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| **Radiocommunication Study Groups** |  |
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| Source: Document 5A/TEMP/242(Rev.1) | **Annex 4 to Document 5A/597-E** |
| **3 June 2022** |
| **English only** |
| Annex 4 to Working Party 5A Chairman’s Report | |
| draft CPM text for WRC-23 Agenda Item 1.3 | |
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CHAPTER 1

Fixed, Mobile and Broadcasting issues

(Agenda items 1.1, 1.2, 1.3, 1.4, 1.5)

Agenda item 1.3

**(WP 5A / WP 3K, WP 3M, WP 4A, WP 5B, WP 5C, WP 5D)**

*1.3 to consider primary allocation of the band 3 600-3 800 MHz to mobile service within Region 1 and take appropriate regulatory actions, in accordance with Resolution* ***246 (WRC-19)****;*

Resolution **246 (WRC-19)** – *Studies to consider possible allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1.*

Different views have been expressed regarding the invites WRC-23 of Resolution **246 (WRC-19)** “to consider possible upgrade of the allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1, and to take appropriate regulatory actions.

***View 1:***

*With regards to Method D (a possible IMT identification under this Agenda Item), several administrations raised the following points,*

1. *identification of the band, if upgraded to primary, for IMT is not in the scope of WRC-23 Agenda Item 1.3*
2. *there is no specific reference to identification of the band, if upgraded to primary, to IMT and the interpretation of the term “Regulatory Action” to mean identification is not supported.*
3. *ITU-R is not eligible to interpret the language used in title of agenda item 1.3 or in its supporting Resolution*
4. *More importantly, this method does not have any provision to protect incumbent services and their future development*

Moreover, these administrations, after consultation with the BR, are of the view that, while the framework of Res. **246 (WRC-19)** does not explicitly exclude studies on IMT from other studies on mobile service applications under the purview of WP5A, it does not address the possibility of an IMT identification of the band under consideration. WP5A may include IMT applications in its studies under AI 1.3 based on input information, e.g. from WP5D, but cannot propose an IMT identification because this task was not decided by WRC-19 when establishing AI 1.3. In this regard, it has to be noted that CPM23-1 followed the clear differentiation of WRC-19 between Agenda Items 1.2 and 1.3 and consequently assigned both to different groups with dedicated expertise. WP5A, when developing and concluding on this draft CPM text, must respect the above.

In addition, the above administrations object to make any reference to considering d) of Res. **246 (WRC-19)** as reproduced below: “considering d)”

“d) that some administrations in Region 1 are currently using the frequency band 3 600- 3 800 MHz, or part of that frequency band, for the mobile service (for example International Mobile Telecommunications (IMT) implementation);

The above objection is based on the fact considering d) only indicate the use of spectrum for IMT as a national policy of administrations wishing to use IMT for that band under RR 4.4

In view of the above these administrations therefore strongly object to make any reference to identification of IMT under this agenda item.

***View 2:***

Some other Administrations have the view that the framework of Resolution **246 (WRC-19)** include the studies on IMT systems as part of mobile service applications as well as IMT identification within the scope of AI 1.3 considered under the purview of WP 5A. The resolution **246 (WRC-19)** invites the 2023 World Radiocommunication Conference:

“ … to consider possible upgrade of the allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1, and to take appropriate regulatory actions”

It is crystal clear from Resolution **246 (WRC-19)** that IMT studies and consequently potential for IMT identification in WRC-23 is part of the AI 1.3 scope as follow:

1. IMT identification is included within the scope of Resolution **246 (WRC-19)** by clearly calling WRC-2023 to consider taking appropriate regulatory actions in addition to upgrading the allocation to mobile service on a primary basis.
2. IMT is part of the mobile service since Resolution **246 (WRC-19)** resolve to invite the ITU Radiocommunication Sector …. to conduct sharing and compatibility studies in time for WRC-23 between the mobile service and other services allocated on a primary basis within the frequency band 3 600-3 800 MHz …,
3. In accordance with Administrative Circular CA/251 CA251, CPM23-1 decided that WP5D is contributing group in the AI 1.3, which is responsible for IMT aspects to be considered in the WP5A studies on this AI 1.3.
4. It is necessary to refer to considering d) of Res. **246 (WRC-19)** as reproduced below: “considering d)”

“d) that some administrations in Region 1 are currently using the frequency band 3 600- 3 800 MHz, or part of that frequency band, for the mobile service (for example International Mobile Telecommunications (IMT) implementation);”

Accordingly, this agenda item was intended to upgrade the mobile allocation to primary and to identify the band for IMT, since IMT is already implemented in many countries of Region 1 as well as other regions.

