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| **World Radiocommunication Conference (WRC-19)Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
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| PLENARY MEETING | **Addendum 5 toDocument 92-E** |
|  | **10 October 2019** |
|  | **Original: English** |
|  |
| India (Republic of) |
| proposals for the work of the conference |
|  |
| Agenda item 1.5 |

1.5 to consider the use of the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) by earth stations in motion communicating with geostationary space stations in the fixed-satellite service and take appropriate action, in accordance with Resolution **158 (WRC-15)**;

***Resolution 158 (WRC‑15):*** *Use of the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5‑29.5 GHz (Earth-to-space) by earth stations in motion communicating with geostationary space stations in the fixed-satellite service.*

# 1 Background

India recognizes 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 (ESIM) to communicate with space stations of geostationary-satellite orbit (GSO) fixed-satellite service (FSS) operating in the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space).

Earth stations in motion (ESIM) currently serve a wide range of applications, both on board aircraft and ships and on land. Considering that users expect to be able to connect wherever they are, the broadband satellite service is a key component in meeting that demand.

The 2015 World Radiocommunication Conference (WRC-15) adopted footnote RR No. **5.527A**, through which ESIM operate. They communicate with geostationary satellite (GSO) networks of the fixed-satellite service (FSS) in the frequency bands 29.5-30.0 GHz (Earth-to-space) and 19.7-20.2 GHz (space-to-Earth) under Resolution **156 (WRC-15)**.

However, recognizing the growing demand for mobile services and the global availability of satellite broadband, WRC-15 adopted WRC-19 agenda item 1.5 to consider ESIM operation in the frequency bands 27.5-29.5 GHz (Earth-to-space) and 17.7-19.7 GHz (space-to-Earth) allocated to FSS, thereby providing more spectrum to meet ESIM demands.

# 2 Views and Proposals

India supports Method B. That is, to add a new footnote in RR Article **5** that refers to a new WRC Resolution **[IND/A15] (WRC-19)** with technical, operational and regulatory conditions for the operation of ESIM while ensuring protection of allocated services and consequential suppression of Resolution **158 (WRC-15)** (Section 3/1.5/5.2 - For Method B, of the CPM Report).

ARTICLE 5

Frequency allocations

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

MOD IND/92A5/1#49988

15.4-18.4 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 17.7-18.1FIXEDFIXED-SATELLITE(space-to-Earth) 5.484A ADD 5.A15(Earth-to-space) 5.516MOBILE | 17.7-17.8FIXEDFIXED-SATELLITE(space-to-Earth) 5.517 ADD 5.A15(Earth-to-space) 5.516BROADCASTING-SATELLITEMobile5.515 | 17.7-18.1FIXEDFIXED-SATELLITE(space-to-Earth) 5.484A ADD 5.A15(Earth-to-space) 5.516MOBILE |
|  | 17.8-18.1FIXEDFIXED-SATELLITE(space-to-Earth) 5.484A ADD 5.A15(Earth-to-space) 5.516MOBILE5.519 |  |
| 18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B ADD 5.A15 (Earth-to-space) 5.520 MOBILE 5.519 5.521 |

MOD IND/92A5/2#49989

18.4-22 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B ADD 5.A15 MOBILE |
| 18.6-18.8EARTH EXPLORATION-SATELLITE (passive)FIXEDFIXED-SATELLITE(space-to-Earth) 5.522B ADD 5.A15MOBILE except aeronauticalmobileSpace research (passive) | 18.6-18.8EARTH EXPLORATION-SATELLITE (passive)FIXEDFIXED-SATELLITE(space-to-Earth) 5.516B 5.522B ADD 5.A15MOBILE except aeronautical mobileSPACE RESEARCH (passive) | 18.6-18.8EARTH EXPLORATION-SATELLITE (passive)FIXEDFIXED-SATELLITE(space-to-Earth) 5.522B ADD 5.A15MOBILE except aeronauticalmobileSpace research (passive) |
| 5.522A 5.522C | 5.522A | 5.522A |
| 18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.523A ADD 5.A15 MOBILE |
| 19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.523B5.523C 5.523D 5.523E ADD 5.A15 MOBILE |

MOD IND/92A5/3#49990

24.75-29.9 GHz

|  |
| --- |
| 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 5.539 ADD 5.A15 MOBILE 5.538 5.540 |
| 28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.523A 5.539 ADD 5.A15 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540 |
| 29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.523C 5.523E 5.535A 5.539 5.541A ADD 5.A15 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540 |

