9**;

– to protect GSO FSS and BSS networks operating in the frequency bands 17.7-18.6 GHz, 19.7-20.2 GHz and 27.5-28.6 and 29.5-30 GHz, non-GSO FSS systems using ESIMs shall comply with the applicable limitations in RR Article **22**, including the epfd limits set out in RR Nos. **22.5C**, **22.5D** and **22.5F** and the operational epfd limits set out in RR Table **22-4B**;

– to protect terrestrial services from aeronautical and maritime ESIMs in the frequency bands 27.5-29.1 GHz and 29.5-30 GHz, the following limits shall be complied with:

• for maritime ESIMs (M-ESIMs): the power flux-density (pfd) limit in the direction of any coastal State and the minimum protection distance from the low-water mark, as officially recognized by the coastal State;

• for aeronautical ESIMs (A-ESIMs): the pfd limits at the Earth’s surface within the territory of any administration;

– the use of ESIMs in non-GSO FSS systems shall not lead to an increase in the level of interference to sensors in the Earth exploration-satellite service (EESS) (passive) operating in the frequency band 18.6-18.8 GHz. To ensure sharing with the EESS (passive) in the frequency band 18.6-18.8 GHz, it is proposed to impose pfd limits at the surface of the oceans on unwanted emissions of non-GSO FSS satellites with which ESIMs communicate. The RCC Administrations are not opposed to adopting the same pfd limits for unwanted emissions of non-GSO FSS satellites under WRC-23 agenda items 1.16 and 1.17.

– ESIMs in non-GSO FSS systems shall not be used in the territory of States which have not granted relevant authorizations (licences) for their use. The notifying administration and operator of the non-GSO FSS system shall take measures to preclude unauthorized use of ESIMs in the territory of States which have not granted relevant authorizations (licences).

The RCC Administrations are considering Method B of the CPM Report, which provides for the addition of a new footnote No. **5.A116** in RR Article **5** and the adoption of a new Resolution **[RCC‑A116] (WRC-23)** containing technical and regulatory limitations for ESIMs communicating with a non-GSO FSS system, subject to the regulatory measures and technical limitations for the use of ESIMs foreseen in the resolution being considered and agreed at the conference.

The RCC Administrations are also considering Method A of the CPM Report (No changes to the Radio Regulations) in the event that the RCC proposals are not agreed at the conference. In that case, it is proposed that the regulatory text put forward in the Annex to Method Abe used.

Proposals

Method B – RCC/85A16/(1-8)

Method A – RCC/85A16/(9-11)

Method B

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations
(See No. 2.1)

MOD RCC/85A16/1#1880

15.4-18.4 GHz

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| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 17.7-18.1FIXEDFIXED-SATELLITE(space-to-Earth) 5.484A 5.517A ADD 5.A116(Earth-to-space) 5.516MOBILE | 17.7-17.8FIXEDFIXED-SATELLITE(space-to-Earth) 5.517 5.517A ADD 5.A116(Earth-to-space) 5.516BROADCASTING-SATELLITEMobile5.515 | 17.7-18.1FIXEDFIXED-SATELLITE(space-to-Earth) 5.484A 5.517A ADD 5.A116(Earth-to-space) 5.516MOBILE |
|  | 17.8-18.1FIXEDFIXED-SATELLITE(space-to-Earth) 5.484A 5.517A ADD 5.A116(Earth-to-space) 5.516MOBILE5.519 |  |
| 18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A ADD 5.A116(Earth-to-space) 5.520 MOBILE 5.519 5.521 |

MOD RCC/85A16/2#1881

18.4-22 GHz

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| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A ADD 5.A116 MOBILE |
| … |  |  |
| 18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.523A ADD 5.A116 MOBILE |
| … |
| 19.7-20.1FIXED-SATELLITE(space-to-Earth) 5.484A 5.484B 5.516B 5.527A ADD 5.A116Mobile-satellite (space-to-Earth) | 19.7-20.1FIXED-SATELLITE(space-to-Earth) 5.484A 5.484B 5.516B 5.527A ADD 5.A116MOBILE-SATELLITE(space-to-Earth) | 19.7-20.1FIXED-SATELLITE(space-to-Earth) 5.484A 5.484B 5.516B 5.527A ADD 5.A116Mobile-satellite (space-to-Earth) |
| 5.524 | 5.524 5.525 5.526 5.527 5.528 5.529 | 5.524 |
| 20.1-20.2FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A ADD 5.A116 MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 |
| ... |