***View 3:***

*Some administrations are of the view that the pfd limit of -154.5 dB(W/(m² ‧ 4 kHz)) at 3 m above ground not to be exceeded for more than 20% of time does not ensure the respect of the short-term criteria for the FSS receiver. Therefore, Method C alternative C5 proposes regulatory approach based on a pfd limit to ensure protection of the uncoordinated typical FSS earth stations.  Proposed value for a limit is based on short-term protection criterion for FSS stations (I/N -1.3 dB not to be exceeded for 0.005% of time), minimal elevation angle of 5 degrees, System noise temperature of 120 K and FSS Earth station antenna Gain pattern  from Rec. S.465, as provided by WP 4A.*

***View 4:***

*Concerning Method C alternative C5, some administrations raised concerns regarding the applicability of the short-term criteria for the following reasons:*

1. *The proposed pfd limit of -154.5 dB (W/(m² ‧ 4 kHz)) was defined for the protection of uncoordinated VSAT (for worst case scenario) and the use of such short-term criteria would lead to unrealistic protection distances*
2. *For large stations, for which the short-term interference criteria is important, the provision of 9.17 also applies in the coordination phase, and the coordination distance is based on the short-term interference criteria.*
3. *If the coordination does not apply, it is because it is not a large station and WRC-07 considered that it was not necessary to update the short-term criteria.*
4. *The pfd value of [-154.5 dB (W/(m² ‧ 4 kHz))] has been previously proposed as the long-term protection threshold at 3m above ground for 20% of the time at the border of other administrations. Method C alternative C5 considers the same long-term pfd value but for 0.005% of time, which is the time % used in the short-term protection criterion. The resulting protection criterion from combining elements of both long- and short-term criteria has not been technically justified in the studies and will result in unrealistic and unnecessary separation distances.*

# 1/1.3/1 Executive summary

Section 1/1.3/3 contains a summary of the compatibility and sharing studies between the MS and the FSS and FS that were conducted before the current study cycle. It also summarises seven studies that have been conducted in the current cycle under WRC-23 agenda item 1.3.

Four methods to satisfy this agenda item are proposed in Section 1/1.3/4:

– Method A: No change

– Method B: Upgrade of the allocation of 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1 without conditions

– Method C: Upgrade of the allocation of 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1 with regulatory and/or technical conditions. This Method includes five alternatives for the conditions.

– Method D: Upgrade of the allocation of 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1 without conditions, and identification for IMT

All four methods also propose to suppress Resolution **246 (WRC-19)**.

The regulatory and procedural considerations for the methods and alternatives are contained in Section 1/1.3/5.

# 1/1.3/2 Background

Further to Resolution **246 (WRC-19)**, efficient implementation of broadband connectivity, inter alia, could play an important role in development of telecommunications services in many countries.

# 1/1.3/3 Summary and analysis of the results of ITU-R studies

## 1/1.3/3.1 Applicable ITU-R Recommendations and Reports

ITU-R Recommendations: P.452, P.1238, P.2040, P.2001, M.2150, F.1336

ITU-R Reports: S.2368, M.2109, S.2199, M.2111, M.2116-2, F.2328

## 1/1.3/3.2 Summary of the results of studies

Sharing and compatibility studies in the frequency band 3 300-4 200 MHz, including frequency band 3 600-3 800 MHz, between mobile service (including IMT) and other existing services have been carried out in preparation of previous World Radio communication Conferences including WRC-07 and WRC-15.

The frequency range 3 400-4 200 MHz, or parts thereof, is allocated to the FS, FSS, ARS, MS and RLS. The frequency bands adjacent to this frequency range are allocated to the RLS, ARS, FS, MS, RNS and ARNS. The details of these allocations and those of the adjacent frequency bands can be found in RR Article **5**.