ADD IND/92A5/4#49992

5.A15 The operation of earth stations in motion communicating with geostationary FSS space stations in the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz, or portions thereof, shall be subject to draft new Resolution **[IND/A15] (WRC‑19)**.(WRC‑19)

ADD IND/92A5/5

draft new RESOLUTION [IND/A15] (WRC-19)

Use of the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz by earth stations in motion (ESIM) communicating with geostationary space stations
in the fixed-satellite service

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

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 (ESIM) to communicate with space stations of geostationary-satellite orbit (GSO) fixed-satellite service (FSS) operating in the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space);

*b)* that appropriate regulatory and interference management mechanisms are necessary for the operation of ESIM;

*c)* that the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) are also allocated to terrestrial and space services used by a variety of different systems and these existing services and their future development need to be protected from the operation of ESIM,

recognizing

*a)* that the administration authorizing ESIM on territory under its jurisdiction has the right to require that ESIM referred to above only use those assignments associated with GSO FSS networks which have been successfully coordinated, notified, brought into use and recorded in the MIFR with a favourable finding under Article **11**, including Nos. **11.31**, **11.32** or **11.32A**, where applicable;

*b)* that for cases of incomplete coordination under No. **9.7** of the GSO FSS network with assignments to be used by ESIM, the operation of ESIM on those assignments in the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz needs to be in accordance with the provisions of No. **11.42** with respect to any recorded frequency assignment which was the basis of the unfavourable finding under No. **11.38**;

*c)* that any course of action taken under this Resolution has no impact on the original date of receipt of the frequency assignments of the GSO FSS satellite network with which ESIM communicate or on the coordination requirements of that satellite network;

*d)* that the operation of any type of ESIM (land, maritime and aeronautical) within the territory(-ies), territorial waters and airspace under the jurisdiction of an administration, shall be carried out only if authorized by that administration,

resolves

1 that for any ESIM communicating with a GSO FSS space station in the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz, or portions thereof, the following conditions shall apply:

1.1 with respect to space services in the 17.7-19.7 GHz and 27.5-29.5 GHz frequency bands, ESIM shall comply with the following conditions:

Option 1

1.1.1 with respect to satellite networks or systems of other administrations, the ESIM characteristics shall remain within the envelope of the satellite network with which these ESIM communicate;

1.1.2 that the notifying administration of the GSO FSS network, with which ESIM communicate, shall ensure that ESIM operation complies with coordination agreements for the frequency assignments of this GSO FSS network under the relevant provisions of the Radio Regulations;

1.1*.*3 for the implementation of *resolves*1.1.1 above, the notifying administration of the GSO FSS network with which ESIM communicate shall send to the Bureau under this Resolutionthe relevant Appendix **4** information related to the characteristics of the ESIM intended to communicate with the space station of that GSO FSS network, together with the commitment that the ESIM operation shall be in conformity with the Radio Regulations and this Resolution;

Option 2 (examination of ESIM in relation to a GSO satellite at either coordination stage or subsequently recorded in the MIFR)

1.1.4 upon receipt of the information provided in accordance with *resolves*1.1.3 above, the Bureau shall examine it in relation to the requirements referred to in *resolves*1.1.1 based on the complete information submitted. If, following this examination, the Bureau concludes that the ESIM characteristics are within the envelope of the satellite network, the Bureau shall publish the results for information in the BR IFIC, otherwise the information shall be returned to the notifying administration;

Option 2 (examination of ESIM in relation to a GSO satellite at either coordination stage or subsequently recorded in the MIFR)

1.1.5 should the Bureau find, prior to entering the characteristics for a network into the MIFR, that the information submitted under *resolves*1.1.3 is not in compliance with the requirements of *resolves* 1.1.1, the corresponding information previously published by the Bureau under *resolves* 1.1.4 shall be suppressed;

1.1.6 for the protection of non-GSO FSS systems operating in the frequency band 27.5-28.6/29.1 GHz, ESIM communicating with GSO FSS networks shall comply with the provisions contained in Annex 1 to this Resolution;

Option 2

1.1.7 is not needed;