MOD RCC/85A16/3#1882

24.75-29.9 GHz

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| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 27.5-28.5 FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.539 ADD 5.A116 MOBILE 5.538 5.540 |
| 28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.523A 5.539 ADD 5.A116 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540 |
| … |
| 29.5-29.9FIXED-SATELLITE(Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 ADD 5.A116Earth exploration-satellite(Earth-to-space) 5.541Mobile-satellite (Earth-to-space) | 29.5-29.9FIXED-SATELLITE(Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 ADD 5.A116MOBILE-SATELLITE(Earth-to-space)Earth exploration-satellite(Earth-to-space) 5.541 | 29.5-29.9FIXED-SATELLITE(Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 ADD 5.A116Earth exploration-satellite(Earth-to-space) 5.541Mobile-satellite (Earth-to-space)  |
| 5.540 5.542 | 5.525 5.526 5.527 5.529 5.540  | 5.540 5.542 |

MOD RCC/85A16/4#1883

29.9-34.2 GHz

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| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 29.9-30 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 ADD 5.A116 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542 |
| ... |

ADD RCC/85A16/5

5.A116The operation of earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service in the frequency bands 17.7-18.6 GHz (space-to-Earth), 18.8-19.3 GHz (space-to-Earth) and 19.7-20.2 GHz (space-to-Earth), 27.5-29.1 GHz (Earth-to-space) and 29.5-30 GHz (Earth-to-space) shall be subject to the application of Resolution **[RCC-A116] (WRC‑23)**.     (WRC‑23)

ADD RCC/85A16/6#1885

draft new RESOLUTION [RCC-A116] (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 earth stations in motion communicating with non-geostationary
space stations in the fixed-satellite service

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that there is a need for global broadband mobile satellite communications, and that some of this need could be met by allowing earth stations in motion (ESIMs) to communicate with space stations of the non-geostationary-satellite (non-GSO) fixed-satellite service (FSS) operating in 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 29.5-30.0 GHz (Earth-to-space);

*b)* that 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) are allocated to space services, and the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 27.5-29.1 GHz are allocated to terrestrial services on a primary basis worldwide; in the countries identified in No. **5.524** of the Radio Regulations, the frequency band 19.7-20.2 GHz is allocated to the fixed and mobile services on a primary basis; and, in the countries identified in No. **5.542** of the Radio Regulations, the frequency band 29.5-30 GHz is allocated to the fixed and mobile services on a secondary basis, and used by a variety of different systems and these existing services and their future development need to be protected, without unjustified additional constraints, from the operation of non-GSO ESIMs;

b bis) that, in operating non-GSO FSS ESIMs, it is necessary to ensure that the primary and secondary terrestrial services referred to in considering b) can continue to provide services, without any reduction in the quality of the services provided;

*c)* that the frequency band 18.6-18.8 GHz is allocated to the Earth exploration-satellite service (EESS) (passive) and space research service (SRS) (passive) and that these services need to be protected from operation of non-GSO FSS systems in the space-to-Earth direction;

*d)* that there is no specific regulatory procedure for the coordination of non-GSO FSS ESIMs relative to terrestrial stations for these services since 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) are not authorized for use by non-GSO FSS ESIMs;

*e)* that regulatory procedures and interference-management mechanisms, including necessary mitigation measures, are required for the operation of non-GSO FSS ESIMs to protect other space and terrestrial services to which the frequency bands referred to in *considering a)* are allocated,

considering further

*a)* that administrations intending to authorize non-GSO FSS ESIMs, when establishing national licensing rules, may, in order to ensure sharing with their terrestrial services, consider adopting other interference-management procedures and/or mitigation measures than those contained in this resolution as long as the provisions in Annex 1 to this resolution are unchanged in cross-border applications;

*b)* that aeronautical and maritime ESIMs operating within the service area of the non-GSO FSS systems with which they communicate may operate within the territories under the jurisdiction of multiple administrations where they have been granted the relevant licence by those administrations;

*c)* that this resolution does not establish any additional technical or regulatory provisions for the operation and use of land ESIMs communicating with non-GSO FSS space stations, beyond those already stipulated for typical earth stations of the non-GSO FSS systems;

