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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 28-E** |
|  | **27 September 2019** |
|  | **Original: Chinese** |
|  |
| China (People's 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)**;

ARTICLE 5

Frequency allocations

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

MOD CHN/28A5/1#49988

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 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 |

**Reasons:** Adding a footnote to frequency allocations table of RR Article **5** to allow for operation of earth stations in motion communicating with GSO FSS space stations in the bands 17.7- 19.7 GHz and 27.5-29.5 GHz.

MOD CHN/28A5/2#49989

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 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 |

**Reasons:** Adding a footnote to frequency allocations table of RR Article **5** to allow for operation of earth stations in motion communicating with GSO FSS space stations in the bands 17.7-19.7 GHz and 27.5-29.5 GHz.

MOD CHN/28A5/3#49990

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 5.539 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 |

**Reasons:** Adding a footnote to frequency allocations table of RR Article **5** to allow for operation of earth stations in motion communicating with GSO FSS space stations in the bands 17.7-19.7 GHz and 27.5-29.5 GHz.

ADD CHN/28A5/4#49991

5.A15The 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 shall be subject to draft new Resolution **[CHN/A15] (WRC‑19)**.(WRC‑19)

**Reasons:** Adding a new footnote to allow the operation of ESIM in the bands 17.7-19.7 GHz and 27.5-29.5 GHz. For coexisting with other services allocated in the same band, ESIM should operate under the technical, operational and regulatory framework specified by the new Resolution **[CHN/A15] (WRC‑19)**.

ADD CHN/28A5/5#49993

draft new RESOLUTION [CHN/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:

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;

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;

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

1.1.6 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**;

1.1.7 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;

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;

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 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;

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;

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;

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

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

3.1 techniques to maintain pointing accuracy with the associated GSO FSS satellite to ensure not to inadvertently track the adjacent GSO satellites shall be employed for the operation of ESIM;

3.2 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;

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

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

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

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

4.2 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, take required action to eliminate or reduce interference to an acceptable level;

5 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 to facilitate the implementation of this Resolution, including assisting in resolving interference, if any;

2 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 when assigning frequencies for ESIM, take the provisions in Annex 2 of this Resolution as guidance to assist administration in facilitating the protection of terrestrial services, where applicable,

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 [CHN/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 27.5-29.1 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) |

*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 [CHN/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 70 km 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;

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

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:

 pfd(θ) = −124.7 (dB(W/m2 ⋅ 14 MHz)) for 0° ≤ θ ≤ 0.01°

 pfd(θ) = −120.9 + 1.9∙log10(θ) (dB(W/m2 ⋅ 14 MHz)) for 0.01° ≤ θ ≤ 0.3°

 pfd(θ) = −116.2 + 11∙log10(θ) (dB(W/m2 ⋅ 14 MHz)) for 0.3° < θ ≤ 1°

 pfd(θ) = −116.2 + 18∙log10(θ) (dB(W/m2 ⋅ 14 MHz)) for 1° < θ ≤ 2°

 pfd(θ) = −117.9 + 23.7∙log10(θ) (dB(W/m2 ⋅ 14 MHz)) for 2° < θ ≤ 8°

 pfd(θ) = −96.5 (dB(W/m2 ⋅ 14 MHz)) for 8° < θ ≤ 90.0°

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

2.2 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;

2.3 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.

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 CHN/28A5/6#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 AND 1.2.4 OF THE DRAFT NEW RESOLUTION [CHN/A15] (WRC‑19)** |  |  |  |  |  |  |  |  |  | **A.20** |  |
| A.20.a | indicate 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 | a commitment that the ESIM operation would be in conformity with the Radio Regulations and draft new Resolution **[CHN/A15] (WRC‑19)** (including its Annexes) |  |  |  |  |  | **+** |  |  |  | A.20.b |  |

SUP CHN/28A5/7#49995

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

**Reasons:** As a new WRC Resolution on ESIM will be developed by the WRC-19, Resolution **158 (WRC-15)** can be suppressed.

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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)