**Reasons**: The band 29.1-29.5 GHz is allocated co-primarily to GSO FSS and to non-GSO MSS feeder links, and hence, coordination in this case is on a first-come-first-served basis. The concern arises when GSO FSS is the first comer and also operates ESIM. When non-GSO MSS feeder links comes latter, *resolves* 1.1.7 requires the operational ESIM to comply to conditions in Annex 1 of the draft new Resolution. It will not be feasible for an ESIM to protect non-GSO MSS feeder links once it has been operational. Also, *resolves* 1.1.7 inadvertently is establishing priority to non-GSO MSS over GSO FSS. The Radio Regulations in force, together with *resolves* 1.1.1 of the draft new Resolution **[IND/A15] (WRC-19)** provide enough assurance that ESIM would not cause interference to space station receivers of non-GSO MSS feeder links.

1.1.8 ESIM shall not claim protection from non-GSO FSS systems operating in the frequency band 17.8-18.6 GHz in accordance with the Radio Regulations, including No. **22.5C**;

1.1.9 ESIM shall not claim protection from BSS feeder link earth stations operating in the frequency band 17.7-18.4 GHz in accordance with the Radio Regulations and shall not affect their future development;

1.2 with respect to terrestrial services in the 17.7-19.7 GHz and 27.5-29.5 GHz frequency bands ESIM shall comply with the following conditions:

1.2.1 the receiving ESIM in the 17.7-19.7 GHz frequency band shall not claim protection from terrestrial services in the above-mentioned frequency band operating in accordance with the Radio Regulations and shall not affect the future development of these services;

1.2.2 the transmitting aeronautical and maritime ESIM in the 27.5-29.5 GHz frequency band shall not cause unacceptable interference to terrestrial services in the above-mentioned frequency band operating in accordance with the Radio Regulations and shall not affect the future development of these services and Annex 2 applies;

1.2.3 the transmitting land ESIM in the 27.5-29.5 GHz frequency band shall not cause unacceptable interference to terrestrial services in neighbouring countries in the above-mentioned frequency band operating in accordance with the Radio Regulations and shall not affect the development of these services and Annex 3 with appropriate title applies;

View 2: regarding *resolves* 1.2.2 above, the part of the sentence “*and* *shall not affect the development of these services*” shall be maintained and applied to existing terrestrial services and its future development as this text is an element cited in *resolves to invite ITU-R* and *considering* *g)* of Resolution 158 (WRC-15). Moreover, the obligations of the notifying administration of ESIM to protect terrestrial services is not limited to only comply with the pfd as contained in Annex 2 of this Resolution due to the fact that the validity and accuracy of pfd is yet to be verified and examined. Moreover, the proponents of this view are of the strong opinion that reference to *resolves* 1.2.3 in view 1 directly or indirectly refers to Annex 3 which has not been agreed by CPM19-2 in its totality.

Option 1

1.2.4 for the implementation of *resolves* 1.2.2 and 1.2.3 above, the notifying administration responsible for the GSO FSS satellite network with which ESIM communicate shall submit to the Bureau together with the Appendix **4** data referred to in *resolves* 1.1.3 a commitment undertaking that in case of unacceptable interference, upon receipt of a report of interference, take necessary action to immediately eliminate this interference or reduce interference to an acceptable level;

[Option 1

1.2.5 that for the protection of terrestrial services operating in the frequency band 27.5- 29.5 GHz, the aeronautical and maritime ESIM shall comply with the provisions contained in Annex 2 of this Resolution;

Option 2

1.2.5 any transmitting aeronautical or maritime ESIM that conforms to the requirements in Annex 2 to this Resolution are considered to not cause unacceptable interference to terrestrial stations under *resolves* 1.2.2 above;

Option 3

1.2.5 for the implementation of *resolves*1.2.2 above, any transmitting aeronautical or maritime ESIM that conforms to the requirements in Annex 2 to this Resolution shall be deemed to have met its obligation to terrestrial stations;

Option 4

1.2.5 is not needed due to the fact that compliance with the requirements in Annex 2 would not release the notifying administration from its obligation not to cause unacceptable interference to any stations in the terrestrial service in accordance with the Radio Regulations. Moreover, the concept of pfd used in Article **21** of the Radio Regulations is part of the Radio Regulations to protect the area in which the terrestrial services are deployed. However, it does not protect the assignment of the terrestrial services due to the fact that there are two provisions of Article **9** (i.e. Nos. **9.17** and **9.18**) to this effect;]