*d)* that any ESIMs shall not cause more interference and shall not claim more protection than that specified for typical earth stations of non-GSO FSS systems,

recognizing

*a)* that the administration authorizing non-GSO FSS ESIMs in the territory under its jurisdiction has the right to require that the non-GSO FSS ESIMs referred to above only use those assignments associated with non-GSO FSS systems which have been successfully coordinated, notified, brought into use and recorded in the Master International Frequency Register (MIFR) with a favourable finding under Articles **9** and **11**, including Nos. **11.31**, **11.32** or **11.32A**, where applicable;

*b)* that, where assignments to non-GSO FSS systems recorded under No. **11.41** will be used for the operation of non-GSO FSS ESIMs in the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-28.6 GHz and 29.5-30 GHz (Earth-to-space), such assignments may be used for non-GSO FSS ESIMs only in accordance with No. **11.42**;

*c)* that, under the provisions of No. **22.2**, in the frequency bands 27.5-28.6 GHz and 29.5-30 GHz (Earth-to-space) non-GSO FSS ESIMs shall not cause unacceptable interference to geostationary-satellite (GSO) FSS and BSS networks operating in accordance with the Radio Regulations, and shall not claim protection from them in the frequency bands17.8-18.6 GHz and 19.7-20.2 GHz (space-to-Earth), and No. **5.43A** does not apply in this case;

*d)* that a non-GSO FSS system operating in the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-28.6 GHz and 29.5-30 GHz (Earth-to-space) in compliance with the provisions and epfd limits set out in Article **22** is considered as having fulfilled its obligations under No. **22.2** with respect to any GSO network;

*e)* that the use of the frequency bands 18.8-19.3 GHz (space-to-Earth) and 28.6-29.1 GHz (Earth-to-space) by non-GSO FSS systems is subject to No. **9.11A** (i.e. the provisions of Nos. **9.12** to **9.16** apply), and No. **22.2** does not apply in this case;

*f)* that, for the use of the frequency bands 17.8-18.6 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 non-GSO FSS systems, No. **9.12** applies;

*g)* that in case of unacceptable interference from non-GSO FSS ESIMs, the administration authorizing the non-GSO FSS ESIM to operate in the territory under its jurisdiction shall, at the request of the affected administration, immediately take all possible measures to eliminate the interference,

recognizing further

*a)* that frequency assignments to non-GSO FSS ESIMs need to be notified to the ITU Radiocommunication Bureau (BR);

*b)* that the notification by different administrations of frequency assignments for use by the same non-GSO FSS satellite system may create difficulties to identify the responsible administration in the case of unacceptable interference;

*c)* that an administration authorizing the operation of non-GSO FSS ESIMs within the territory under its jurisdiction may modify or withdraw that authorization at any time,

resolves

1 that, before using an ESIM in 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), the notifying administration of the non-GSO FSS system in which the ESIM is to be used shall send to BR the relevant Appendix **4** notification information relating to the characteristics of the ESIMs intended to communicate with the non-GSO FSS system, together with a commitment to operate the non-GSO FSS ESIMs in conformity with the Radio Regulations, including this resolution;

2 that, upon receipt of the notification information referred to in *resolves* 1 above, the Bureau shall examine it for conformity with Article 11, taking into account *recognizing* *a)* and *b)* as well as the provisions of this resolution, and publish the results of the examination in the International Frequency Information Circular (BR IFIC);

3 that, where the operation of the ESIMs referred to in *resolves* 1 will use assignments to non-GSO FSS systems recorded under No. 11.41, such assignments may be used for non-GSO FSS ESIMs only in accordance with No. 11.42;

4 that ESIMs communicating with space stations of a non-GSO FSS system in 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), or portions thereof, shall not cause more interference or claim more protection than that specified for typical earth stations of that non-GSO FSS system;

5 that, for any aeronautical or maritime ESIM communicating with non-GSO FSS space stations in 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), or portions thereof, the following conditions shall apply:

5.1 with respect to space services in 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), and in the adjacent frequency band 18.6-18.8 GHz, non-GSO FSS ESIMs shall comply with the following conditions:

5.1.1 to prevent potential interference with respect to satellite networks or systems of other administrations, the characteristics of non-GSO FSS ESIMs shall remain within the envelope characteristics and conditions specified for typical earth stations associated with the non-GSO FSS system with which these ESIMs communicate;

