

Authors: Kim Baum (SES), Pascale Dumit (SES), Alex Epshteyn (Intelsat), Scott Kotler (LMCO),
Chris Murphy (Inmarsat)

United States of America
Draft Proposals for the Work of the WRC-15

AGENDA ITEM 1.1: to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution **233 (WRC-12)**

BACKGROUND: Joint Task Group 4-5-6-7 (JTG 4-5-6-7) was established by Conference Preparatory Meeting 15-1 to conduct sharing studies under agenda item 1.1 and prepare draft CPM text. The IMT spectrum requirements under this agenda item, as well as characteristics of envisioned IMT systems, were developed in Working Party 5D (WP 5D). In addition, WP 5D has defined suitable frequency ranges for IMT as 410 to 6425 MHz. The JTG conducted studies in a variety of frequency bands within this suitable range, including 3400-4200 MHz and 4500-4800 MHz which are allocated to the fixed-satellite service (FSS) on a primary basis and generally referred to as “C-band.”

These global C-band FSS allocations are and have been the workhorse spectrum bands for the FSS since the 1970’s. There are approximately 180 geostationary satellites operating in these bands, and many new satellites with C-band capacity have been constructed or are under construction and scheduled to be launched in the near future. The C-band, with its unique and important technical properties, such as low rain fade and coverage of wide service areas, is extensively used worldwide. After several decades of development, C-band payloads reflect an efficient, proven technology; this allows for very low cost equipment which benefits users, small and large, in developing or developed nations. This is also the reason why many countries have utilized C-band to establish themselves as space-faring nations, placing their important national telecommunication and broadcasting infrastructure in the bands with high availability and reliability, at the lowest costs. In addition, many highly sensitive and public services are also using FSS C-band, such as satellite telemetry, disaster relief, public meteorological data distribution, and aeronautical applications in various regions, etc.

With respect to sharing studies in the 3400-4200 MHz and 4500-4800 MHz bands, Report ITU-R M.2109 finds that the minimum required separation distances from IMT-Advanced base stations, when using the long term interference criterion derived in the studies, are at least in the tens of kilometers for in-band co-channel operations; and that the minimum separation distances associated with short-term interference criterion, generally, but not in all cases, exceed one hundred kilometers in the considered cases with similar assumptions as the ones used for the long-term.

The conclusion of the studies indicate that if FSS is deployed in a ubiquitous manner and/or with no individual licensing of earth stations, sharing is not feasible in the same geographical area since no minimum separation distance can be guaranteed. The FSS deployment in C-band is ubiquitous in most geographical areas of the world. C-band FSS applications would be severely impacted if limitations are imposed on their location and/or deployments.

Similarly, recent sharing studies have been performed in JTG 4-5-6-7 to assess the technical feasibility of deploying IMT-Advanced systems in the 3 400-4 200 MHz and 4500-4800 MHz bands using the latest IMT-Advanced characteristics provided by WP 5D. These results from the recent sharing studies have shown no improvements in the ability of IMT-Advanced to share with FSS, and thus are in line with those already found in Report ITU-R M.2109. To provide protection of the FSS receive earth stations operating in the C-band, the following measures are required:

- For the in-band case, for suburban and urban macro-cell as well as small-cell outdoor deployment scenarios, for the long-term interference criterion, the required separation distances are at least in the tens of km. Similarly, in the case of IMT-Advanced small-cell indoor deployment scenarios, the required separation distances vary from about 5 kilometres to tens of kilometres
- For the out of band case, using the long-term interference criteria, the required separation distance is from 5 kilometres up to tens of kilometres for IMT-Advanced macro-cell (urban and suburban) deployment and from 900 metres to less than 5 kilometres for IMT-Advanced small-cell outdoor deployments, respectively, with no guard band.
- For a specific macro-cell deployment scenario studied, the required separation distances from the edge of the IMT-Advanced deployment area are in the range of 30 kilometres to 20 kilometres with an associated guardband of 2 MHz to 80 MHz respectively. The results show that an IMT implementation of any deployment scenario sterilizes large geographical areas preventing future deployment of satellite earth stations, e.g., VSATs.

With respect to sharing studies in the band 4 500-4 800 MHz, it should be recognized that this band is part of the Appendix 30B FSS Plan. This Plan aims to preserve orbit/spectrum resources and guarantee, for developed and developing countries equitable access to the geostationary-satellite orbit at anytime and anywhere for their use. From a technical point of view, the same sharing difficulties will be faced when IMT is allocated in this band as found above for the 3400-4200 MHz band.

Noting that the resulting contours produced by these sharing studies enclose areas of considerable size, and given the considerable numbers of FSS Earth stations that operate in the C band around the world, IMT deployment in this band would not be feasible. As a result, this Administration proposes no change to the 3400-4200 MHz and 4500-4800 MHz frequency bands under this agenda item.

PROPOSAL:

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations

(See No. 2.1)

2 700-4 800 MHz

| Allocation to services | | |
|---|---|--|
| Region 1 | Region 2 | Region 3 |
| ***** | | |
| 3 400-3 600 FIXED FIXED-SATELLITE (space-to-Earth) Mobile 5.430A Radiolocation 5.431 | 3 400-3 500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.431A Radiolocation 5.433 5.282 | 3 400-3 500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432B Radiolocation 5.433 5.282 5.432 5.432A |
| | 3 500-3 700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 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 Radiolocation 5.435 |
| | 3 700-4 200 FIXED FIXED-SATELLITE (space to-Earth) MOBILE except aeronautical mobile | |
| ***** | | |
| 4 500-4 800 | FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE 5.440A | |

Reasons: Report ITU-R M.2109 and the studies performed by the JTG show that sharing between IMT and FSS in these frequency bands is not feasible.