2 that ESIM shall not be used or relied upon for safety-of-life applications;

3 that for the implementation of this Resolution, administrations may consider relevant parts of Annex 3 when considering to authorize ESIM as well as in their bilateral or multilateral negotiations (this part of the Resolution may be more appropriate to be an *invites*, depending on the content of Annex 3);

4 that the administration responsible for the GSO FSS satellite network with which the ESIM communicate shall ensure that:

4.1 techniques to maintain pointing accuracy with the associated GSO FSS satellite without inadvertently tracking adjacent GSO satellites; are employed for the operation of ESIM;

4.2 all necessary measures are taken so that ESIM are subject to permanent monitoring and control by a Network Control and Monitoring Centre (NCMC) or equivalent facility and are capable of receiving and acting upon at least “enable transmission” and “disable transmission” commands from the NCMC or equivalent facility (this *resolves* should be assessed against the content of Annex 3);

4.3 measures, when required, are taken to limit the operation of ESIM to the territory or territories under the jurisdiction of the administrations authorizing ESIM;

4.4 a point of contact is provided for the purpose of tracing any suspected cases of unacceptable interference from ESIM;

5 that in case of unacceptable interference caused by any type of ESIM:

5.1 the administration of the country in which the ESIM is authorized shall cooperate with an investigation into the matter and provide, where possible, any required information on the operation of ESIM and a point of contact to provide such information;

5.2 the administration of the country in which the ESIM is authorized and the notifying administration of the satellite network with which the ESIM communicate shall, jointly or individually, as the case may be, upon receipt of a report of interference shall take required action to eliminate or reduce interference to an acceptable level;

*Note: in resolves 5.1 and 5.2 the administration authorizing ESIM is the administration providing the radio licence to the vehicle on which the ESIM operate.*

6 that the application of this Resolution does not provide regulatory status to ESIM different from that derived from the GSO FSS network with which they communicate taking into account the provisions referred to in this Resolution,

instructs the Director of the Radiocommunication Bureau

1 to take any necessary actions for the implementation of this Resolution;

2 to take any necessary actions to facilitate the implementation of this Resolution, including assisting in resolving interference, if any;

3 to report to future WRCs any difficulties or inconsistencies encountered in the implementation of this Resolution,

invites administrations

1 to collaborate, to the maximum extent practicable, for the implementation of this Resolution, in particular for resolving interference, if any;

2 to consider Annex 3 when authorizing an ESIM, as well as for bilateral or multilateral negotiations,

instructs the Secretary-General

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

Annex 1 to draft new Resolution [IND/A15] (WRC-19)

Provisions for ESIM to protect space services in the frequency band 27.5‑29.5 GHz

1 In order to protect those non-GSO FSS systems referred to in *resolves*1.1.6 of this Resolution, ESIM shall comply with the following provisions:

*a)* the level of equivalent isotropically radiated power (e.i.r.p.) density emitted by an ESIM in a geostationary-satellite network in the 27.5-28.6/29.1 GHz frequency band shall not exceed the following values for any off-axis angle ϕ which is 3° or more off the main-lobe axis of an ESIM antenna and outside 3° of the GSO:

|  |  |  |
| --- | --- | --- |
| *Off-axis angle* |  | *Maximum e.i.r.p. density* |
|  3    7 |  | 28 − 25 log dB(W/40 kHz) |
|  7    9.2 |  |  7 dB(W/40 kHz) |
|  9.2    48 |  | 31 − 25 log dB(W/40 kHz) |
| 48    180 |  | −1 dB(W/40 kHz) |

Option 1

*b)* for any ESIM that does not meet the condition *a)* above, outside of 3° of the GSO arc, the maximum ESIM on-axis e.i.r.p. shall not exceed 55 dBW for emission bandwidths up to and including 100 MHz. For emission bandwidths larger than 100 MHz, the maximum ESIM on‑axis e.i.r.p. may be increased proportionately.

Annex 2 to draft new Resolution [IND/A15] (WRC-19)

Provisions for maritime and aeronautical ESIM to protect terrestrial services in the frequency band 27.5-29.5 GHz

Part 1: MARITIME ESIM

1 The notifying administration of the GSO FSS satellite network with which a maritime ESIM communicates shall ensure compliance of the maritime ESIM with the following conditions:

1.1 the minimum distances from the low-water mark as officially recognized by the coastal State beyond which maritime ESIM can operate without the prior agreement of any administration is (60 to 120 km, with preference to 60 to 70 km, depending on the results of studies)\* in the 27.5‑29.5 GHz frequency band. Any transmissions from maritime ESIM within the minimum distance shall be subject to the prior agreement of the concerned coastal State;

\* WRC-19 is invited to consider this range and decide upon a single value.