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 3 300-3 400  RADIOLOCATION  5.149 5.429 5.429A 5.429B  5.430 | 3 300-3 400  RADIOLOCATION  Amateur  Fixed  Mobile  5.149 5.429C 5.429D | 3 300-3 400  RADIOLOCATION  Amateur  5.149 5.429 5.429E 5.429F |
| 3 400-3 600  FIXED  FIXED-SATELLITE  (space-to-Earth)  MOBILE except aeronautical mobile 5.430A  Radiolocation  5.431 | 3 400-3 500  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.431A 5.431B  Amateur  Radiolocation 5.433  5.282 | 3 400-3 500  FIXED  FIXED-SATELLITE (space-to-Earth)  Amateur  Mobile 5.432 5.432B  Radiolocation 5.433  5.282 5.432A |
| 3 500-3 600  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.431B  Radiolocation 5.433 | 3 500-3 600  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.433A  Radiolocation 5.433 |
| 3 600-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  Mobile | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.434  Radiolocation 5.433 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile  Radiolocation  5.435 |
| 3 700-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | |

### 1/1.3/3.2.1 Studies from previous cycles (before WRC-19)

Notwithstanding the studies performed under WRC-23 agenda item 1.3, the results provided in Reports ITU-R S.2368, S.2199, F.2328 reflected in this section remain valid taking into account the parameters, assumptions and conditions based on which these Reports were adopted. However, the relevance of the studies in these Reports depend on current and future deployments of Radiocommunications Services including the Land Mobile Service.

#### 1/1.3/3.2.1.1 Compatibility and sharing studies with FSS system

Report ITU-R S.2368 assessed compatibility and sharing studies between IMT-Advanced systems and geostationary satellite networks in the fixed-satellite service in the frequency range 3 400‑4 200 MHz. Section 7 of the Report contains the Summary of the results including the assumptions and interference mechanisms considered, and Section 9 provides the overall summary. For co-channel sharing, the following separation distance requirements were found, to protect the long-term interference criterion of FSS receiving earth stations

– For suburban/urban macro-cell deployment scenarios: some studies resulted in distances as low as around 10 km, and other studies showed distances as large as around 100 km;

– For small-cell outdoor deployment scenarios: some studies resulted in distances as low as around 0.5 km, and other studies showed distances as large as around 80 km;

– For small-cell indoor deployment scenarios: some studies resulted in distances as low as around 0.5 km, and other studies showed distances as large as around 60 km.

Report ITU-R S.2368 also provides studies which indicated that for co-channel configurations the separation distances when considering short-term protection criterion, as presented in the report, for FSS receiving earth stations could be as low as around 0.2 km and as large as around 400 km, depending on assumptions of the studies.

Report ITU-R S.2368 also provides studies which indicated that for adjacent channel configurations, the separation distances when considering long-term protection criterion for FSS receiving earth stations could be less than 0.3 km and as large as around 49 km, depending on the assumptions of the studies including guard bands between 0 MHz and 20 MHz.

Report ITU-R S.2199 examined the compatibility of Broadband Wireless Access systems (BWA) with FSS systems also in the frequency range 3 400‑4 200 MHz. Section 6 of the Report contains the Summary of the results including the assumptions and interference mechanisms considered, and Section 8 provides the overall summary. The separation distance requirements to facilitate sharing were found to be:

– Co-frequency: several tens to in excess of 100 km;

– Out-of-band emissions: a few km; and

– FSS receiver saturation: a few to several km.

Study A in Attachment 1 to Annex B of Report ITU-R S.2199 states that the minimum required distance can be smaller than 100 m. However, this was not reflected in the Conclusions of Report ITU-R S.2199.