5.1.2 the notifying administration of the non-GSO FSS system with which the ESIMs communicate, together with administration authorizing the use of non-GSO FSS ESIMs within its territory, shall ensure that the operation of ESIMs complies with *resolves* 5.1.1 above and with the coordination agreements for the frequency assignments of the typical earth station of the non-GSO FSS system concluded under the relevant provisions of Article **9** of the Radio Regulations;

5.1.3 the notifying administration of the non-GSO FSS system with which the ESIMs communicate shall ensure that non-GSO FSS ESIMs comply with the epfd limits and provisions set out in Article **22** for the protection of GSO FSS networks operating in the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-28.6 GHz and 29.5-30 GHz (Earth-to-space) (see *recognizing e)*);

5.1.4 non-GSO FSS ESIMs shall not claim protection from BSS feeder-link earth stations operating in accordance with the Radio Regulations in the frequency band 17.7‑18.4 GHz;

5.1.5 with respect to the EESS (passive) operating in the frequency band 18.6-18.8 GHz, a non-GSO FSS satellite system operating in the frequency bands 18.3-18.6 GHz and 18.8-19.1 GHz with which aeronautical and/or maritime ESIMs communicate shall comply with the provisions laid down in Annex 2 to this resolution;

5.2 with respect to terrestrial services in the frequency bands 17.7‑18.6 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz, 27.5-29.1 GHz and 29.5-30 GHz, non-GSO FSS ESIMs shall comply with the following conditions:

5.2.1 receiving non-GSO FSS ESIMs in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz shall not claim protection from assignments in the terrestrial services to which those frequency bands are allocated and operating in accordance with the Radio Regulations;

5.2.2 transmitting non-GSO FSS ESIMs in the frequency band 27.5-29.1 GHz shall not cause unacceptable interference to terrestrial services to which the frequency band is allocated and operating in accordance with the Radio Regulations, and Annex 1 to this resolution shall apply;

5.2.3 transmitting non-GSO FSS ESIMs in the frequency band 29.5-30.0 GHz shall not adversely affect the operations of terrestrial services to which this frequency band is allocated on a secondary basis and operating in accordance with the Radio Regulations, and the limits in Annex 1 to this resolution shall apply with respect to administrations mentioned in No. **5.542**;

5.2.4 the provisions of this resolution, including Annex 1, set the conditions for protecting terrestrial services from unacceptable interference from non-GSO FSS ESIMs, in accordance with the provisions included in *resolves* 5.2.2 and 5.2.3 above, in the frequency bands 27.5-29.1 GHz and 29.5-30.0 GHz; however, the requirement not to cause unacceptable interference to, or claim protection from, terrestrial services to which the frequency bands are allocated and operating in accordance with the Radio Regulations remains valid (see *resolves* 10);

5.2.5 the Bureau shall examine, in accordance with the provisions included in *resolves* 5.2.2 and 5.2.3, and with the methodology described in the latest version of the relevant ITU‑R Recommendation, the characteristics of maritime and aeronautical non‑GSO FSS ESIMs with respect to their conformity with the power flux-density (pfd) limits specified in Annex 1 to this resolution, and publish the results of the examination in the BR IFIC; if the limits specified in Annex 1 are not met, BR shall formulate an unfavourable finding with respect to No. **11.31**;

5.2.6if BR is unable to examine, in accordance with *resolves* 5.2.5, non-GSO FSS maritime and aeronautical ESIMs with respect to their conformity with the pfd limits specified in Annex 1, the notifying administration shall send to BR a commitment to the effect that the aeronautical non-GSO FSS ESIMs comply with those limits;

5.2.7 BR shall formulate a qualified favourable finding under No. **11.31** with respect to the pfd limits contained in Annex 1; otherwise it shall formulate an unfavourable finding;

5.2.8 once the methodology to examine the characteristics of maritime and aeronautical non-GSO FSS ESIMs with respect to conformity with the pfd limits specified in Annex 1 is available, *resolves*5.2.5 shall be applied by the Bureau;

5.3 that, in the case that unacceptable interference to stations of affected services from non-GSO FSS ESIMs is reported:

5.3.1 the notifying administration of the non-GSO FSS satellite system with which ESIMs communicate and the administration authorizing the use of non-GSO FSS ESIMs within its territory are responsible for resolving cases of unacceptable interference;

5.3.2 if the unacceptable interference is caused by a non-GSO FSS ESIM located in the territory of an administration authorizing the use, that administration shall immediately take the required action to eliminate the interference or reduce it to an acceptable level;

5.3.3 if the unacceptable interference is caused by non-GSO FSS ESIMs located in international waters or in international airspace, or in the territory of an administration that has not authorized the operation of ESIMs, the notifying administration of the non-GSO FSS system with which the ESIMs communicate shall immediately take the required action to eliminate the interference or reduce it to an acceptable level;

5.3.4 in the case of unacceptable interference from non-GSO FSS ESIMs referred to in *resolves* 5.3.3, the administration responsible for the aircraft or vessel on which the non-GSO FSS ESIM operates shall immediately take the required action to eliminate the interference or reduce it to an acceptable level and shall provide the affected administration with information on the notifying administration of the non-GSO FSS system satellite with which the ESIM communicates;

5.4 that the notifying administration of a non-GSO FSS satellite system with which ESIMs communicate shall ensure that:

5.4.1 for the operation of a non-GSO FSS ESIM, techniques are employed to maintain adequate antenna pointing accuracy towards the relevant non-GSO FSS satellite;

5.4.2 all necessary measures are taken so that all non-GSO FSS ESIMs are subject to permanent monitoring and control by a network control and monitoring centre (NCMC) in order to comply with the provisions in this resolution, and are capable of receiving and immediately acting upon, as a minimum, “enable transmission” and “disable transmission” commands from the NCMC;

5.4.3 any ESIM located in the territory under the jurisdiction of an administration, including its territorial waters and its national airspace, from which authorization and/or explicit agreement for the use of ESIMs has not been obtained is precluded from connecting to a non-GSO FSS satellite system, taking into account *resolves* 7;

5.4.3*bis* a space station of a non-GSO FSS system is precluded from communicating with any ESIM located in the territory under the jurisdiction of an administration, including its territorial waters and its national airspace, from which explicit agreement for its inclusion in the service area of the non-GSO FSS satellite system has not been obtained;

5.4.4 the notifying administration of the non-GSO FSS system with which ESIMs communicate shall provide contacts in the Appendix **4** submission, and this information shall be published in the relevant special section of the BR IFIC for the purpose of tracing any suspected cases of unacceptable interference from non-GSO FSS ESIMs and immediately responding to relevant requests;

6 that non-GSO FSS ESIMs shall not be used or relied upon for safety-of-life applications, except in cases of application of No. 4.9;

7 that the operation of non-GSO ESIMs within the territory, including territorial waters and airspace, under the jurisdiction of any administration shall be carried out only if an authorization or a licence from that administration is obtained in accordance with paragraph a) of Article 30 of the 2006 Convention on International Civil Aviation and taking into account No. **18.1**;

8 that the notifying administrations of those non-GSO FSS systems with which non-GSO FSS ESIMs are intended to operate in the frequency bands indicated in *considering a)* shall, when providing the Appendix **4** information, submit a commitment to BR to immediately act to eliminate interference or reduce it to an acceptable level upon receiving a report of unacceptable interference (see *resolves*9 below);

9 that, where there is more than one administration involved in the notification of frequency assignments of the same non-GSO FSS satellite system with which ESIMs communicate, those administrations shall nominate one administration as the notifying administration to act on their behalf, be responsible for eliminating any cases of unacceptable interference and informing BR accordingly;

10 that the application of this resolution does not provide regulatory status to a non-GSO FSS ESIM different from that derived from the non-GSO FSS satellite system with which it communicates, taking into account the provisions referred to in this resolution (see *recognizing a)* and*b)*),

11 that any course of action taken under this resolution has no impact on the original date of receipt by BR of notices for the frequency assignments to space and earth stations of the non-GSO FSS satellite system with which ESIMs communicate,

resolves further

1 that, in case of continued unacceptable interference, the frequency assignment causing the interference shall be submitted to the Radio Regulations Board with a view to its deletion from the MIFR;

2 that non-GSO FSS ESIMs shall be designed and operate so as to cease transmission over the territory of any administration/country from which authorization to use ESIMs has not been obtained;