1.2 the maximum maritime ESIM e.i.r.p. spectral density towards the horizon shall be limited to 12.98 dB(W/1 MHz). Transmissions from maritime ESIM with higher e.i.r.p. spectral density levels towards the territory of any coastal state shall be subject to the prior agreement of the concerned coastal State together with the mechanism by which this level is to be maintained.

Part 2: AERONAUTICAL ESIM

Option 2 (this option is associated with options 1, 2 and 3 of *resolves* 1.2.5 of the Resolution)

The part below is intended as provisions for aeronautical ESIM to protect terrestrial services operating in the frequency band 27.5-29.5 GHz for the implementation of *resolves* 1.2.2.

2 The notifying administration of the GSO FSS satellite network with which an aeronautical ESIM communicates shall ensure compliance of the aeronautical ESIM with the following conditions:

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 ESIM shall not exceed:

Option 1

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

 pfd(δ) = −132.4+1.9∙log10(δ) (dB(W/m2 ⋅ 1 MHz)) for 0.01° ≤ δ ≤ 0.3°

 pfd(δ) = −127.7+11∙log10(δ) (dB(W/m2 ⋅ 1 MHz)) for 0.3° < δ ≤ 1°

 pfd(δ) = −127.7+18∙log10(δ) (dB(W/m2 ⋅ 1 MHz)) for 1° < δ ≤ 12.4°

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

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

Option 2

2.2 is not needed. A minimum altitude is not required since the compliance with a pfd mask in 1.1 above is sufficient to protect terrestrial services;

Note: With respect to Options 1 and 2 above, the approach of using a minimum altitude to be complied with still needs to be agreed upon.

2.3 higher pfd levels than those provided in 2.1 within an administration produced by aeronautical ESIM on the surface of the Earth above shall be subject to the prior agreement of that administration;

2.4 within the territory under the jurisdiction of an administration where the ESIM operate, aeronautical ESIM shall comply with the bilateral or multilateral agreements of the concerned administrations.

Note: Due to lack of time and the complexity of the issue, the parts of contributions addressing Annex 3, including section 3/1.5/5.2.1 and section 3/1.5/5.2.2 were not discussed in detail at CPM19-2. Therefore, the contents of this Annex and those sections are presented as in input Document [CPM19-2/1](https://www.itu.int/md/R15-CPM19.02-C-0001/en).

Annex 3 to draft new Resolution [IND/A15] (WRC-19)

Land ESIM and overall responsibilities for
the operation of all three ESIM types

or

Guidelines to assist administrations to authorize ESIM
in the frequency band 27.5-29.5 GHz

Note: The title needs to be revised in order to align with the responsibilities stipulated in the ITU CS.

Note: It is necessary to carefully review the responsibility and obligation of each entity in this Annex with regard to the mandatory actions mentioned below.

Note: Once the content of this Annex is reviewed and agreed, the list of administrations below could be reduced or deleted, as appropriate, to reflect only the entities involved.

Note: For the operation of ESIM, the technical, operational and regulatory responsibilities of entities operating various types of ESIM (on board aircraft, on board vessels and on board land vehicles) need to be defined:

a) notifying administration of the ESIM assignments corresponding to the satellite networks on which the ESIM operate;

b) satellite operators of ESIM assignments;

c) the gateway administration which facilitates the radiocommunication connection between the ESIM terminal and the satellite space station;

d) administrations on territory (air space, territorial water and land) of which the ESIM terminal will operate.

How the responsibilities mentioned above are assumed by each of these four entities and how the interference management system would be performed need to be defined.