#### 1/1.3/3.2.1.2 Compatibility and sharing studies with FS system

Report ITU-R F.2328 examined the sharing and compatibility of IMT and FS systems operating in the frequency range 3 400-4 200 MHz. Table 6 of the Report contains the Summary of the results including the assumptions and interference mechanisms considered, and the Conclusions Section provides the overall summary. The separation distance requirements between the IMT BS and the FS receiver to facilitate sharing were found to be:

– Co-frequency: 50.4-92.0 km (Macro Suburban), 41.7-81.0 km (Macro Urban), 13.4-45.0 km (Small Cell Outdoor) and 1-10 km (Small Cell Indoor), depending on the interference scenario and deployment environment; and

– the adjacent channel: between 1 km (for a frequency separation of 27.7 MHz) and 30 km (for a frequency separation of 9 MHz).

#### 1/1.3/3.2.1.3 Analysis of the results of studies (before WRC-19)

Report ITU-R S.2368 contains conclusions on the sharing and compatibility studies between IMT-Advanced and the FSS in the frequency band 3 400-4 200 MHz, indicating that sharing is feasible when FSS earth stations are at known, specific locations, and deployment of IMT-Advanced is outside the minimum required distances for each azimuth to protect these specific FSS earth stations. When FSS earth stations are deployed in a typical ubiquitous manner or with no individual licensing, sharing between IMT-Advanced and FSS may not be feasible in the same geographical area since no minimum separation distance can be guaranteed.

In the frequency band 3 400-3 600 MHz regulatory and technical conditions to protect existing services contain, a power flux-density (pfd) limit, applicable to stations of the mobile service, of −154.5 dB(W/(m2· 4 kHz)) at 3 m above ground not to be exceeded for more than 20% of time at the border of the territory of any other administration.

Compatibility and sharing studies in Report ITU-R S.2368, Report ITU-R M.2109 and Report ITU-R F.2328, do not differentiate between frequency bands 3.4-3.6 GHz and 3.6-3.8 GHz.

Therefore, the same regulatory and technical provisions could be considered in the frequency bands 3.6-3.8 GHz for a possible primary allocation of the frequency band 3.6-3.8 GHz to the mobile service.

### 1/1.3/3.2.2 WRC-23 study cycle summary of studies

#### 1/1.3/3.2.2.1 Compatibility and sharing studies with FSS systems

##### 1/1.3/3.2.2.1.1 Parameters and assumptions of the studies

The table below summarises the parameters and assumptions used in the FSS-MS compatibility studies. The rest of this section summarises the results of the studies.