3 that the authorization for non-GSO FSS ESIMs to operate in the territory under the jurisdiction of an administration shall in no way release the notifying administration of the non‑GSO FSS satellite system with which the ESIMs communicate from the obligation to comply with the provisions included in this resolution and those contained in the Radio Regulations;

4 that, should an administration authorizing aeronautical and/or maritime non-GSO FSS ESIMs agree to less stringent limits than those contained Annex 1 to this resolution within the territory under its jurisdiction, such agreement shall not affect other countries that are not party to that agreement,

instructs the Director of the Radiocommunication Bureau

1 to take all necessary actions to facilitate the implementation of this resolution, and also provide any assistance for the resolution of interference, when required;

2 to report to future world radiocommunication conferences any difficulties or inconsistencies encountered in the implementation of this resolution, including whether or not the obligations relating to the operation of aeronautical and maritime non-GSO FSS ESIMs have been duly fulfilled;

3 not to examine, under No. **11.31**, the conformity of non-GSO FSS systems with the provisions of *resolves*5.1.5 of this resolution with respect to the EESS (passive);

4 to report to future world radiocommunication conferences any difficulties or inconsistencies encountered in the implementation of Recommendation ITU‑R S.1503 for verifying that the non-GSO FSS systems under this resolution comply with the epfd limits specified in Article **22**;

5 to publish the list of non-GSO FSS satellite systems with which ESIMs communicate that have been brought into use, with information on their service area and countries authorizing such use, if any; this information shall be updated regularly,

invites administrations

to collaborate for the implementation of this resolution, in particular for resolving interference, if any,

instructs the Secretary-General

to bring this resolution to the attention of the Secretary-General of the International Maritime Organization and of the Secretary General of the International Civil Aviation Organization.

Annex 1 to draft new Resolution [RCC-A116] (WRC‑23)

Provisions for maritime and aeronautical non-GSO FSS ESIMs to protect terrestrial services operating in the frequency band 27.5-29.1 GHz and for the frequency band 29.5-30.0 GHz with respect to administrations mentioned in No. 5.542

The parts below contain provisions to ensure that maritime and aeronautical non-GSO FSS ESIMs do not at any time cause unacceptable interference to terrestrial service operations when non‑GSO FSS ESIMs operate on frequencies overlapping with those used by terrestrial services to which the frequency band 27.5-29.1 GHz is allocated and operating in accordance with the Radio Regulations. The provisions below also apply for the operation of non‑GSO FSS ESIMs in the frequency band 29.5-30 GHz with respect to administrations mentioned in No. **5.542**.

Part 1: Maritime non-GSO FSS ESIMs

1 The notifying administration of the non-GSO FSS satellite system with which maritime ESIMs communicate shall ensure that the maritime ESIMs comply with both of the following conditions for the protection of terrestrial services to which the frequency band is allocated within a coastal State:

1.1 The minimum distance from the low-water mark as officially recognized by the coastal State beyond which maritime ESIMs can operate without the prior agreement of any administration is 70 km. Any transmissions from maritime ESIMs within the minimum distance shall be subject to the prior agreement of the coastal State(s) concerned.

1.2 Where maritime ESIMs are located 70 km or more from the low-water mark as officially recognized by the coastal State, the maximum power flux-density (pfd) produced by the emissions of a single maritime non-GSO FSS ESIM on the territory of any coastal State at a height of [3 m] shall not exceed:

pfd = −136.2 (dB(W/(m2 ⋅ 1 МHz))).

Part 2: Aeronautical non-GSO FSS ESIMs

2 The notifying administration of the non-GSO FSS satellite system with which aeronautical ESIMs communicate shall ensure that the aeronautical ESIMs operating in the frequency bands 27.5-29.1 GHz and 29.5-30 GHz comply with all of the following conditions for the protection of the terrestrial services to which the frequency bands are allocated:

2.1 When within line-of-sight of the territory of an administration, the maximum pfd produced at the surface of the Earth on the territory of an administration by emissions from a single aeronautical non-GSO FSS ESIM shall not exceed:

 pfd(θ) = −136.2 (dB(W/(m2 ∙ 1 MHz))) for 0° ≤ θ ≤ 0.01°

 pfd(θ) = −132.4 + 1.9 ∙ logθ (dB(W/(m2 ∙ 1 MHz))) for 0.01° < θ ≤ 0.3°

 pfd(θ) = −127.7 + 11 ∙ logθ (dB(W/(m2 ∙ 1 MHz))) for 0.3° < θ ≤ 1°

 pfd(θ) = −127.7 + 18 ∙ logθ (dB(W/(m2 ∙ 1 MHz))) for 1° < θ ≤ 12.4°

 pfd(θ) = −108 (dB(W/(m2 ∙ 1 MHz))) for 12.4° < θ ≤ 90°

where θ is the angle of arrival of the radio-frequency wave (degrees above the horizon).