It is understood that there would be a monitoring and control station to take necessary actions in regard with “enabling” and “disabling” the operation of the ESIM terminals. If such actions are envisaged to be performed by the entities mentioned in a), b) and c) above, then it should be clear how such responsibilities are shared between these entities. On the other hand if such “enabling” and “disabling” functions are divided or shared by these three entities, then the responsibility of the fourth entity (the entity on the territory under the jurisdiction of which the ESIM terminals would be located) could act? Suppose that such “enabling” and “disabling” functions are totally performed outside the control of the fourth entity, then that entity which, in fact, licensed the operation of the ESIM terminals has no authority or responsibility on the function of the ESIM terminals that it authorized/licensed. However, according to the *resolves* of Resolution **1** **(Rev.WRC-03)** that fourth entity is legally responsible towards other administrations in regard with any potential interference that may occur.

In addition, in case that interference caused by the operation of ESIM terminals to the terrestrial or space services of other administrations, the appropriate course of action and operational procedure on how rapidly reduce the interference to the acceptable level or its elimination is also not addressed, at all.

Shared responsibilities among various entities and administrations need to be defined.

1 For the purpose of this Annex, the entities below are defined as follows:

*a)* Administration A is the administration on the territory of which an ESIM operates.

*b)* Administration B is the administration on the territory of which a potentially interfered-with FS receiver is located.

*c)* Administration C is the administration on the territory of which the ESIM gateway is located. The ESIM gateway is TBD.

*d)* Administration D is the notifying administration of the GSO FSS network with which the ESIM communicate.

*e)* Administration E is the administration on the territory of which the Network Control and Monitoring Centre (NCMC) is located. The NCMC is TBD.

*f)* Administration F is the administration whose licence is mutually recognized by Administration A when an ESIM is operating on the territory under the jurisdiction of Administration A.

Note - An additional guideline may be considered to suggest that administrations authorizing ESIM should notify so to the Bureau.

*g)* the ESIM network operator is TBD.

or

*g)* the ESIM network operator is the service provider that uses capacity on the satellite communicating with the ESIM.

The following guidelines are provided for all administrations involved in the authorization and operation of ESIM in the 27.5-29.5 GHz and 17.7-19.7 GHz frequency bands:

2 With regard to Land ESIM (L‑ESIM), the administration authorizing L‑ESIM has the right to require:

*a)* That L‑ESIM operate within the territory under the jurisdiction of another administration shall only do so if authorized by that administration.

*b)* The operator of any ESIM network within which the L‑ESIM operate ensure that such L‑ESIM only have the capability to *limit operations to/operate within* the territory of administrations having authorized those L‑ESIM.

or

*b)* That the ESIM network operator ensures that such L‑ESIM have the capability to limit operations to the territory of administrations having authorized those L‑ESIM.

*c)* The administration authorizing L‑ESIM shall require that the ESIM network operator put in place all necessary measures so that its L‑ESIM are subject to permanent monitoring and control by a NCMC or equivalent facility and are capable of receiving and acting upon at least “enable transmission” and “disable transmission” commands from the NCMC or equivalent facility.

*d)* The operator of the ESIM network within which the L‑ESIM operate provide a point of contact for the purpose of tracing any suspected cases of interference from L‑ESIM.

3 With regard to Maritime ESIM (M‑ESIM), the administration authorizing M‑ESIM has the right to require:

*a)* That M‑ESIM operating within the territorial waters under the jurisdiction of another administration shall only do so if authorized by that administration.

*b)* The operator of any ESIM network within which the M‑ESIM operate ensure that such M‑ESIM only have the capability to *limit operations/operate* within the territorial waters of administrations having authorized those M‑ESIM.

*c)* The administration authorizing M‑ESIM shall require that the ESIM network operator put in place all necessary measures so that its M‑ESIM are subject to permanent monitoring and control by an NCMC or equivalent facility and are capable of receiving and acting upon at least “enable transmission” and “disable transmission” commands from the NCMC or equivalent facility.

*d)* The administration authorizing M‑ESIM shall require that the ESIM network operator provide a point of contact for the purpose of tracing any suspected cases of interference from M‑ESIM.

3.1 The Administration C on the territory of which the ESIM Gateway is located and the network operator of M‑ESIM operating in the international waters are responsible for compliance with all necessary actions related to the implementation of the M‑ESIM licensing procedures adopted in the “Flag of the Vessel” State.

4 With regard to Aeronautical ESIM (A‑ESIM), the administration authorizing A‑ESIM has the right to require:

*a)* That A‑ESIM operate within the territorial airspace under the jurisdiction of an administration only if authorized by that administration.

or

*a)* The administration authorizing A‑ESIM shall require that A‑ESIM operating within the national controlled airspace under the jurisdiction of another administration shall only do so if authorized by that administration.