|  | Study A | Study B | Study C | Study D | Study E | Study | Study G |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scenario | In-band | In-band | In-band | In-band | In-band | In-band and adjacent band | In-band |
| Methodology | Statistical | Statistical | Statistical study | Statistical study | Statistical study | statistical | Deterministic (single entry) and statistical |
| MS characteristics |  |  |  |  |  |  |  |
| Deployment scenarios | Urban, suburban macro | Urban macro | Urban macro | Urban macro | Urban, suburban macro | Urban, suburban, rural macro | Urban, suburban, rural macro |
| BS antenna | AAS | AAS | AAS | AAS | AAS | AAS | non-AAS |
| Parameter source | See Doc. [5A/378](https://www.itu.int/md/R19-WP5A-C-0378/en) | See Doc. [5A/378](https://www.itu.int/md/R19-WP5A-C-0378/en) | See Doc. [5A/378](https://www.itu.int/md/R19-WP5A-C-0378/en) | See Doc. [5A/378](https://www.itu.int/md/R19-WP5A-C-0378/en) | See Doc. [5A/378](https://www.itu.int/md/R19-WP5A-C-0378/en) | See Doc. [5A/378](https://www.itu.int/md/R19-WP5A-C-0378/en) | See Doc. [5A/378](https://www.itu.int/md/R19-WP5A-C-0378/en) |
| FSS characteristics |  |  |  |  |  |  |  |
| Antenna diameter (metres) | 1.2 m, 3 m, 32 m | 3 m & 32 m | 5 m to 7.3 m | 3 m | 3 m | AAS: 1.2-32 m | Non-AAS: 2.4-12 m, |
| Elevation angle (degrees) | 10 | 26 to 55 | 24.8 to 50 | 30&68 | 10°, 15° and 48° | 10 deg AAS | 17-77 degrees non AAS, |
| Antenna height (metres) | 10 m & 17 m | 5 m & 18 m | 1.8 m | 1.8 m | 5 m | 10 m | 10 m |
| Azimuth angle between FSS boresight & IMT network (degrees) | 0 and 180 | 0 | 0 and 180 | 0 | 0 | 0 degrees for AAS | Full circle for non AAS, |
| Parameter source | See Doc. [5A/395](https://www.itu.int/md/R19-WP5A-C-0395/en) | See Doc. [5A/395](https://www.itu.int/md/R19-WP5A-C-0395/en)  3-dB scale factor in the antenna pattern | See Doc. [5A/395](https://www.itu.int/md/R19-WP5A-C-0395/en) | See Doc. [5A/395](https://www.itu.int/md/R19-WP5A-C-0395/en) | See Doc. [5A/395](https://www.itu.int/md/R19-WP5A-C-0395/en) | See Doc. [5A/395](https://www.itu.int/md/R19-WP5A-C-0395/en) | See Doc. [5A/395](https://www.itu.int/md/R19-WP5A-C-0395/en) |
| Propagation and clutter models |  |  |  |  |  |  |  |
| Model source | See Doc. [5A/384](https://www.itu.int/md/R19-WP5A-C-0384/en) | See Doc. [5A/384](https://www.itu.int/md/R19-WP5A-C-0384/en) | See Doc. [5A/384](https://www.itu.int/md/R19-WP5A-C-0384/en) | See Doc. [5A/384](https://www.itu.int/md/R19-WP5A-C-0384/en) | See Doc. [5A/384](https://www.itu.int/md/R19-WP5A-C-0384/en) | See Doc. [5A/384](https://www.itu.int/md/R19-WP5A-C-0384/en) | See Doc. [5A/384](https://www.itu.int/md/R19-WP5A-C-0384/en) |
| Propagation model | Rec. ITU-R P.452 with 50% time, no terrain data | Rec. ITU-R P.2001 random time %, no terrain data | Rec. ITU-R P.452 with 20% time, no terrain data | Rec. ITU-R P.452 with random time %, terrain data | Rec. ITU-R P.2001 with random time %, no terrain data | AAS: Rec. ITU-R P.452 with random time % | Non-AAS: Rec. ITU-R P.452 with 20% for long-term and 0.005% for short term, terrain data |
| Clutter model | Rec. ITU-R P.2108 at mobile BSs & ES / mobile BSs only, random distribution | Rec. ITU-R P.2108 at mobile BSs / mobile BS & ES , random distribution | Rec. ITU-R P.2108 at mobile BSs and ES, random distribution | Rec. ITU-R P.2108 at mobile BSs, random distribution | Rec. ITU-R P.2108 at mobile urban BSs, (two cases: 100% of urban BSs, 50% of urban BSs), random distribution | AAS: Rec. ITU-R P.2108 at 50% of mobile BSs, random distribution | Non-AAS: Rec. ITU-R P.452 |

NOTE: The above table provides an overview of the main assumptions for each of the sharing and compatibility studies that are summarized in this section and indicates the main parameters used in each study. Since the various studies have used different assumptions for various parameters, the corresponding summary is shown at the end of each study to indicate the results of that study. The overall summary of all studies, to the extent practicable, is also shown at the end of this section. It is evident that it would be difficult or impractical to properly reflect such overall results in the section "Methods to satisfy agenda the item" taking into account that some of the input parameters merely reflect the conditions and circumstances based on which the study was carried out. Consequently, no single unified overall conclusion can be drawn from these studies. The appropriate conclusions for sharing and compatibility depend on which parameter assumptions are considered most relevant by each administration.

##### 1/1.3/3.2.2.1.2 Results of the studies

###### 1/1.3/3.2.2.1.2.1 Study A

Simulation results provide the required separation distances in urban and suburban scenarios. When considering the both sides clutter loss, the range of distances are from <1 km to 11.7 km to meet the long-term criteria, and from 1.5 km to 27 km to meet the short-term criteria. When considering only MS side clutter loss, the range of distances are from 9 km to 39.3 km to meet the long-term criteria, and from 7.5 km to 39 km to meet the short-term criteria.