2.3 The pfd levels provided in § 2.1 above relate to the pfd and angles of arrival that shall be obtained using attenuation due to the aircraft fuselage. Unless there is an available ITU‑R Recommendation to calculate attenuation due to the aircraft fuselage in the frequency bands 27.5‑29.1 GHz and 29.5-30 GHz, the formulae in the table below shall be used for the calculation of attenuation due to the aircraft fuselage in these frequency bands:

Fuselage attenuation model from Report ITU-R M.2221

|  |  |  |  |
| --- | --- | --- | --- |
| *Lfuse*(γ) = 3.5 + 0.25 · γ | dB | for | 0°≤ γ ≤ 10° |
| *Lfuse*(γ) = −2 + 0.79 · γ | dB | for | 10°< γ ≤ 34° |
| *Lfuse*(γ) = 3.75 + 0.625 · γ | dB | for | 34°< γ ≤ 50° |
| *Lfuse*(γ) = 35 | dB | for | 50°< γ ≤ 90° |

where γ is the angle in the vertical plane (degrees below the horizon) determining the direction of the loss due to the fuselage (based on the fuselage loss function).

2.3 The maximum power in the out-of-band domain should be attenuated below the maximum output power of the aeronautical ESIM transmitter as described in Recommendation ITU‑R SM.1541.

2.4 Higher pfd levels than those specified in § 2.1 above produced by aeronautical ESIMs at the surface of the Earth in an area under the jurisdiction of any administration must be agreed with that administration.

Annex 2 to draft new Resolution [RCC-A116] (WRC‑23)

Provisions for non-GSO FSS systems[[1]](#footnote-1)1 transmitting to aeronautical and/or maritime ESIMs operating in or over an ocean in the frequency bands
18.3-18.6 GHz and 18.8-19.1 GHz with respect to EESS (passive)
operating in the frequency band 18.6-18.8 GHz
(in accordance with *resolves*5.1.5)

The unwanted emission power flux-density of a non-GSO FSS space station operating in the frequency bands 18.3-18.6 GHz and 18.8-19.1 GHz with an orbit apogee greater than 2 000 km and less than 20 000 km (MEO) communicating with an aeronautical or maritime ESIM produced at the surface of the ocean shall not exceed −118 dB(W/(m2 ⋅ 200 MHz)) in the 18.6-18.8 GHz band.

The unwanted emission power flux-density of a non-GSO FSS space station operating in the frequency bands 18.3-18.6 GHz and 18.8-19.1 GHz with an orbit apogee not greater than 2 000 km (LEO) communicating with an aeronautical or maritime ESIM produced at the surface of the ocean shall not exceed −110 dB(W/(m2 ⋅ 200 MHz)) in the 18.6-18.8 GHz band.

APPENDIX 4 (REV.WRC‑19)

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

[***Comment****: There is a need to define the minimum set of information that an administration shall submit to BR for notification of an ESIM (e.g., associated non-GSO space station beam, frequency group, class of station, power, antenna height, etc.) to allow BR and administrations to verify compliance with the requirements of this resolution.*]

ANNEX 2

Characteristics of satellite networks, earth stations
or radio astronomy stations[[2]](#footnote-2)2    (Rev.WRC‑12)