*b)* That the ESIM network operator ensures that such A‑ESIM have the capability to limit operations to the territorial airspace of administrations having authorized those A‑ESIM.

or

*b)* The administration authorizing A‑ESIM shall require that the ESIM network operator ensure that such A‑ESIM only have the capability to operate within the national controlled airspace of administrations having authorized those A‑ESIM.

or

*b)* The operator of any ESIM network within which the A‑ESIM operate ensure that such A‑ESIM have the capability to limit operations to the territorial airspace of administrations having authorized those A‑ESIM.

*c)* That the ESIM network operator provide a point of contact for the purpose of tracing any suspected cases of interference from A‑ESIM.

or

*c)* The administration authorizing A‑ESIM shall require that the ESIM network operator put in place all necessary measures so that its A‑ESIM are subject to permanent monitoring and control by an NCMC or equivalent facility and are capable of receiving and acting upon at least “enable transmission” and “disable transmission” commands from the NCMC or equivalent facility.

*d)* The administration authorizing A‑ESIM shall require that the ESIM network operator provide a point of contact for the purpose of tracing any suspected cases of interference from A‑ESIM.

4.1 The Administration C on the territory of which the ESIM Gateway is located and the network operator of A‑ESIM operating in the international airspace are responsible for compliance with all necessary actions related to the implementation of the A‑ESIM licensing procedures adopted in the “Flag of the Aircraft” State.

5 At the regional or multi-country level, mutual recognition of national licences (authorizations) for the operation of ESIM is allowed subject to bilateral or multilateral agreements between the interested States on free circulation, cross-border movement and use of different types of ESIM considered in the Resolution.

APPENDIX 4 (REV.WRC‑15)

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

ANNEX 2

Characteristics of satellite networks, earth stations
or radio astronomy stations[[1]](#footnote-1)2    (Rev.WRC‑12)

Footnotes to Tables A, B, C and D

MOD IND/92A5/6#49994

**TABLE A**

GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK,
EARTH STATION OR RADIO ASTRONOMY STATION     (Rev.WRC‑19)

| Items in Appendix | *A \_ GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK, EARTH STATION OR RADIO ASTRONOMY STATION*  | Advance publication of a geostationary-satellite network | Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article 9 | Advance publication of a non-geostationary-satellite network 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 | 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.18** | **COMPLIANCE WITH NOTIFICATION OF AIRCRAFT EARTH STATION(S)** |  | **A.18** |  |
| A.18.a | a commitment that the characteristics of the aircraft earth station (AES) in the aeronautical mobile-satellite service are within the characteristics of the specific and/or typical earth station published by the Bureau for the space station to which the AES is associatedRequired only for the band 14-14.5 GHz, when an aircraft earth station in the aeronautical mobile-satellite service communicates with a space station in the fixed-satellite service |  |  |  | **+** | **+** |  |  |  |  | A.18.a |  |
| **A.19** | **COMPLIANCE WITH § 6.26 OF ARTICLE 6 OF APPENDIX 30B** |  |  |  |  |  |  |  |  |  | **A.19** |  |
| A.19.a | a commitment that the use of the assignment shall not cause unacceptable interference to, nor claim protection from, those assignments for which agreement still needs to be obtained Required if the notice is submitted under § 6.25 of Article 6 of Appendix **30B** |  |  |  |  |  |  |  |  | **+** | A.19.a |  |
| **A.20** | **COMPLIANCE WITH r*esolves*** **1.1.3 OF DRAFT NEW RESOLUTION [IND/A15] (WRC‑19)** |  |  |  |  |  |  |  |  |  | **A.20** |  |
| A.20.a | indicator (yes) if an assignment for the 27.5‑29.5 GHz and/or 17.7-19.7 GHz band in the satellite network will be used by ESIM |  |  |  |  |  | **O** |  |  |  | A.20.a |  |
| A.20.b | if yes under A.20.a, a commitment that the ESIM operation would be in conformity with the Radio Regulations and draft new Resolution **[IND/A15] (WRC‑19)** (including its Annexes) |  |  |  |  |  | **+** |  |  |  | A.20.b |  |

SUP IND/92A5/7#49987

RESOLUTION 158 (WRC‑15)

Use of the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) by earth stations in motion communicating with
geostationary space stations in the fixed-satellite service

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

1. 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-1)