###### 1/1.3/3.2.2.1.2.2 Study B

The results show that the aggregated interference in urban scenarios from MS BSs to a FSS ES is able to satisfy the FSS long-term protection criterion for all considered cases at a separation distance of 20 km for FSS ESs with a small antenna diameter (3 m) and at a separation distance of 30 km for FSS ESs with a large antenna diameter (32 m). Additional results show that, if the FSS ES has natural and/or artificial shielding, the separation distances required are below 1 km.

###### 1/1.3/3.2.2.1.2.3 Study C

The results show separation distances between 4.5 km and 7.5 km for different ES, azimuth distance, and protection criteria (long-term and short-term criteria).

###### 1/1.3/3.2.2.1.2.4 Study D

The study presents results in the form of CCDFs showing the probability that the aggregate interference-to-noise ratio exceeds different ΣI/N values for a number of different scenarios. The probability that an example ΣI/N value of -10 dB is exceeded is < 0.01 for all scenarios modelled in the study. The study illustrates that the probability of exceedance of interference was below 1% with at most a few tens of kms, with results dependent on specific scenarios on a case by case basis.

###### 1/1.3/3.2.2.1.2.5 Study E

The results indicate that distances of up to 24 km between FSS ES and urban mobile service base stations were sufficient to meet the interference criteria, while distances of up to 30 km between FSS ES and suburban mobile service base stations were sufficient to meet the interference criteria when no clutter was considered at the MS base station.

###### 1/1.3/3.2.2.1.2.6 Study F

A single-entry study calculates separation distances to protect operational FSS ES in some countries in Africa. The study concludes on required separation distance of 79.5 km to 149 km to meet the long-term interference criteria and from 248 km to 420 km to meet the short-term interference criteria depending on the FSS ES location, terrain and characteristics.

Another aggregate interference study showing the I/N aggregate impact at the Niamey FSS ES for urban and suburban deployment cases around the ES. The results corroborate the single-entry sharing study by showing a large exceedance of the FSS ES protection criteria even for small MS deployment around the FSS ES.

These studies have only addressed protection of FSS ES at a known location.

###### 1/1.3/3.2.2.1.2.7 Study G

For the in-band case the results lead to separation distance of 150-218 km to meet the long-term interference criteria and of 460-505 km to meet the short-term interference criteria. Further, for the out-of-band case, the results show:

– that the FSS ES LNB would be driven into saturation without filtering consideration and;

– the mobile OOB emissions falling into the FSS ES receiving band would have an impact on the FSS ES receiving performances even when the two services are separated by several tens of km

#### 1/1.3/3.2.2.2 Compatibility and sharing studies with FS systems

One sharing study was presented. It provides the preliminary results of the interference from MS BSs to FS station in the frequency band 3 600-3 800 MHz. Recommendations ITU-R P.452 and P.2108 are applied as propagation model and clutter loss model separately. For clutter loss model, the cases of both MS side and FS  side (with 20 m FS antenna height) and only MS side (with 60 m FS antenna height) are considered. In the simulation, the MS BSs are aside the FS station at a given distance. Monte Carlo simulation method is used in the study to evaluate the aggregated interference. The long-term protection criteria are considered when assessing the interference level from MS to FS.

Simulation results provide the required separation distances in urban and suburban scenarios. To meet the protection criteria in urban scenario, the required separation distances in the direction of FS points towards the MS are 65 km (with 60 m FS antenna height) and 26 km (with 20 m FS antenna height), and in the direction of FS facing away from the MS are 1 km (with 60 m FS antenna height) and <1 km (with 20 m FS antenna height). In addition, to meet the protection criteria in suburban scenario, the required separation distances in the direction of FS points towards the MS are 66.2 km (with 60 m FS antenna height) and 31.2 km (with 20 m FS antenna height), and in the direction of FS facing away from the MS are 2 km (with 60 m FS antenna height) and 1 km (with 20 m FS antenna height).

# 1/1.3/4 Methods to satisfy the agenda item

The following methods reflect the views of administration(s) proposing any of these methods:

## 1/1.3/4.1 Method A: No change to the RR except suppression of Resolution 246 (WRC-19)

Reason/justification:

Sharing and compatibility studies are not convincing enough to protect incumbent services therefore upgrading the allocation to primary is not supported.