Footnotes to Tables A, B, C and D

MOD RCC/85A16/7#1886

**TABLE A**

GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM,
EARTH STATION OR RADIO ASTRONOMY STATION     (Rev.WRC‑23)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Items in Appendix** | ***A \_ GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION*** | **Advance publication of a geostationary-satellite network** | **Advance publication of a non-geostationary-satellite network or system subject to coordination under Section II of Article 9** | **Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9** | **Notification or coordination of a geostationary-satellite network (including space operation functions under Article 2A of Appendices 30 or 30A)**  | **Notification or coordination of a non-geostationary-satellite network or system** | **Notification or coordination of an earth station (including notification under Appendices 30A or 30B)**  | **Notice for a satellite network in the broadcasting-satellite service under Appendix 30 (Articles 4 and 5)** | **Notice for a satellite network (feeder-link) under Appendix 30A (Articles 4 and 5)** | **Notice for a satellite network in the fixed-satellite service under Appendix 30B (Articles 6 and 8)** | **Items in Appendix** | **Radio astronomy** |
| ... | ... |  |  |  |
| **A.24** | **COMPLIANCE WITH NOTIFICATION OF A NON-GSO SHORT DURATION MISSION** |  | **A.24** |  |
| A.24.a | a commitment by the administration that, in the case that unacceptable interference caused by a non-GSO satellite network or system identified as short-duration mission in accordance with Resolution **32 (WRC‑19)** is not resolved, the administration shall undertake steps to eliminate the interference or reduce it to an acceptable levelRequired only for notification |  |  |  |  | **+** |  |  |  |  | A.24.a |  |
| **A.25** | **COMPLIANCE WITH *resolves* 1 OF RESOLUTION [RCC-A116] (WRC-23)** |  | **A.25** |  |
| A.25.a | a commitment that the non-GSO FSS ESIM operation would be in conformity with the Radio Regulations and Resolution **[RCC-A116] (WRC‑23)**Required only for the notification of earth stations in motion submitted in accordance with Resolution **[RCC-A116] (WRC‑23)** |  |  |  |  | **+** |  |  |  |  | A.25.a |  |
| **A.26** | **COMPLIANCE WITH *resolves* 5.1.5 OF RESOLUTION [RCC-A116]** **(WRC**‑**23)** |  |  |  |  |  |  |  |  |  | **A.26** |  |
| A.26.a | a commitment that the non-GSO FSS ESIM operation would be in conformity with *resolves* 5.1.5 of Resolution **[RCC-A116] (WRC‑23)**Required only for the notification of earth stations in motion submitted in accordance with Resolution **[RCC-A116] (WRC‑23)** |  |  |  |  | **+** |  |  |  |  | A.26.a |  |
| **A.27** | **COMPLIANCE WITH *resolves* 8 OF RESOLUTION [RCC-A116]** **(WRC**‑**23)** |  | **A.27** |  |
| A.27.a | a commitment that, upon receiving a report of unacceptable interference, the notifying administration for the non-GSO FSS network with which ESIMs communicate shall follow the procedures in *resolves*9 of Resolution **[RCC-A116] (WRC‑23)**Required only for the notification of earth stations in motion submitted in accordance with Resolution **[RCC-A116] (WRC‑23)** |  |  |  |  | **+** |  |  |  |  | A.27.a |  |
| **A.28** | **COMPLIANCE WITH *resolves* 5.2.4 OF RESOLUTION [RCC-A116]** **(WRC‑23)** |  | **A.28** |  |
| A.28.a | a commitment that aeronautical and maritime non-GSO FSS ESIMs would be in conformity with the pfd limits specified in Annex 1 to Resolution **[RCC-A116] (WRC‑23)**Required only for the notification of earth stations in motion submitted in accordance with Resolution **[RCC-A116] (WRC‑23)** |  |  |  |  | **+** |  |  |  |  | A.28.a |  |

SUP RCC/85A16/8

RESOLUTION 173 (WRC‑19)

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
earth stations in motion communicating with non-geostationary space stations
in the fixed-satellite service

Method A

NOC RCC/85A16/9

ARTICLES

NOC RCC/85A16/10

APPENDICES

SUP RCC/85A16/11

RESOLUTION 173 (WRC‑19)

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
earth stations in motion communicating with non-geostationary space stations
in the fixed-satellite service

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

1. 1 These provisions do not apply to non-GSO systems using orbits with an apogee less than 2 000 km that employ a frequency reuse factor of at least three. [↑](#footnote-ref-1)
2. 2 The Radiocommunication Bureau shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this appendix and related decisions of future conferences. Additional information on the items listed in this annex together with an explanation of the symbols is to be found in the Preface to the BR IFIC (Space Services).    (WRC‑12) [↑](#footnote-ref-2)