## 1/1.3/4.2 Method B: Upgrade the allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1 without conditions and suppression of Resolution 246 (WRC-19)

This method proposes to upgrade the allocation of the mobile, except aeronautical mobile, service on a primary basis in the Frequency Allocation Table for the frequency band 3 600-3 800 MHz in Region 1 without any conditions. This method also proposes suppression of Resolution **246 (WRC-19)**.

## 1/1.3/4.3 Method C: Upgrade of the allocation to the mobile, except aeronautical mobile, service on a primary basis within Region 1 with regulatory and/or technical conditions and suppression of Resolution 246 (WRC-19)

This Method contains five Alternatives. They are self-contained so if chosen by administrations when preparing proposals for WRC-23 the whole Method is clearly presented.

All the Alternatives propose the suppression of Resolution **246 (WRC-19)**. To this effect there may be a need for a new Resolution in this regard yet to be decided, if necessary.

### 1/1.3/4.3.1 Alternative C1

Alternative C1 of Method C recognizes the need of upgrading the allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis in Region 1, subject to agreement to be obtained under RR No. **9.21**. This Alternative proposes the same technical and regulatory conditions as for the frequency band 3 400-3 600 MHz (except IMT identification). This upgrade to be done while ensuring the protection of existing primary services. This objective could be reached by adopting the same technical and regulatory conditions applicable to the frequency band 3 400-3 600 MHz, in particular the pfd limit of -154.5 dB(W/(m² ‧ 4 kHz)) at 3 m above ground not to be exceeded for more than 20% of time at the border.

### 1/1.3/4.3.2 Alternative C2

Alternative C2 of Method C recognizes the need of upgrading the allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis in Region 1. This upgrade to be done while ensuring the protection of existing primary services. This objective could be reached by adopting particular conditions in a footnote to the RR, in particular the pfd limit of -154.5 dB(W/(m² ‧ 4 kHz)) at 3 m above ground not to be exceeded for more than 20% of time at the border.

### 1/1.3/4.3.3 Alternative C3

Alternative C3 of Method C supports the upgrade to a mobile, except aeronautical mobile, service on a primary basis in the frequency band 3 600-3 800 MHz, or parts thereof, in Region 1, while recognising the need of the appropriate protection of the FSS at the border of each country (specifically with the implementation of a pfd limit, applicable to stations of the mobile service, of −154.5 dB(W/(m2 ‧ 4 kHz)) at 3 m above ground not to be exceeded for more than 20% of time at the border of the territory of any other administration).

### 1/1.3/4.3.4 Alternative C4

Alternative C4 of Method C proposes to upgrade the allocation of the mobile, except aeronautical mobile, service on a primary basis in the Frequency Allocation Table for the frequency band 3 600-3 800 MHz in Region 1, together with regulatory conditions in a footnote including the application of RR No **9.21**.

### 1/1.3/4.3.5 Alternative C5: Upgrading the mobile allocation with power flux-density (pfd) protection limits based on short-term protection criterion

Alternative C5 of Method C proposes alternative pfd protection limits, to include a pfd limit of [-154.5] dB (W/(m² ‧ 4 kHz)) at 3 m above ground not to be exceeded for more than 0.005% of the time at the border of the territory.

Note: This Alternative C5 was included in accordance with View 3.

With regards to Method C Alternative C5, see also Views 3 and 4 before Section 1/1.3/1.

## 1/1.3/4.4 Method D: Upgrade of the allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1 without conditions, and identification for IMT. Suppression of Resolution 246(WRC-19).

This method proposes to upgrade the allocation of the mobile, except aeronautical mobile, service on a primary basis in the Frequency Allocation Table for the frequency band 3 600-3 800 MHz in Region 1 without any conditions, and identification of the band for IMT.

Note: This Method was included in accordance with View 2

With regards to Method D, see also Views 1 and 2 before Section 1/1.3/1.

1/1.3/5 Regulatory and procedural considerations

**NOTE:** For some of the Methods presented, regulatory and procedural considerations are subject to further studies and related decisions by administrations in Region 1 and may be added at a later stage in accordance with § A2.4.5 of Resolution ITU-R 2-8.

1/1.3/5.1 For Method A: No Change

NOC

ARTICLES

1/1.3/5.2 For Method B: Upgrade to a primary basis of the allocation of 3 600-3 800 MHz to the mobile service without conditions

ARTICLE 5

Frequency allocations

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

MOD

3 600-4 800 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 3 600-3 800  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.434  Radiolocation 5.433 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile  Radiolocation  5.435 |
| 3 700-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | |
| 3 800-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  Mobile |

1/1.3/5.3 For Method C: Upgrade of the allocation to the mobile, except aeronautical mobile, service on a primary basis within Region 1 with particular regulatory and/or technical conditions

1/1.3/5.3.1 For Method C, Alternative C1

ARTICLE 5

Frequency allocations

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

MOD

3 600-4 800 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 3 600-3 800  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile ADD 5.A13-C1 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.434  Radiolocation 5.433 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile  Radiolocation  5.435 |
| 3 700-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | |
| 3 800-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  Mobile |

ADD

5.A13-C1 The allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service is subject to agreement obtained under No. **9.21**. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band, it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m2 ⋅ 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station) and with the assistance of the Bureau if so requested. In case of disagreement, calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service systems operating in the frequency band 3 600-3 800 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations.      (WRC-23)

1/1.3/5.3.2 For Method C, Alternative C2

ARTICLE 5

Frequency allocations

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

MOD

3 600-4 800 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 3 600-3 800  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile ADD 5.B13-C2 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.434  Radiolocation 5.433 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile  Radiolocation  5.435 |
| 3 700-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | |
| 3 800-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  Mobile |

ADD

5.B13-C2 Before an administration in Region 1 brings into use a (base or mobile) station of the mobile service in the frequency band 3 600-3 800 MHz, it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m2 ⋅ 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station) and with the assistance of the Bureau if so requested. In case of disagreement, calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service systems operating in the frequency band 3 600-3 800 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations.      (WRC-23)

1/1.3/5.3.3 For Method C, Alternative C3

*[TBD - Example(s) of regulatory text for this alternative to satisfy the agenda item may follow in dedicated proposals to CPM23-2 or WRC-23 directly, to give more time for national consideration and studies.]*

1/1.3/5.3.4 For Method C, Alternative C4

ARTICLE 5

Frequency allocations

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

MOD

3 600-4 800 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 3 600-3 800  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile ADD 5.C13-C4 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.434  Radiolocation 5.433 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile  Radiolocation  5.435 |
| 3 700-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | |
| 3 800-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  Mobile |

ADD

**5.C13-C4** In Region 1, the allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis is subject to agreement obtained under No. **9.21**. Stations of the mobile service in the frequency band 3 600-3 800 MHz shall not claim more protection from space stations than that provided in Table **21-4**.      (WRC-23)

1/1.3/5.3.5 For Method C, Alternative C5

*[TBD - Example(s) of regulatory text for this alternative to satisfy the agenda item may follow in dedicated proposals to CPM23-2 or WRC-23 directly, to give more time for national consideration.]*

1/1.3/5.4 For Method D: An allocation to the mobile service on a primary basis in Region 1 and identification for International Mobile Telecommunications (IMT)

ARTICLE 5

Frequency allocations

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

MOD

3 600-4 800 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 3 600-3 800  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile ADD 5.D13-D | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.434  Radiolocation 5.433 | 3 600-3 700  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile  Radiolocation  5.435 |
| 3 700-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | |
| 3 800-4 200  FIXED  FIXED-SATELLITE (space-to-Earth)  Mobile |

ADD

**5.D13-D** The frequency band 3 600 -3 800 MHz, or portions thereof, are identified for use by administrations in Region 1 wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.      (WRC-23)

1/1.3/5.5 For all Methods: Suppression of Resolution 246 (WRC-19)

SUP

RESOLUTION 246 (WRC‑19)

Studies to consider possible allocation of the frequency band   
3 600-3 800 MHz to the mobile, except aeronautical mobile,   
service on a primary basis within Region 1

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